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Supplementary text, tables, and figures for Zuza et al.

Tectonic evolution of the Qilian Shan: An early Paleozoic orogen reactivated in the Cenozoic

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- **Full-size versions of geologic maps (Figs. 8 and 9)**
- **Geochronology Expanded Methods**
- **Whole-rock Geochemistry**
- **Thermobarometry**
- **Metamorphic Basement Attitude Rotation**
- **Seismicity in northern Tibet and brittle-ductile transition**

(A)

38° 40' N

38° 30' N

38° 20' N

97° 30' E

98° 00' E

Geologic Map of the Shule Nan Shan, Central Qilian Shan

Geologic symbols

- Lithologic contact (dashed where inferred)
- Unconformity (dots on overlying strata)
- Bedding attitude
- Foliation attitude
- Thrust fault with dip (and striation attitude)
- Strike-slip fault
- Fault label
- Inferred and covered fault
- Anticline axial trace
- Syncline axial trace
- Glacier or permanent snowield
- River or drainage
- City

Shule Nan Shan

Shule River

Hara Lake

Haiyuan Fault

f1 f2 f3 f4 f5 f6 f6a

A A'

0 5 10 km

contour invertal = 250 m

N

Basemap: 1:200,000 Soviet Military Topographic Map

Projection: Gauss-Krasovskii based on Pulkovo 1942 datum Krasovskii spheroid

AZ16

Map units

- Q_{ax} Quaternary active axial river deposits
- Q_{aly} Quaternary active alluvial deposits
- Q_{alo} Quaternary inactive alluvial deposits
- N Neogene red fluvial and lacustrine clastic deposits
- J Jurassic conglomerate, coal-rich sandstone and siltstone
- T_3 Upper-Triassic
- T_2 Middle-Triassic
- T_1 Lower-Triassic
- Shallow marine and lacustrine deposits
- P Permian continental shelf silici-clastic and carbonate deposits
- C Carboniferous continental shelf and marginal marine deposits
- D Devonian fluvial and alluvial conglomerate
- O Ordovician sandstone, volcaniclastic siltstone, mélange, and arc rocks
- gr Granitoid
- sch Schist and marble

(B) Cross section across the Shule Nan Shan

Termination of Haiyuan fault (out-of-plane motion unconstrained)

Elevation (km)

Hara Lake

sch O(gr)

0 5 km

No vertical exaggeration

Minimum shortening strain: ~26.5%

Deformed length of Lower Triassic (T_1) strata: ~46 km

Minimum shortening of Lower Triassic strata (T_1): ~16.5 km

(C) Restored cross section

Minimum restored section length of Lower Triassic (T_1) strata: ~62.5 km

Termination of Haiyuan fault (out-of-plane motion unconstrained

Thickness (km)

Area balance predicts a detachment depth at ~7 km below the base of the Carboniferous strata

Itemized explanation (boxed numbers):

(1) Geometries of faults and folds under Hara Lake were constrained by projecting structural data along strike.

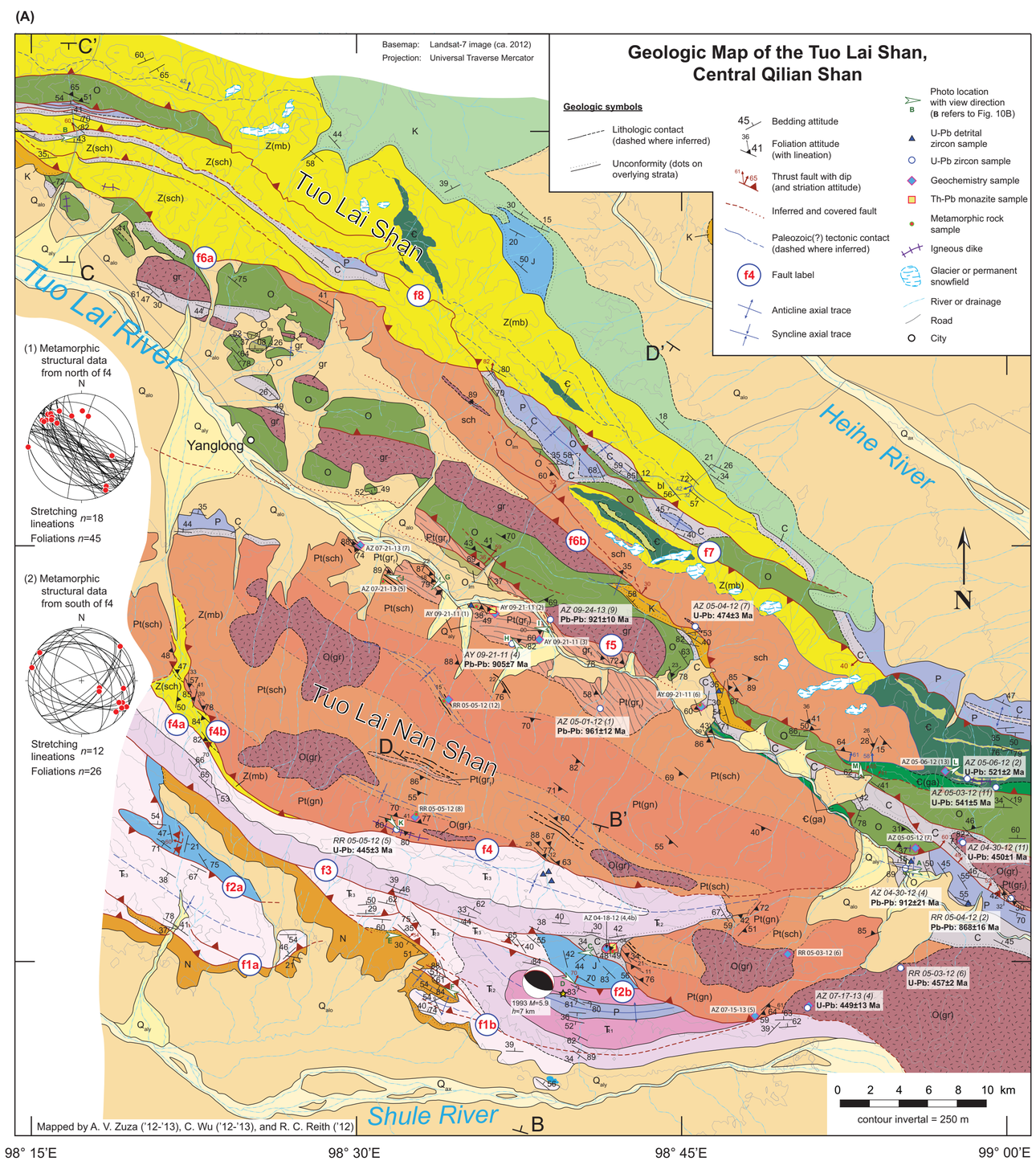
(2) Angle of hanging-wall flat determined from the angle of the overlying **P**-T_1 strata.

(3) The assumed Carboniferous strata pinch-out to the north is part of the regional buttress unconformity underlying the **C**-**P** strata.

(4) Minimum slip on the fault is restored due to eroded hanging-wall cutoff.

(5) Pinline placed through undeformed hanging-wall strata.

Figure DR1. Full-size version of Figure 8 in text. (A) Geologic map of the Shule Nan Shan and Hala Lake basin (for location, see Fig. 4) compiled from unpublished Chinese geologic maps, Gansu Geological Bureau (1989), Qinghai BGMR (1991), satellite-image analysis (e.g., Landsat 7 and 8, and Google Earth), and our own structural interpretations. The base map projection is from a 1:200,000 scale Soviet topographic map. (B) Cross section across the Shule Nan Shan area. (C) Restored cross section of the Shule Nan Shan area. See text for major cross-section assumptions and discussion, and see part A for cross-section line location.



Itemized explanation (boxed numbers):
(1) Fault 2b is interpreted to sole into Permian strata because this north-vergent thrust does not expose older/deeper rocks.
(2) Nature of unconformity between Paleozoic strata and **gn** is unconstrained. Current cross section model imples ~1-2 km topography at the start of **C-P**. Note that adjusting this initial condition does not significantly alter our shortening estimates.
(3) Overturned thrust currently displays **J** over T_3 relationship, but is interpreted to have been a **J** footwall flat and **P-**T_3 hanging-wall ramp. See field photograph in Figure 10D.
(4) Footwall syncline shows T_3 unconformably overlying **sch-gn**; the inferred absense of **C-P** strata is due to paleotopography of the basement rocks.
(5) Minimum fault slip restored due to erosion of the hanging-wall cutoff.
(6) Earthquake focal mechanism from 1993 M_w=5.9 event and preferred nodal plane of fault slip. Event position (focal depth) calculated by Chu et al. (2009).
(7) Pinline placed through undeformed footwall strata.

Itemized explanation (continued) (boxed numbers):
(8) Eroded unconformity inferred from map relationships.
(9) Minimum length of Carboniferous unconformity.
(10) The pre-Cenozoic geology at depth is poorly constrained, especially the relationship between **Z(mb)** and **O** strata.
(11) As drawn, this inferred contact implies that the Ordovician strata were deposited unconformably on Proterozoic basement and that the contact is intruded by a **O-S** pluton. This is supported by the absence of a major fault juxaposing the basement and Ordovician units. Pre-Cenozoic upwarping of contact reduces Cenozoic shortening magnitude.
(12) Pinline placed through inferred undeformed hanging-wall strata.

Itemized explanation (continued) (boxed numbers):
(13) Hanging-wall cutoffs of trailing imbricate fan thrust system are eroded, and cross section is constructed to minimize fault slip. Duplication of unconformity at the base of the Carboniferous strata constrains the number of fault splays.
(14) Pinline placed through undeformed footwall strata.

Figure DR2. Full-size version of Figure 9 in text. Figure 9. (A) Geologic map of the Tuo Lai Nan Shan and Tuo Lai Shan (for location, see Fig. 4) based on unpublished Chinese geologic maps, Qinghai BGMR (1991), and our own detailed mapping. The base map is a Landsat 7 satellite image that was acquired in 2012. Also plotted is a focal mechanism for a 1993 M_w = 5.9 earthquake that occurred in the Tuo Lai Nan Shan, as recalculated by Chu et al. (2009) from the Global Centroid Moment Tensor (CMT) catalogue. Stretching lineation and foliation measurements from the metamorphic basement rocks are plotted separately to the north and south of fault 4 (i.e., the fault labeled "f4"). (B) Unfolded structural data (i.e., foliation and lineation attitudes) from the metamorphic basement units that represent the pre-Carboniferous state. (C–E) Geologic cross sections across the Tuo Lai Shan and Tuo Lai Nan Shan in a deformed and restored states. Cross-section lines are presented in part A.

GEOCHRONOLOGY EXPANDED METHODS

U-Pb zircon geochronology of igneous rocks

Zircons grains were separated using standard crushing and density methods, including heavy liquid and magnetic separation, at UCLA and the Institute of Geomechanics, Chinese Academy of Geological Sciences (CAGS) in Beijing. Grains were mounted in 1" epoxy rounds along with zircon standards, and the mount was polished to 0.25 μm and coated with ~100 Å of gold using a sputter coater. Prior to analysis, zircon grains were observed by a cathodoluminescence (CL) detector on a JEOL SuperProbe scanning electron microscope (SEM) to document their internal structure and guide analysis locations (Fig. DR3).

U-Pb single shot analyses on zircon were acquired on two separate ion microprobe instruments, depending on the sample: analyses were performed either on the Sensitive High Resolution Ion Microprobe (SHRIMP)-II at the Beijing SHRIMP center, Institute of Geology, Chinese Academy of Geological Sciences (CAGS) in Beijing following the procedures of Williams (1998), or on a CAMECA IMS-270 secondary ion mass spectrometer (SIMS) at UCLA using the analytical procedures of Quidelleur et al. (1997). Each instrument used different zircon standards. The interelement fractionation between U, Th, and Pb during analysis were corrected by using a linear calibration curve of ^{206}Pb/U RSF (relative sensitivity factor) versus UO/U for the following zircon standards: TEM (zircon from the Middledale Gabbroic Diorite in eastern Australia: 416.75 ± 0.24Ma; Black et al., 2003) and AS3 (zircon from the Duluth Complex: 1099.1 ± 0.5 Ma; Paces and Miller, 1993; Schmitz et al., 2003) at CAGS and UCLA, respectively. The absolute concentrations of U, Th, and Pb were calibrated using the following zircon standards: SL 13 (Sri Lankan zircon: 572.1 ± 0.4 Ma; Claoué-Long et al., 1995) and Harvard 91500 (i.e., a Canadian zircon: 1065 Ma; Wiedenbeck et al., 1995) at CAGS and

UCLA, respectively. Analyses were made using an 8-15 nA O- primary beam focused to a spot of ~20 μm diameter. To enhance the secondary ionization of Pb+ and increase the measured Pb isotope intensity, the sample chamber was flooded with oxygen at a pressure of $\sim 3\times10^{-5}$ torr. The isotopic ratios were corrected for common Pb with a ^{204}Pb correction from the model of Stacey and Kramers (1975). Data was reduced and processed via the in-house ZIPS 3.0.4 program by Chris Coath. Concordia plots and ages were obtained using Isoplot/Ex 4.15 (Ludwig, 2003). Complete U-Pb isotopic data for zircon analyses are presented in Table DR1 and ^{207}Pb/^{235}U-^{206}Pb/^{238}U concordia diagrams are displayed in the main text (Fig. 11).

U-Pb detrital zircon geochronology

Minerals were separated at the Institute of the Hebei Regional Geology and Mineral Survey in Langfang, China. Crushed samples (to 60 mesh) were washed by water and alcohol, and magnetic and heavy minerals were removed by an electromagnetometer and liquids respectively. Zircon grains were randomly mounted in epoxy resin and polished to roughly one-third of the individual grain diameters. CL imaging was employed to investigate the internal texture of zircon, which in turn was used to select appropriate spots for dating.

Analyses of detrital zircons was conducted on an Agilent 7500a Q-ICP-MS with a 193 nm excimer ArF laser-ablation system at the Institute of Tibetan Plateau Research, Chinese Academy of Science. We followed analytical procedures similar to those outlined in Xie et al. (2008): the first 15 s with the laser-off mode were used to collect the background values, and the following 40 s with the laser-on mode were employed to measure the peak intensities of the ablated material. A 25 μm ablation pit was used on all grains. This study used zircon standards Plešovice (337 Ma; Slama et al., 2008) and glass reference material NIST SRM 612 (Pearce et

al., 1997). Isotopic data from analyses are presented in Table DR2 and $^{207}Pb/^{235}U$-$^{206}Pb/^{238}U$ concordia diagrams are displayed in Figure DR4.

Zircon Geochronology References:

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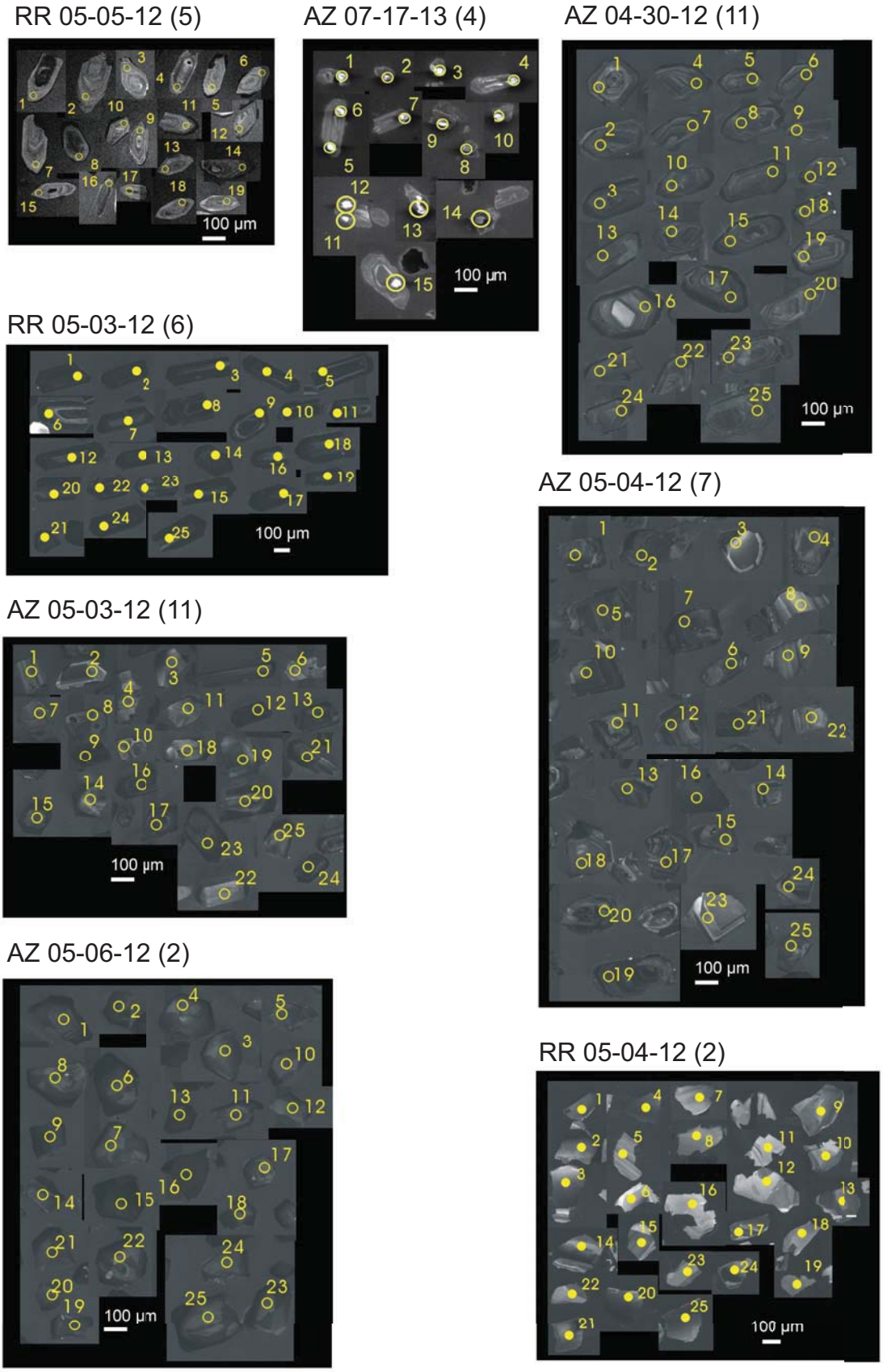

Figure DR3. Cathodoluminescence (CL) images of zircon and locations of U-Pb spot analyses.

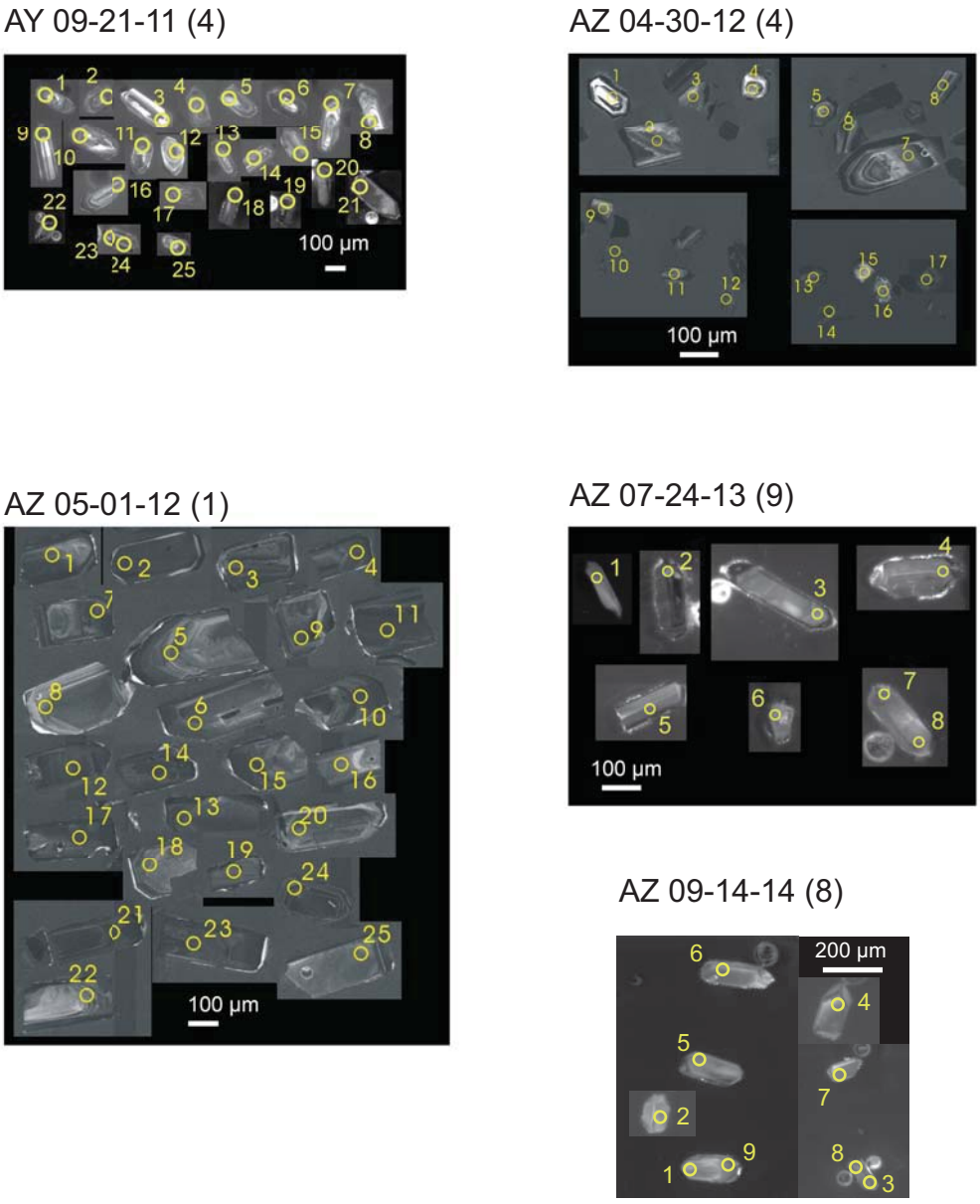

Figure DR3 (*continued*). Cathodoluminescence (CL) images of zircon and locations of U-Pb spot analyses.

Table DR1. U-Pb isotopic data for central Qilian Shan igneous samples

	Age							Isotopic ratios										
Spot	$^{206}Pb/^{238}U$	1 σ	$^{207}Pb/^{235}U$	1 σ	$^{207}Pb/^{206}Pb$	1 σ	$^{206}Pb^*$ (%)	$^{206}Pb^*/^{238}U$	1 σ	$^{207}Pb^*/^{235}U$	1 σ	$^{207}Pb^*/^{206}Pb^*$	1 σ	ρ[!]	Th/U	Conc.[#]	Exc.[$]	Remarks[%]
RR 05-05-12 (5), 38° 34.698' N 98° 31.760' E (4584 m)																		
(5)-5	435.1	7.7	436.5	8.3	463.8	123.9	99.7	0.070	0.0013	0.542	0.0319	0.056	0.0031	0.31	0.47	0.94		
(5)-6	437.9	7.4	439.6	8.0	374.8	55.1	99.7	0.070	0.0012	0.524	0.0158	0.054	0.0013	0.58	0.42	1.17		
(5)-10	438.7	6.9	440.0	7.4	445.3	77.6	99.6	0.070	0.0011	0.542	0.0209	0.056	0.0019	0.42	0.42	0.99		
(5)-8	441.4	7.1	440.4	7.5	534.8	36.8	100.0	0.071	0.0012	0.568	0.0134	0.058	0.0010	0.70	0.48	0.83		
(5)-12	441.9	7.0	443.6	7.3	382.7	69.4	99.1	0.071	0.0012	0.531	0.0186	0.054	0.0017	0.47	0.40	1.15		
(5)-16	443.9	7.5	444.2	7.8	428.9	54.8	99.5	0.071	0.0012	0.545	0.0164	0.055	0.0014	0.58	0.42	1.03		
(5)-11	445.8	6.8	445.1	7.2	494.2	30.0	100.0	0.072	0.0011	0.563	0.0117	0.057	0.0008	0.76	0.51	0.90		
(5)-1	445.8	7.4	447.8	7.9	418.7	82.4	100.0	0.072	0.0012	0.545	0.0222	0.055	0.0020	0.42	0.34	1.06		
(5)-14	446.8	6.8	449.6	7.4	403.2	42.4	100.0	0.072	0.0011	0.542	0.0133	0.055	0.0010	0.64	0.38	1.11		
(5)-19	447.0	7.2	448.3	7.7	382.6	88.5	99.5	0.072	0.0012	0.537	0.0230	0.054	0.0021	0.39	0.44	1.17		
(5)-2	447.7	7.2	450.1	7.7	407.3	52.6	100.0	0.072	0.0012	0.544	0.0157	0.055	0.0013	0.58	0.33	1.10		
(5)-15	448.1	7.3	451.7	7.7	282.5	108.7	99.8	0.072	0.0012	0.515	0.0260	0.052	0.0025	0.33	0.29	1.59		
(5)-18	448.2	6.9	449.8	7.4	426.5	45.9	99.5	0.072	0.0012	0.550	0.0143	0.055	0.0011	0.61	0.53	1.05		
(5)-9	448.3	7.0	448.2	7.4	508.3	39.1	99.8	0.072	0.0012	0.570	0.0137	0.057	0.0010	0.67	0.57	0.88		
(5)-4	448.3	7.1	449.2	7.7	441.0	52.2	99.4	0.072	0.0012	0.553	0.0158	0.056	0.0013	0.57	0.40	1.02		
(5)-13	450.0	8.5	452.6	9.3	390.9	88.7	99.9	0.072	0.0014	0.543	0.0239	0.054	0.0022	0.44	0.29	1.15		
(5)-7	451.9	7.9	450.0	8.6	487.4	61.9	97.0	0.073	0.0013	0.570	0.0190	0.057	0.0016	0.54	0.37	0.93		
(5)-17	519.6	8.7	522.2	9.1	501.9	177.3	99.7	0.084	0.0015	0.663	0.0546	0.057	0.0046	0.21	0.40	1.04	X	(4), (5)
(5)-3	643.4	10.0	438.2	25.3	3525.0	45.6	99.7	0.105	0.0017	4.498	0.1518	0.311	0.0092	0.48	0.39	0.18	X	(1)
Weighted mean age: 445 ± 3 Ma (n = 17); MSWD: 0.38																		
AZ 07-17-13 (4), 38° 28.546' N 98° 49.882' E (4290m)																		
(4)-1	475.8	23.7	462.2	19.3	394.9	17.8	99.9	0.077	0.0040	0.577	0.0300	0.055	0.0004	0.99	0.24	1.20		
(4)-2	485.3	28.3	478.5	23.5	446.3	40.9	98.1	0.078	0.0047	0.602	0.0370	0.056	0.0010	0.95	0.31	1.09		
(4)-3	360	20.5	355.1	60.5	322.9	423	82.6	0.057	0.0034	0.419	0.0846	0.053	0.0098	0.41	0.21	1.11	X	(2)
(4)-4	453.2	26.4	432	33.2	320.8	172	90.6	0.073	0.0044	0.530	0.0500	0.053	0.0040	0.60	1.68	1.41		
(4)-5	314.3	16.4	358.2	102	652.9	689	68.9	0.050	0.0027	0.423	0.1420	0.061	0.0197	0.36	0.28	0.48	X	(1), (2)
(4)-6	455.6	23	448.9	19.4	414.9	28.6	99.9	0.073	0.0038	0.556	0.0298	0.054	0.0024	0.97	0.30	1.10		
(4)-7	473	26.2	452.6	21	350	21.5	99.8	0.076	0.0044	0.562	0.0323	0.054	0.0005	0.99	0.20	1.35		
(4)-8	679.7	164	628.2	142	446.8	156	99.4	0.111	0.0282	0.857	0.2600	0.056	0.0039	0.98	0.28	1.52	X	(1),(3)
(4)-9	419.5	20	446.4	31.4	587.1	154	93.2	0.067	0.0033	0.552	0.0480	0.060	0.0042	0.58	0.37	0.71		
(4)-10	413.3	22.1	449.1	27.4	636.8	112	94.7	0.066	0.0037	0.556	0.0420	0.061	0.0032	0.72	0.21	0.65		
(4)-11	439.3	20.3	453.6	27	526.9	114	90.3	0.071	0.0034	0.563	0.0416	0.058	0.0030	0.71	0.70	0.83		

(4)-12	455	26.7	441.9	27.8	374.1	99.7	92.6	0.073	0.0044	0.545	0.0423	0.055	0.0007	0.82	0.30	1.22		
(4)-13	437.6	22.7	434	18.8	414.7	15.2	99.8	0.070	0.0038	0.533	0.0284	0.055	0.0004	0.99	0.11	1.06		
(4)-14	483.4	27.1	468.5	22.3	396	22.2	99.8	0.078	0.0045	0.586	0.0348	0.055	0.0005	0.99	0.99	1.22		
(4)-15	442.8	24	441.8	23.7	436.7	68.1	92.4	0.071	0.0040	0.545	0.0360	0.056	0.0017	0.89	1.45	1.01		
Weighted mean age: 449 ± 13 Ma (n = 12); MSWD: 0.99																		
AZ 04-30-12 (11), 38° 34.473' N 98° 58.035' E (3911 m)																		
(11a)-1	451.4	2.8	452.4	6.5	457.3	33.5	80.1	0.073	0.0004	0.561	0.0081	0.056	0.0008	0.43	0.63	0.99		
(11a)-2	450.5	2.9	450.6	5.1	451.0	28.3	80.2	0.072	0.0005	0.559	0.0063	0.056	0.0007	0.57	0.68	1.00		
(11a)-3	450.8	2.7	452.6	4.7	461.7	22.7	82.3	0.072	0.0004	0.562	0.0059	0.056	0.0006	0.57	0.56	0.98		
(11a)-4	450.1	2.6	448.5	4.3	440.0	20.9	81.0	0.072	0.0004	0.555	0.0053	0.056	0.0005	0.61	0.63	1.02		
(11a)-5	449.4	2.7	450.8	8.6	458.3	38.0	77.1	0.072	0.0004	0.559	0.0107	0.056	0.0010	0.31	0.74	0.98		
(11a)-6	448.5	2.7	447.4	8.9	441.7	40.3	79.7	0.072	0.0004	0.554	0.0110	0.056	0.0010	0.30	0.59	1.02		
(11a)-7	440.5	2.5	448.8	4.3	491.5	20.3	76.7	0.071	0.0004	0.556	0.0053	0.057	0.0005	0.60	1.11	0.90		High Th/U
(11a)-8	450.3	2.6	449.8	7.4	447.5	35.5	78.3	0.072	0.0004	0.557	0.0092	0.056	0.0009	0.35	0.68	1.01		
(11a)-9	450.5	2.6	454.3	6.3	473.4	29.6	76.5	0.072	0.0004	0.564	0.0079	0.057	0.0008	0.42	0.76	0.95		
(11a)-10	450.2	2.6	454.1	5.7	474.0	27.3	79.1	0.072	0.0004	0.564	0.0071	0.057	0.0007	0.46	0.62	0.95		
(11a)-11	450.7	2.6	450.9	5.7	452.0	27.1	79.2	0.072	0.0004	0.559	0.0071	0.056	0.0007	0.45	0.67	1.00		
(11a)-12	451.0	2.7	452.1	8.3	457.6	37.2	77.3	0.072	0.0004	0.561	0.0103	0.056	0.0009	0.32	0.73	0.99		
(11a)-13	449.5	2.6	447.3	5.6	435.5	27.3	76.4	0.072	0.0004	0.553	0.0069	0.056	0.0007	0.46	0.82	1.03		
(11a)-14	469.8	2.7	468.3	5.1	460.7	23.2	78.3	0.076	0.0004	0.586	0.0064	0.056	0.0006	0.53	0.74	1.02	X	(4)
(11a)-15	470.9	2.8	473.1	5.8	483.8	26.5	80.5	0.076	0.0004	0.594	0.0073	0.057	0.0007	0.48	0.67	0.97	X	(4)
(11a)-16	467.5	2.8	470.4	8.5	484.7	35.6	80.8	0.075	0.0005	0.589	0.0106	0.057	0.0009	0.34	0.54	0.96	X	(4)
(11a)-17	450.0	2.8	448.4	6.0	440.0	32.2	78.1	0.072	0.0004	0.555	0.0074	0.056	0.0008	0.46	0.66	1.02		
(11a)-18	470.3	2.8	470.4	7.6	471.3	32.1	77.5	0.076	0.0004	0.589	0.0095	0.056	0.0008	0.37	0.69	1.00	X	(4)
(11a)-19	497.0	3.2	578.3	12.7	911.9	39.2	91.6	0.080	0.0005	0.767	0.0169	0.069	0.0013	0.30	0.06	0.55	X	(1), (6)
(11a)-20	522.4	3.0	581.7	9.6	820.6	34.2	77.6	0.084	0.0005	0.773	0.0128	0.066	0.0011	0.35	0.76	0.64	X	(1)
(11a)-21	449.6	2.6	452.7	4.8	468.6	23.6	80.9	0.072	0.0004	0.562	0.0059	0.056	0.0006	0.55	0.58	0.96		
(11a)-22	451.4	2.7	452.1	4.6	455.4	22.2	79.1	0.073	0.0004	0.561	0.0057	0.056	0.0006	0.58	0.69	0.99		
(11a)-23	452.0	2.7	454.2	4.9	465.5	25.6	77.6	0.073	0.0004	0.564	0.0061	0.056	0.0007	0.56	0.59	0.97		
(11a)-24	451.6	2.6	447.6	7.4	427.3	35.7	78.3	0.073	0.0004	0.554	0.0091	0.055	0.0009	0.35	0.63	1.06		
(11a)-25	451.0	2.7	453.6	6.5	467.0	28.7	78.4	0.072	0.0004	0.563	0.0081	0.056	0.0007	0.41	0.65	0.97		
Weighted mean age: 450 ± 1 Ma (n = 19); MSWD: 0.92																		
RR 05-03-12 (6) , 38° 29.415' N 98° 54.218' E (3982 m)																		
(6a)-1	472.6	2.7	486.6	4.6	552.8	19.9	84.2	0.076	0.0004	0.615	0.0059	0.059	0.0005	0.59	0.48	0.86	X	(1), (4)
(6a)-2	458.7	7.5	464.8	10.1	494.7	25.9	84.5	0.074	0.0012	0.580	0.0126	0.057	0.0007	0.75	0.43	0.93		
(6a)-3	457.0	4.3	463.4	9.5	494.9	30.8	80.8	0.073	0.0007	0.578	0.0119	0.057	0.0008	0.46	0.54	0.92		
(6a)-4	457.4	2.7	461.1	6.0	479.6	26.7	72.9	0.074	0.0004	0.575	0.0075	0.057	0.0007	0.44	1.16	0.95		

(6a)-5	454.0	2.6	458.5	5.3	481.4	25.2	79.0	0.073	0.0004	0.571	0.0066	0.057	0.0006	0.49	0.65	0.94		
(6a)-6	464.6	2.9	471.5	5.1	505.1	21.9	67.5	0.075	0.0005	0.591	0.0064	0.057	0.0006	0.57	1.38	0.92		(7)
(6a)-7	452.6	2.8	460.5	7.6	500.0	31.1	80.3	0.073	0.0005	0.574	0.0095	0.057	0.0008	0.38	0.55	0.91		
(6a)-8	486.2	3.0	491.1	4.3	514.3	17.8	83.1	0.078	0.0005	0.622	0.0055	0.058	0.0005	0.70	0.58	0.95	X	(4)
(6a)-9	451.5	2.8	456.3	4.2	480.4	19.7	76.7	0.073	0.0005	0.567	0.0052	0.057	0.0005	0.68	0.89	0.94		
(6a)-10	457.3	3.5	463.6	6.7	494.8	24.0	73.2	0.074	0.0006	0.579	0.0083	0.057	0.0006	0.53	1.03	0.92		(7)
(6a)-11	456.7	2.8	468.4	4.7	526.0	19.5	77.9	0.073	0.0005	0.586	0.0058	0.058	0.0005	0.62	0.62	0.87		
(6a)-12	504.4	3.8	510.1	12.9	535.4	42.1	74.7	0.081	0.0006	0.653	0.0165	0.058	0.0011	0.29	0.96	0.94	X	(4)
(6a)-13	453.6	2.7	464.1	4.3	516.5	21.1	70.2	0.073	0.0004	0.579	0.0054	0.058	0.0006	0.64	1.37	0.88		(7)
(6a)-14	463.3	3.0	469.7	4.1	501.5	16.4	74.7	0.075	0.0005	0.588	0.0051	0.057	0.0004	0.74	1.00	0.92		
(6a)-15	465.3	3.2	473.8	6.7	515.3	22.6	83.8	0.075	0.0005	0.595	0.0083	0.058	0.0006	0.49	0.45	0.90		
(6a)-16	455.6	2.8	460.5	5.0	485.1	20.7	79.5	0.073	0.0005	0.574	0.0062	0.057	0.0005	0.58	0.73	0.94		
(6a)-17	454.1	3.1	460.3	4.6	491.4	24.3	93.6	0.073	0.0005	0.574	0.0057	0.057	0.0006	0.69	0.32	0.92		
(6a)-18	451.8	2.6	457.0	5.1	482.7	23.5	75.9	0.073	0.0004	0.568	0.0063	0.057	0.0006	0.52	0.84	0.94		
(6a)-19	452.6	2.7	457.1	5.7	479.8	29.9	79.7	0.073	0.0004	0.569	0.0071	0.057	0.0008	0.48	0.66	0.94		
(6a)-20	462.8	2.6	469.9	4.2	504.9	18.5	93.0	0.074	0.0004	0.588	0.0052	0.057	0.0005	0.64	0.06	0.92		
(6a)-21	461.9	2.8	467.9	4.0	497.5	17.4	77.1	0.074	0.0004	0.585	0.0051	0.057	0.0005	0.69	0.86	0.93		
(6a)-22	461.7	2.7	469.4	4.3	507.5	17.6	87.2	0.074	0.0004	0.588	0.0054	0.057	0.0005	0.65	0.33	0.91		
(6a)-23	455.8	2.7	464.8	8.4	509.4	40.7	79.0	0.073	0.0004	0.581	0.0105	0.057	0.0011	0.33	0.78	0.89		
(6a)-24	443.4	3.2	451.4	13.6	492.5	56.8	84.0	0.071	0.0005	0.560	0.0168	0.057	0.0015	0.24	0.47	0.90		
(6a)-25	465.4	2.8	468.7	4.9	485.2	19.6	79.5	0.075	0.0004	0.587	0.0061	0.057	0.0005	0.57	0.56	0.96		
Weighted mean age: 457 ± 2 Ma (n = 22); MSWD: 3.5																		
AZ 09-14-14 (8), 37° 37.658' N 101° 49.904' E (3198 m)																		
(8)-1	461.1	17.7	454.6	17.5	421.8	48.4	100	0.0742	0.0030	0.5647	0.0269	0.055	0.0012	0.89	0.88	1.09		
(8)-2	465.8	19.2	459.3	25	426.5	92.8	99.8	0.0749	0.0032	0.5719	0.0387	0.055	0.0023	0.81	0.6	1.09		
(8)-3	580.4	20.2	865.9	21.3	1690	18.3	100	0.0942	0.0034	1.346	0.0491	0.104	0.0010	0.96	0.47	0.34		(1)
(8)-4	457.8	19	457.6	24.3	456.9	126	99.6	0.0736	0.0032	0.5694	0.0376	0.056	0.0032	0.53	0.89	1.00		
(8)-5	437.7	15.9	450.2	17.6	514.2	60.4	99.9	0.0703	0.0026	0.5579	0.0270	0.058	0.0016	0.82	0.5	0.85		
(8)-6	452	15.4	416.3	30.3	223	182	99.4	0.0726	0.0026	0.5068	0.0450	0.051	0.0040	0.47	0.56	2.03		(1)
(8)-7	507.7	21.2	492.6	19	423	55.6	99.9	0.0819	0.0036	0.6244	0.0304	0.055	0.0014	0.86	0.81	1.20		(1)
(8)-8	503.6	22.1	506	20.7	516.7	46.2	100	0.0813	0.0037	0.646	0.0335	0.058	0.0012	0.91	0.54	0.97		
(8)-9	499.1	26.7	490.4	18.2	449.9	59.6	99.9	0.0805	0.0045	0.6209	0.0291	0.056	0.0015	0.88	0.93	1.11		
Weighted mean age: 462 ± 14 Ma (n = 7); MSWD: 1.2																		
AZ 05-04-12 (7), 38° 41.752' N 98° 45.627' E (3850 m)																		
(7)-1	470.2	2.8	467.9	6.9	456.5	30.7	81.8	0.076	0.0005	0.585	0.0086	0.056	0.0008	0.40	0.59	1.03		
(7)-2	471.4	2.9	470.9	7.9	468.6	31.6	83.5	0.076	0.0005	0.590	0.0098	0.056	0.0008	0.37	0.43	1.01		
(7)-3	471.1	2.9	475.4	8.9	496.3	40.1	76.0	0.076	0.0005	0.597	0.0112	0.057	0.0010	0.33	0.82	0.95		

(7)-4	472.5	2.7	472.1	5.2	470.2	23.8	88.4	0.076	0.0004	0.592	0.0066	0.056	0.0006	0.52	0.24	1.00		
(7)-5	490.1	2.9	488.0	5.0	478.1	23.2	72.7	0.079	0.0005	0.617	0.0063	0.057	0.0006	0.58	1.01	1.03	X	(4), (7)
(7)-6	471.0	2.9	472.3	4.3	478.2	19.6	75.4	0.076	0.0005	0.592	0.0054	0.057	0.0005	0.67	0.99	0.98		
(7)-7	471.0	3.0	473.8	4.3	487.3	20.4	79.1	0.076	0.0005	0.595	0.0054	0.057	0.0005	0.70	0.69	0.97		
(7)-8	419.7	2.9	422.4	13.1	436.9	62.7	74.9	0.067	0.0005	0.516	0.0160	0.056	0.0016	0.22	0.78	0.96	X	(8)
(7)-9	470.7	2.8	468.9	6.8	460.1	32.5	74.9	0.076	0.0004	0.587	0.0085	0.056	0.0008	0.41	0.89	1.02		
(7)-10	470.4	2.8	467.7	8.0	454.8	34.9	73.0	0.076	0.0005	0.585	0.0100	0.056	0.0009	0.35	1.03	1.03		
(7)-11	470.2	2.8	474.1	5.9	493.1	26.7	86.7	0.076	0.0004	0.595	0.0074	0.057	0.0007	0.47	0.32	0.95		
(7)-12	469.6	2.8	471.1	4.3	478.7	20.4	72.7	0.076	0.0004	0.590	0.0054	0.057	0.0005	0.64	1.12	0.98		(7)
(7)-13	473.0	2.8	471.4	4.7	463.3	22.1	79.6	0.076	0.0004	0.591	0.0059	0.056	0.0006	0.58	0.71	1.02		
(7)-14	480.3	2.8	484.4	4.9	503.6	22.1	80.5	0.077	0.0005	0.611	0.0062	0.057	0.0006	0.58	0.66	0.95		
(7)-15	480.8	2.9	483.0	4.5	493.3	19.7	85.1	0.077	0.0005	0.609	0.0057	0.057	0.0005	0.64	0.43	0.97		
(7)-16	483.1	2.8	480.3	4.8	467.3	20.8	77.8	0.078	0.0005	0.605	0.0060	0.056	0.0005	0.59	0.85	1.03		
(7)-17	501.5	3.1	507.0	6.3	531.7	23.5	77.1	0.081	0.0005	0.648	0.0081	0.058	0.0006	0.50	0.77	0.94	X	(4)
(7)-18	483.2	2.8	477.9	4.7	452.9	21.2	79.6	0.078	0.0005	0.601	0.0059	0.056	0.0005	0.59	0.68	1.07		
(7)-19	472.0	2.9	475.9	4.3	495.1	19.1	92.7	0.076	0.0005	0.598	0.0054	0.057	0.0005	0.69	0.06	0.95		
(7)-20	416.2	3.7	421.5	5.0	450.7	20.7	85.8	0.067	0.0006	0.515	0.0061	0.056	0.0005	0.74	0.38	0.92	X	(8)
(7)-21	510.6	3.4	514.6	4.9	532.2	19.7	80.2	0.082	0.0006	0.660	0.0062	0.058	0.0005	0.71	0.63	0.96	X	(4)
(7)-22	481.3	3.0	482.1	7.5	485.9	33.1	78.2	0.078	0.0005	0.608	0.0094	0.057	0.0009	0.40	0.70	0.99		
(7)-23	480.7	2.9	474.9	7.0	446.8	31.9	76.9	0.077	0.0005	0.596	0.0088	0.056	0.0008	0.41	0.76	1.08		
(7)-24	490.5	3.0	490.7	5.2	491.8	22.1	66.6	0.079	0.0005	0.621	0.0066	0.057	0.0006	0.57	1.40	1.00	X	(4), (7)
(7)-25	471.1	2.8	470.5	4.3	467.4	19.6	71.3	0.076	0.0004	0.589	0.0054	0.056	0.0005	0.64	1.09	1.01		(7)
Weighted mean age: 474 ± 3 Ma (n=19); MSWD: 3.2																		
AZ 05-06-12 (2), 38° 36.800' N 98° 58.482' E (4509 m)																		
(6)-1	529.4	3.2	530.2	5.9	533.6	23.0	80.7	0.086	0.0005	0.686	0.0076	0.058	0.0006	0.72	0.73	0.99		
(6)-2	525.1	3.0	517.1	5.9	481.8	24.0	81.7	0.085	0.0005	0.664	0.0076	0.057	0.0006	0.40	0.68	1.09		
(6)-3	518.1	3.1	518.8	4.9	521.9	18.9	79.1	0.084	0.0005	0.667	0.0063	0.058	0.0005	0.59	0.90	0.99		
(6)-4	520.8	3.2	519.8	5.2	515.7	20.2	82.0	0.084	0.0005	0.669	0.0067	0.058	0.0005	0.57	0.72	1.01		
(6)-5	520.1	3.0	518.2	5.4	509.7	22.2	79.1	0.084	0.0005	0.666	0.0070	0.057	0.0006	0.72	0.92	1.02		
(6)-6	533.4	3.3	526.3	7.8	495.3	28.2	84.3	0.086	0.0005	0.679	0.0101	0.057	0.0007	0.43	0.59	1.08		
(6)-7	565.8	3.3	567.3	6.3	573.0	23.7	81.4	0.092	0.0005	0.748	0.0084	0.059	0.0006	0.84	0.69	0.99	X	(4)
(6)-8	549.7	3.7	550.1	8.1	552.2	29.0	82.3	0.089	0.0006	0.719	0.0105	0.059	0.0008	0.60	0.71	1.00	X	(4)
(6)-9	543.3	3.3	539.7	6.2	524.3	21.7	81.0	0.088	0.0005	0.702	0.0081	0.058	0.0006	0.71	0.81	1.04	X	(4)
(6)-10	542.0	3.2	543.6	6.4	550.7	24.6	80.9	0.088	0.0005	0.708	0.0083	0.059	0.0007	0.59	0.79	0.98	X	(4)
(6)-11	510.8	3.0	507.5	4.8	492.6	20.2	80.1	0.082	0.0005	0.648	0.0061	0.057	0.0005	0.81	0.85	1.04		
(6)-12	519.5	3.1	520.5	4.8	524.7	19.1	81.3	0.084	0.0005	0.670	0.0061	0.058	0.0005	0.43	0.74	0.99		
(6)-13	522.7	3.1	516.2	4.5	487.5	17.1	78.7	0.084	0.0005	0.663	0.0057	0.057	0.0004	0.72	0.86	1.07		
(6)-14	520.1	3.2	523.8	4.9	540.1	19.0	81.7	0.084	0.0005	0.675	0.0064	0.058	0.0005	0.69	0.55	0.96		

(6)-15	519.7	3.0	520.1	4.5	521.6	18.0	79.9	0.084	0.0005	0.669	0.0058	0.058	0.0005	0.51	0.65	1.00		
(6)-16	521.0	3.1	517.5	4.5	502.0	17.7	76.5	0.084	0.0005	0.665	0.0057	0.057	0.0005	0.81	0.83	1.04		
(6)-17	520.0	3.1	520.2	5.3	521.5	21.1	77.6	0.084	0.0005	0.669	0.0069	0.058	0.0006	0.67	0.71	1.00		
(6)-18	522.3	3.1	520.0	4.9	509.6	19.0	78.4	0.084	0.0005	0.669	0.0062	0.057	0.0005	0.60	0.67	1.02		
(6)-19	519.9	3.1	522.9	4.8	536.0	18.2	92.6	0.084	0.0005	0.674	0.0062	0.058	0.0005	0.60	0.06	0.97		(6)
(6)-20	520.3	3.1	519.3	6.2	515.0	25.6	77.2	0.084	0.0005	0.668	0.0080	0.058	0.0007	0.52	0.64	1.01		
(6)-21	522.5	3.1	522.9	4.5	524.7	17.6	80.8	0.084	0.0005	0.674	0.0058	0.058	0.0005	0.74	0.52	1.00		
(6)-22	539.2	3.2	537.3	4.9	529.0	18.4	77.3	0.087	0.0005	0.697	0.0064	0.058	0.0005	0.76	0.63	1.02	X	(4)
(6)-23	520.8	3.1	520.0	5.1	516.5	19.9	78.4	0.084	0.0005	0.669	0.0065	0.058	0.0005	0.61	0.55	1.01		
(6)-24	520.9	3.1	522.3	5.4	528.3	21.6	78.3	0.084	0.0005	0.673	0.0070	0.058	0.0006	0.88	0.59	0.99		
(6)-25	520.5	3.2	521.1	6.3	523.5	24.6	78.6	0.084	0.0005	0.671	0.0081	0.058	0.0006	0.38	0.59	0.99		

Weighted mean age: 521 ± 2 Ma (n = 20); MSWD: 1.3

AZ 05-03-12 (11), 38° 36.640' N 98° 59.398' E (4442 m)

(11)-1	1587.7	9.7	1724.2	14.5	1894.2	13.8	70.0	0.279	0.0017	4.464	0.0376	0.116	0.0009	0.72	1.24	0.84	X	(1)
(11)-2	115.8	0.7	141.8	2.2	601.2	32.9	80.1	0.018	0.0001	0.150	0.0023	0.060	0.0009	0.40	0.65	0.19	X	(1)
(11)-3	551.3	3.5	552.0	5.9	555.0	22.5	83.9	0.089	0.0006	0.722	0.0078	0.059	0.0006	0.59	0.54	0.99		
(11)-4	501.3	2.9	501.3	5.2	501.7	22.1	78.9	0.081	0.0005	0.638	0.0066	0.057	0.0006	0.57	0.87	1.00	X	(8)
(11)-5	551.9	3.4	551.6	4.8	550.4	18.5	83.6	0.089	0.0006	0.722	0.0062	0.059	0.0005	0.72	0.78	1.00		
(11)-6	550.4	3.3	846.8	11.8	1731.5	23.3	73.4	0.089	0.0005	1.303	0.0181	0.106	0.0013	0.43	0.75	0.32	X	(1)
(11)-7	1585.9	13.2	2033.5	20.1	2524.3	12.3	74.1	0.279	0.0023	6.409	0.0634	0.167	0.0012	0.84	1.58	0.63	X	(1)
(11)-8	517.2	3.1	516.8	5.1	515.1	20.1	80.0	0.084	0.0005	0.664	0.0066	0.058	0.0005	0.60	1.02	1.00	X	(8)
(11)-9	528.6	3.1	531.0	4.4	541.5	16.6	82.1	0.085	0.0005	0.687	0.0057	0.058	0.0004	0.71	0.86	0.98		
(11)-10	530.6	3.7	527.6	6.2	514.9	23.6	78.6	0.086	0.0006	0.681	0.0080	0.058	0.0006	0.59	1.11	1.03		
(11)-11	1721.1	18.3	1884.8	24.6	2070.2	15.4	70.1	0.306	0.0033	5.400	0.0706	0.128	0.0011	0.81	1.72	0.83	X	(1), (4)
(11)-12	529.2	4.4	532.2	10.3	545.2	28.5	75.5	0.086	0.0007	0.689	0.0134	0.058	0.0008	0.43	1.16	0.97		
(11)-13	529.8	3.1	528.8	4.3	524.4	16.5	80.1	0.086	0.0005	0.683	0.0055	0.058	0.0004	0.72	0.81	1.01		
(11)-14	572.5	3.9	574.7	5.7	583.5	16.8	88.3	0.093	0.0006	0.761	0.0075	0.059	0.0005	0.69	0.26	0.98	X	(4)
(11)-15	549.7	3.2	548.6	6.3	544.2	23.8	79.2	0.089	0.0005	0.717	0.0082	0.058	0.0006	0.51	0.54	1.01		
(11)-16	511.1	3.9	509.1	4.8	499.9	16.6	80.3	0.083	0.0006	0.651	0.0062	0.057	0.0004	0.81	0.71	1.02	X	(8)
(11)-17	553.0	3.3	547.3	4.8	523.9	17.8	83.3	0.090	0.0005	0.714	0.0063	0.058	0.0005	0.67	0.46	1.06		
(11)-18	531.7	3.9	529.5	6.5	519.8	21.0	77.7	0.086	0.0006	0.684	0.0083	0.058	0.0006	0.60	0.74	1.02		
(11)-19	532.6	3.1	532.8	5.2	533.7	20.7	92.6	0.086	0.0005	0.690	0.0067	0.058	0.0005	0.60	0.06	1.00		(6)
(11)-20	551.0	3.3	546.8	6.2	529.1	23.4	76.8	0.089	0.0005	0.713	0.0081	0.058	0.0006	0.52	0.67	1.04		
(11)-21	529.6	3.3	528.2	4.4	522.4	16.3	75.2	0.086	0.0005	0.682	0.0057	0.058	0.0004	0.74	0.91	1.01		
(11)-22	1670.5	10.1	1682.3	13.3	1696.9	13.1	71.0	0.296	0.0018	4.242	0.0336	0.104	0.0007	0.76	1.10	0.98	X	(7), (4)
(11)-23	551.5	3.6	552.8	5.9	558.2	19.4	82.5	0.089	0.0006	0.724	0.0077	0.059	0.0005	0.61	0.46	0.99		
(11)-24	549.0	6.5	546.9	7.3	538.2	17.6	83.7	0.089	0.0010	0.714	0.0095	0.058	0.0005	0.88	0.66	1.02		
(11)-25	553.1	3.3	549.4	8.7	534.4	32.9	81.5	0.090	0.0005	0.718	0.0113	0.058	0.0009	0.38	0.74	1.03		

Weighted mean age: 541 ± 6 Ma (n = 15); MSWD: 10.1

RR 05-04-12 (2) , 38° 32.708' N 99° 00.082' E (4060 m)

(1a)-1	832.8	4.7	845.1	12.1	877.8	29.1	79.5	0.138	0.0008	1.299	0.0186	0.068	0.0010	0.40	0.51	0.95		
(1a)-2	807.9	4.7	828.5	10.9	884.3	27.6	79.6	0.134	0.0008	1.261	0.0166	0.069	0.0009	0.44	0.54	0.91		
(1a)-3	835.3	4.7	840.5	10.4	854.3	25.1	78.2	0.138	0.0008	1.288	0.0159	0.068	0.0008	0.46	0.59	0.98		
(1a)-4	843.8	4.7	863.3	9.3	913.8	21.4	78.3	0.140	0.0008	1.340	0.0145	0.070	0.0007	0.52	0.57	0.92		
(1a)-5	764.5	5.3	774.2	26.8	802.2	62.4	83.8	0.126	0.0009	1.144	0.0396	0.066	0.0020	0.20	0.40	0.95		
(1a)-6	829.6	5.7	832.4	35.5	840.1	80.6	79.9	0.137	0.0009	1.270	0.0541	0.067	0.0026	0.16	0.37	0.99		
(1a)-7	883.8	6.1	892.1	35.7	912.4	72.7	76.0	0.147	0.0010	1.407	0.0564	0.069	0.0025	0.17	0.46	0.97		
(1a)-8	859.7	6.4	886.5	43.7	953.8	85.8	74.0	0.143	0.0011	1.394	0.0687	0.071	0.0030	0.15	0.62	0.90		
(1a)-9	654.8	5.9	669.6	42.4	719.9	128.4	74.6	0.107	0.0010	0.934	0.0592	0.063	0.0038	0.14	0.04	0.91	X	(6), (8)
(1a)-10	823.9	7.2	829.0	35.3	842.8	73.6	78.0	0.136	0.0012	1.262	0.0538	0.067	0.0024	0.21	0.50	0.98		
(1a)-11	1074.1	26.4	1106.2	198.9	1169.8	515.4	55.1	0.181	0.0045	1.972	0.3546	0.079	0.0205	0.14	0.29	0.92	X	(4)
(1a)-12	915.4	8.9	926.7	77.4	953.9	167.5	76.4	0.153	0.0015	1.491	0.1246	0.071	0.0058	0.12	0.34	0.96		
(1a)-13	995.4	10.0	1010.8	43.4	1044.4	77.6	76.2	0.167	0.0017	1.706	0.0732	0.074	0.0028	0.23	0.52	0.95	X	(4)
(1a)-14	1029.8	8.4	1074.1	23.1	1165.2	38.6	71.4	0.173	0.0014	1.880	0.0405	0.079	0.0015	0.38	0.68	0.88	X	(4)
(1a)-15	1203.9	18.8	1247.3	94.5	1323.2	136.6	67.2	0.205	0.0032	2.416	0.1829	0.085	0.0060	0.21	0.43	0.91	X	(4)
(1a)-16	1074.1	23.2	1100.6	61.2	1153.4	108.8	70.2	0.181	0.0039	1.956	0.1088	0.078	0.0043	0.39	0.31	0.93	X	(4)
(1a)-17	797.0	4.5	814.3	10.6	862.1	26.6	86.7	0.132	0.0007	1.230	0.0160	0.068	0.0009	0.43	0.32	0.92		
(1a)-18	776.5	4.7	787.3	29.3	818.1	77.3	85.6	0.128	0.0008	1.171	0.0437	0.066	0.0025	0.16	0.34	0.95		
(1a)-19	792.1	4.6	802.4	15.1	831.2	38.3	81.5	0.131	0.0008	1.204	0.0227	0.067	0.0012	0.31	0.57	0.95		
(1a)-20	813.7	4.7	820.4	8.7	838.7	20.8	92.1	0.135	0.0008	1.243	0.0132	0.067	0.0007	0.55	0.06	0.97		(6)
(1a)-21	748.8	4.3	768.3	16.1	825.5	42.7	84.6	0.123	0.0007	1.131	0.0237	0.067	0.0014	0.27	0.40	0.91		
(1a)-22	805.8	4.8	827.8	21.9	887.1	54.1	86.3	0.133	0.0008	1.260	0.0334	0.069	0.0018	0.22	0.31	0.91		
(1a)-23	802.4	4.7	821.1	20.9	872.1	51.7	81.2	0.133	0.0008	1.245	0.0317	0.068	0.0017	0.23	0.58	0.92		
(1a)-24	800.9	4.8	819.3	10.8	869.7	26.7	81.6	0.132	0.0008	1.241	0.0164	0.068	0.0009	0.45	0.56	0.92		
(1a)-25	882.6	6.7	902.2	40.1	950.5	71.2	78.1	0.147	0.0011	1.432	0.0636	0.071	0.0025	0.17	0.58	0.93		

Weighted mean Pb-Pb age: 868 ± 16 Ma (n = 19); MSWD: 0.79

AY 09-21-11 (4), 38° 41.418' N 98° 37.762' E (3624 m)

(4)-1	974.0	80.8	956.1	56.0	915.0	17.1	100.0	0.163	0.0146	1.564	0.1410	0.070	0.0006	1.00	0.40	1.06
(4)-2	882.4	54.6	886.3	41.9	896.0	27.1	99.9	0.147	0.0097	1.394	0.0988	0.069	0.0009	0.98	0.39	0.98
(4)-3	855.8	49.6	873.1	36.7	917.4	33.1	99.9	0.142	0.0088	1.363	0.0854	0.070	0.0011	0.97	0.39	0.93
(4)-4	903.0	60.7	895.1	44.7	875.8	25.2	99.9	0.150	0.0108	1.415	0.1060	0.068	0.0008	0.99	0.29	1.03
(4)-5	902.7	46.7	892.4	33.0	867.1	20.2	99.8	0.150	0.0083	1.408	0.0782	0.068	0.0007	0.98	0.49	1.04
(4)-6	956.2	57.8	947.2	39.2	926.4	18.6	100.0	0.160	0.0104	1.542	0.0982	0.070	0.0006	0.99	0.37	1.03
(4)-7	888.6	53.4	903.7	39.3	940.9	17.2	100.0	0.148	0.0095	1.435	0.0943	0.070	0.0006	0.99	0.40	0.94
(4)-8	906.2	63.4	918.4	43.2	947.8	32.1	100.0	0.151	0.0113	1.471	0.1050	0.071	0.0011	0.98	0.37	0.96

(4)-9	989.1	69.4	948.5	47.2	855.5	33.9	99.8	0.166	0.0125	1.545	0.1180	0.068	0.0011	0.98	0.38	1.16		
(4)-10	917.0	46.8	909.1	33.5	889.9	20.5	100.0	0.153	0.0084	1.448	0.0807	0.069	0.0007	0.98	0.34	1.03		
(4)-11	956.7	61.0	935.0	41.5	884.3	18.0	100.0	0.160	0.0110	1.511	0.1030	0.069	0.0006	0.99	0.36	1.08		
(4)-12	1085.0	96.4	1037.0	62.4	937.9	31.1	99.9	0.183	0.0177	1.777	0.1710	0.070	0.0011	0.99	0.72	1.16		
(4)-13	894.7	58.5	901.9	41.8	919.4	25.4	100.0	0.149	0.0104	1.431	0.1000	0.070	0.0009	0.98	0.17	0.97		
(4)-14	966.0	59.8	953.6	42.0	925.1	14.7	100.0	0.162	0.0108	1.558	0.1060	0.070	0.0005	0.99	0.32	1.04		
(4)-15	950.6	51.8	941.6	35.9	920.8	13.2	100.0	0.159	0.0093	1.528	0.0895	0.070	0.0004	0.99	0.30	1.03		
(4)-16	993.9	61.9	974.3	41.1	930.3	21.9	100.0	0.167	0.0112	1.610	0.1060	0.070	0.0007	0.99	0.58	1.07		
(4)-17	962.0	55.4	944.4	38.5	903.8	16.0	99.9	0.161	0.0100	1.535	0.0960	0.069	0.0005	0.99	0.44	1.06		
(4)-18	895.7	65.0	794.5	57.2	520.2	140.0	98	0.149	0.0116	1.187	0.1230	0.058	0.0037	0.79	0.01	1.72	X	(1)
(4)-19	1022.0	51.6	984.4	39.0	901.4	34.2	100	0.172	0.0094	1.637	0.1010	0.069	0.0012	0.97	0.30	1.13		
(4)-20	1007.0	37.7	980.6	24.6	920.9	16.9	99.9	0.169	0.0068	1.627	0.0638	0.070	0.0006	0.98	0.19	1.09		
(4)-21	934.1	39.4	925.2	30.3	903.9	19.5	100	0.156	0.0071	1.487	0.0743	0.069	0.0007	0.99	0.35	1.03		
(4)-22	1014.0	55.1	982.4	37.9	913.3	21.5	100	0.170	0.0100	1.631	0.0982	0.069	0.0007	0.98	0.46	1.11		
(4)-23	964.9	49.1	941.8	34.8	888.1	15.1	99.8	0.162	0.0088	1.528	0.0868	0.069	0.0005	0.99	0.15	1.09		
(4)-24	803.9	28.7	828.8	23.1	896.1	16.2	99.9	0.133	0.0050	1.262	0.0516	0.069	0.0005	0.98	0.23	0.90		
(4)-25	930.8	37.2	918.6	26.2	889.3	8.8	99.9	0.155	0.0067	1.471	0.0638	0.069	0.0003	1.00	0.17	1.05		
Weighted mean Pb-Pb age: 905 ± 7 Ma (n = 24); MSWD: 1.3																		
AZ 04-30-12 (4) , 38° 33.522' N 98° 55.447' E (3778 m)																		
(4a)-1	38.2	0.2	39.9	0.9	148.1	51.8	66.6	0.006	0.0000	0.040	0.0009	0.049	0.0011	0.26	1.65	0.26	X	(1)
(4a)-2	909.5	5.9	909.6	7.2	909.8	15.0	78.7	0.152	0.0010	1.449	0.0115	0.069	0.0005	0.81	0.70	1.00		
(4a)-3	909.8	5.3	911.8	8.4	916.7	18.6	82.3	0.152	0.0009	1.455	0.0135	0.070	0.0006	0.62	0.53	0.99		
(4a)-4	658.0	3.8	783.8	11.5	1160.8	25.5	73.2	0.107	0.0006	1.164	0.0171	0.079	0.0010	0.40	1.04	0.57	X	(1)
(4a)-5	472.5	2.9	712.6	21.8	1567.7	51.2	69.7	0.076	0.0005	1.017	0.0312	0.097	0.0027	0.20	0.92	0.30	X	(1)
(4a)-6	1066.7	11.7	1747.1	68.0	2697.6	47.9	63.4	0.180	0.0020	4.588	0.1787	0.185	0.0054	0.28	0.46	0.40	X	(1)
(4a)-7	907.8	5.4	907.9	13.8	908.1	27.5	81.9	0.151	0.0009	1.445	0.0220	0.069	0.0009	0.39	0.50	1.00		
(4a)-8	1116.6	10.4	2157.0	53.8	3376.9	27.2	49.3	0.189	0.0018	7.367	0.1836	0.283	0.0049	0.38	0.97	0.33	X	(1)
(4a)-9	944.8	7.6	1448.8	39.3	2293.0	36.8	69.0	0.158	0.0013	3.165	0.0859	0.145	0.0031	0.30	0.35	0.41	X	(1)
(4a)-10	2036.1	15.1	2287.0	47.3	2519.4	25.9	68.3	0.371	0.0028	8.510	0.1759	0.166	0.0026	0.36	0.76	0.81	X	(1)
(4a)-11	1967.3	11.8	1961.3	15.3	1954.9	12.9	84.5	0.357	0.0021	5.900	0.0460	0.120	0.0009	0.77	0.31	1.01	X	(4)
(4a)-12	1810.3	11.9	1814.8	14.9	1819.8	12.9	66.9	0.324	0.0021	4.973	0.0409	0.111	0.0008	0.80	2.29	0.99	X	(4), (7)
(4a)-13	1065.0	6.3	1410.1	24.3	1978.7	27.1	74.1	0.180	0.0011	3.010	0.0519	0.122	0.0018	0.34	0.47	0.54	X	(1)
(4a)-14	1842.2	14.3	1848.5	17.6	1855.7	13.3	73.0	0.331	0.0026	5.175	0.0493	0.113	0.0008	0.81	1.67	0.99	X	(4)
(4a)-15	622.3	6.4	716.4	14.9	1023.6	28.5	82.3	0.101	0.0010	1.025	0.0213	0.073	0.0010	0.50	0.51	0.61	X	(1)
(4a)-16	460.3	2.6	512.8	6.5	754.3	27.3	81.07	0.074	0.0004	0.657	0.0083	0.064	0.0008	0.45	0.63	0.61	X	(1)
Weighted mean Pb-Pb age: 912 ± 21 Ma (n = 3); MSWD: 0.053																		
AZ 05-01-12 (1), 38° 39.452' N 98° 41.372' E (3624 m)																		

(1)-1	950.5	5.8	949.0	9.4	945.5	19.6	81.1	0.159	0.0010	1.546	0.0154	0.071	0.0007	0.61	0.55	1.01		
(1)-2	948.8	5.7	950.2	7.8	953.3	15.3	76.1	0.159	0.0010	1.549	0.0128	0.071	0.0005	0.73	0.82	1.00		
(1)-3	951.8	5.6	954.5	10.1	960.7	19.3	78.7	0.159	0.0009	1.560	0.0165	0.071	0.0007	0.56	0.61	0.99		
(1)-4	949.0	5.7	948.6	9.3	947.7	17.5	83.2	0.159	0.0009	1.545	0.0151	0.071	0.0006	0.61	0.39	1.00		
(1)-5	949.8	5.6	953.3	8.6	961.4	16.8	83.1	0.159	0.0009	1.557	0.0140	0.071	0.0006	0.65	0.40	0.99		
(1)-6	970.7	5.8	975.7	8.1	987.1	15.7	79.6	0.163	0.0010	1.614	0.0134	0.072	0.0006	0.71	0.60	0.98		
(1)-7	959.9	5.6	960.1	8.5	960.7	16.5	82.9	0.161	0.0009	1.574	0.0139	0.071	0.0006	0.66	0.42	1.00		
(1)-8	944.8	5.6	955.4	10.3	979.7	21.0	80.0	0.158	0.0009	1.562	0.0168	0.072	0.0007	0.55	0.55	0.96		
(1)-9	959.3	5.7	963.3	9.9	972.5	19.4	79.6	0.160	0.0010	1.582	0.0163	0.072	0.0007	0.58	0.51	0.99		
(1)-10	987.5	5.8	989.1	8.3	992.4	16.1	80.6	0.166	0.0010	1.649	0.0138	0.072	0.0006	0.70	0.47	1.00		
(1)-11	982.2	5.7	984.4	8.1	989.5	15.6	77.9	0.165	0.0010	1.637	0.0135	0.072	0.0006	0.70	0.60	0.99		
(1)-12	999.1	5.8	1000.3	8.6	1002.8	16.3	77.1	0.168	0.0010	1.678	0.0144	0.073	0.0006	0.67	0.64	1.00		
(1)-13	995.4	5.8	1001.7	9.5	1015.5	18.1	81.0	0.167	0.0010	1.682	0.0160	0.073	0.0007	0.61	0.44	0.98		
(1)-14	949.4	5.8	948.8	7.6	947.6	15.7	76.9	0.159	0.0010	1.546	0.0124	0.071	0.0005	0.76	0.62	1.00		
(1)-15	949.4	5.6	946.8	8.2	940.6	16.4	80.6	0.159	0.0009	1.541	0.0134	0.070	0.0006	0.68	0.51	1.01		
(1)-16	948.8	5.7	955.6	12.8	971.2	26.6	76.9	0.159	0.0010	1.563	0.0210	0.071	0.0009	0.45	0.70	0.98		
(1)-17	947.4	5.6	952.5	8.1	964.4	15.9	82.2	0.158	0.0009	1.555	0.0132	0.071	0.0006	0.70	0.44	0.98		
(1)-18	948.7	6.2	949.5	8.8	951.5	17.8	78.3	0.159	0.0010	1.548	0.0143	0.071	0.0006	0.71	0.66	1.00		
(1)-19	949.3	5.5	954.6	10.2	966.9	20.7	91.6	0.159	0.0009	1.560	0.0167	0.071	0.0007	0.54	0.06	0.98		(7)
(1)-20	885.2	5.7	1071.4	24.4	1472.9	36.3	73.7	0.147	0.0009	1.872	0.0426	0.092	0.0018	0.28	0.56	0.60	X	(1)
(1)-21	958.9	5.5	958.8	8.9	958.5	18.2	82.0	0.160	0.0009	1.571	0.0146	0.071	0.0006	0.62	0.46	1.00		
(1)-22	935.0	5.4	933.9	10.2	931.3	21.4	81.2	0.156	0.0009	1.509	0.0165	0.070	0.0007	0.53	0.48	1.00		
(1)-23	899.8	6.0	900.3	8.5	901.7	17.5	79.0	0.150	0.0010	1.427	0.0134	0.069	0.0006	0.71	0.78	1.00		
(1)-24	920.0	5.5	918.5	7.6	915.1	16.0	79.6	0.153	0.0009	1.471	0.0122	0.070	0.0005	0.71	0.78	1.01		
(1)-25	918.2	5.6	921.6	8.8	929.9	18.5	83.3	0.153	0.0009	1.478	0.0142	0.070	0.0006	0.64	0.55	0.99		
Weighted mean Pb-Pb age: 961 ± 12 Ma (n = 24); MSWD: 2.4																		
AZ 07-24-13 (9), 38° 42.472' N 98° 38.763' E (3554 m)																		
(9)-1	924.9	42.0	924.6	31.6	923.7	16.8	100.0	0.154	0.0075	1.486	0.0774	0.070	0.0006	0.99	0.30	1.00		
(9)-2	1102.0	56.6	1039.0	37.2	909.0	12.2	99.8	0.186	0.0104	1.783	0.1020	0.069	0.0004	0.99	0.15	1.21		(1)
(9)-3	989.9	43.0	961.6	29.5	897.5	13.3	99.9	0.166	0.0078	1.578	0.0749	0.069	0.0004	0.99	0.26	1.10		
(9)-4	1015.0	45.9	986.6	30.8	923.5	14.7	100.0	0.171	0.0083	1.642	0.0802	0.070	0.0005	0.99	0.20	1.10		
(9)-5	913.8	35.1	916.4	23.4	922.6	15.5	100.0	0.152	0.0063	1.466	0.0568	0.070	0.0005	0.98	0.42	0.99		
(9)-6	1055.0	48.7	1003.0	33.5	890.5	26.0	100.0	0.178	0.0089	1.685	0.0886	0.069	0.0009	0.97	0.27	1.18		
(9)-7	931.3	45.3	936.6	31.6	949.0	10.6	99.8	0.155	0.0081	1.515	0.0783	0.071	0.0004	1.00	0.17	0.98		
(9)-8	846.1	38.8	863.6	30.2	908.9	18.9	99.5	0.140	0.0069	1.341	0.0695	0.069	0.0006	0.99	0.21	0.93		
Weighted mean Pb-Pb age: 921 ± 10 Ma (n = 8); MSWD: 1.8																		

[1]Concordia coefficient

[#]Concordance

[$]Excluded from weighted mean calculation; See explanation of Remarks column and text for further details

[%]Explanation of Remarks column:

(1) Discordant
(2) Low % radiogenic 206Pb relative to other analyses
(3) Outside UO/U calibration range
(4) Outside main age population; Possibly inherited
(5) High 204 Pb
(6) Low Th/U
(7) High Th/u
(8) Distinct young age possibly due to Pb loss

Table DR2. U-Pb isotopic data for Qilian Shan detrital zircon analyses

	Age				Isotopic ratios									
	206Pb/		207Pb/		206Pb*/		207Pb*/		207Pb*/					
Spot ID	238U	1σ	206Pb	1σ	238U	1σ	235U	1σ	206Pb*	1σ	ρ	Th/U	Conc.*	Comments
AY 09-21-11 (8); 38°40' 01.5"N, 95°46' 48.2"E (3855 m)														
1	272	3	270	78	0.04309	0.00049	0.30677	0.0132	0.05166	0.00229	0.90	0.51	1.01	
2	932	7	938	21	0.1556	0.00127	1.50804	0.02499	0.07032	0.00129	0.90	0.29	0.99	
3	285	4	289	117	0.04514	0.00059	0.32408	0.01988	0.05209	0.00326	0.90	0.55	0.99	
4	1944	14	1911	12	0.35203	0.00296	5.67662	0.07424	0.117	0.00176	0.90	0.36	1.02	
5	254	5	257	237	0.04017	0.00083	0.28435	0.03458	0.05137	0.00632	0.90	1.12	0.99	
6	287	5	295	149	0.04558	0.00078	0.32805	0.02597	0.05222	0.00421	0.90	0.64	0.97	
7	1795	15	1749	18	0.32118	0.00305	4.73764	0.08145	0.10702	0.00201	0.90	1.02	1.03	
8	1714	24	1840	44	0.30467	0.00489	4.72272	0.17481	0.11246	0.00426	0.90	0.83	0.93	Common Pb < det. lim.
9	2300	19	2298	13	0.4288	0.00413	8.62192	0.12811	0.14588	0.0024	0.90	0.50	1.00	
10	1537	38	1640	93	0.26918	0.00755	3.74307	0.27236	0.10088	0.00743	0.90	0.14	0.94	
11	248	4	253	118	0.0393	0.00059	0.27766	0.01761	0.05126	0.00333	0.90	0.31	0.98	
12	257	4	257	161	0.04069	0.00072	0.28806	0.02454	0.05136	0.00446	0.90	1.33	1.00	
13	288	6	295	187	0.04576	0.00095	0.32947	0.03282	0.05223	0.00529	0.90	0.57	0.98	
~~14~~	~~350~~	~~8~~	~~502~~	~~174~~	~~0.05582~~	~~0.00126~~	~~0.44061~~	~~0.04231~~	~~0.05726~~	~~0.00561~~	~~0.90~~	~~0.74~~	~~0.70~~	~~Discordant~~
15	1753	25	1768	42	0.31252	0.00518	4.65804	0.16964	0.10812	0.00403	0.90	0.63	0.99	
16	945	8	905	31	0.15788	0.00148	1.50617	0.0337	0.0692	0.00166	0.90	0.45	1.04	
17	1845	14	1847	15	0.33144	0.00294	5.15879	0.07669	0.11291	0.00188	0.90	0.57	1.00	
~~18~~	~~325~~	~~5~~	~~473~~	~~132~~	~~0.05163~~	~~0.0008~~	~~0.40229~~	~~0.02879~~	~~0.05652~~	~~0.00412~~	~~0.90~~	~~0.67~~	~~0.69~~	~~Discordant~~
19	281	3	288	85	0.04457	0.00055	0.31993	0.01507	0.05206	0.00253	0.90	0.53	0.98	
20	917	11	918	59	0.15283	0.00203	1.46773	0.05773	0.06966	0.00283	0.90	0.45	1.00	
21	1680	21	1688	36	0.29774	0.00423	4.2487	0.13147	0.10351	0.00331	0.90	0.69	1.00	
22	405	7	403	176	0.06488	0.00119	0.48993	0.04524	0.05478	0.00513	0.90	0.68	1.00	
23	1731	12	1868	27	0.30812	0.00241	4.85384	0.06139	0.11425	0.0017	0.89	0.15	0.93	
24	437	4	445	39	0.07014	0.00061	0.53967	0.01324	0.05581	0.00146	0.90	0.27	0.98	
25	274	5	276	145	0.04346	0.00075	0.31025	0.02404	0.05178	0.0041	0.90	0.49	0.99	
26	1992	18	2008	19	0.36215	0.0039	6.16771	0.11876	0.12353	0.00255	0.90	0.49	0.99	
~~27~~	~~1470~~	~~26~~	~~1625~~	~~63~~	~~0.25616~~	~~0.00507~~	~~3.53305~~	~~0.17536~~	~~0.10004~~	~~0.00503~~	~~0.90~~	~~0.32~~	~~0.90~~	~~Common Pb < det. lim.~~
28	1230	13	1238	48	0.21018	0.00239	2.36655	0.07969	0.08167	0.00284	0.90	0.28	0.99	
29	2528	27	2533	18	0.48024	0.00609	11.09215	0.22433	0.16753	0.00353	0.90	0.81	1.00	
30	1706	12	1815	29	0.30298	0.00246	4.63603	0.06227	0.11098	0.00174	0.88	0.07	0.94	
31	1406	26	1522	80	0.24368	0.00494	3.18062	0.18689	0.09467	0.00566	0.90	0.76	0.92	
32	441	4	442	54	0.07082	0.00072	0.54415	0.01766	0.05573	0.00189	0.90	0.84	1.00	
33	1862	21	1827	29	0.3348	0.00431	5.15439	0.13575	0.11166	0.00306	0.90	1.37	1.02	
34	1820	14	1866	15	0.32627	0.00288	5.13255	0.07692	0.11409	0.00192	0.90	0.87	0.98	
35	2570	21	2564	12	0.48986	0.00488	11.52515	0.1693	0.17064	0.00277	0.90	0.60	1.00	
36	2632	26	2819	37	0.50417	0.00597	13.8388	0.25643	0.19908	0.00438	0.89	0.34	0.93	
37	979	10	1200	37	0.16402	0.00182	1.81191	0.05027	0.08012	0.00234	0.90	0.32	0.82	
38	1834	13	1825	33	0.32909	0.00274	5.06333	0.07923	0.11159	0.00198	0.89	0.34	1.00	
39	939	7	952	22	0.15677	0.00128	1.53061	0.02627	0.07081	0.00135	0.90	0.39	0.99	
40	1860	13	1958	27	0.3345	0.00263	5.54151	0.07023	0.12015	0.00179	0.88	0.17	0.95	

41	1586	15	1697	49	0.27891	0.00298	4.0005	0.094	0.10403	0.00269	0.88	0.20	0.93	
42	2742	23	2740	12	0.53008	0.00543	13.86655	0.20317	0.18973	0.00306	0.90	0.78	1.00	
43	926	10	968	45	0.15447	0.00177	1.52028	0.04742	0.07138	0.00233	0.90	0.38	0.96	
44	2521	24	2524	16	0.47866	0.00559	10.99478	0.20193	0.1666	0.00324	0.90	0.34	1.00	
45	909	7	1024	23	0.15138	0.00127	1.53135	0.02769	0.07337	0.00146	0.90	0.35	0.89	Common Pb < det. lim.
46	267	3	266	101	0.04223	0.00055	0.30017	0.01623	0.05156	0.00286	0.90	0.23	1.00	
47	277	4	281	113	0.04398	0.00064	0.31467	0.01908	0.05189	0.00323	0.90	0.79	0.99	
48	2323	20	2419	35	0.43391	0.00448	9.36525	0.16291	0.15654	0.00317	0.88	0.28	0.96	
49	939	7	927	24	0.15685	0.00131	1.51247	0.02752	0.06994	0.0014	0.90	0.32	1.01	
50	1921	17	1945	20	0.34716	0.00363	5.70722	0.10954	0.11924	0.00246	0.90	0.92	0.99	
51	2561	19	2566	10	0.48781	0.00428	11.4888	0.14193	0.17083	0.00245	0.90	0.56	1.00	
52	333	4	428	84	0.05303	0.0007	0.40499	0.01947	0.05539	0.00275	0.90	0.80	0.78	
53	906	8	928	31	0.15095	0.0014	1.45658	0.03314	0.06999	0.00171	0.90	0.24	0.98	
54	915	11	950	56	0.15242	0.00196	1.48676	0.05596	0.07076	0.00276	0.90	0.43	0.96	
55	2239	15	2412	9	0.41531	0.00332	8.9268	0.09961	0.15591	0.00211	0.90	0.74	0.93	Common Pb < det. lim.
56	1860	17	1906	21	0.3345	0.00356	5.38203	0.10764	0.11671	0.0025	0.90	0.57	0.98	Common Pb < det. lim.
57	2540	21	2553	12	0.48283	0.00477	11.28522	0.16656	0.16955	0.00278	0.90	0.89	0.99	
58	231	2	230	77	0.0365	0.00039	0.25547	0.01073	0.05077	0.0022	0.90	0.83	1.00	
59	944	8	947	33	0.15772	0.0015	1.53584	0.03631	0.07064	0.00178	0.90	0.41	1.00	
60	477	6	480	83	0.07686	0.001	0.60092	0.02889	0.05671	0.00281	0.90	0.66	0.99	
61	1112	10	1172	30	0.18823	0.00183	2.05002	0.04658	0.07901	0.00192	0.90	0.34	0.95	
62	1919	14	1940	30	0.3467	0.00282	5.68432	0.07927	0.11891	0.00192	0.88	0.22	0.99	
63	260	6	250	215	0.04116	0.00094	0.2905	0.03313	0.05121	0.00594	0.90	1.75	1.04	
64	383	7	375	159	0.06127	0.00113	0.45682	0.03884	0.05409	0.00468	0.90	0.57	1.02	
65	1877	15	1937	17	0.33796	0.00319	5.52974	0.09233	0.11871	0.00219	0.90	1.41	0.97	
66	1923	50	1923	100	0.34757	0.01049	5.64317	0.44964	0.1178	0.00942	0.90	0.17	1.00	
67	946	35	984	301	0.15806	0.00632	1.5668	0.27265	0.07192	0.01265	0.90	0.82	0.96	
68	1658	28	1655	61	0.29337	0.00555	4.11123	0.19786	0.10168	0.00496	0.90	0.74	1.00	
69	906	9	963	41	0.15096	0.00159	1.48129	0.04216	0.0712	0.00213	0.90	0.40	0.94	
70	1911	19	2054	22	0.34507	0.00406	6.02976	0.13222	0.12679	0.00294	0.90	0.83	0.93	Common Pb < det. lim.
71	1719	26	1727	47	0.30565	0.00522	4.45344	0.17519	0.10573	0.00425	0.90	0.67	1.00	
72	1946	12	2065	8	0.35238	0.0025	6.19675	0.05826	0.1276	0.00157	0.90	0.13	0.94	
73	1646	15	1740	23	0.29083	0.003	4.26808	0.08774	0.10649	0.00236	0.90	0.56	0.95	
74	1864	13	1994	12	0.33533	0.00272	5.66283	0.07284	0.12255	0.00185	0.90	0.56	0.93	
75	1541	21	1612	89	0.27001	0.00406	3.69792	0.16277	0.09933	0.00462	0.87	0.50	0.96	
76	1909	31	1976	95	0.34473	0.00647	5.76867	0.27891	0.12136	0.00629	0.88	0.56	0.97	
77	1442	15	1577	33	0.25062	0.00296	3.36723	0.09198	0.0975	0.00279	0.90	0.61	0.91	
78	941	9	993	39	0.15715	0.00165	1.56437	0.04345	0.07224	0.00212	0.90	0.36	0.95	
79	1929	24	1975	32	0.34875	0.005	5.82752	0.1691	0.12127	0.00364	0.90	1.15	0.98	
80	293	6	353	196	0.0465	0.0009	0.34312	0.03521	0.05356	0.00558	0.90	1.35	0.83	
W821-b1; 38°33'28.8"N 98°38'38.9"E (3997 m)														
1	1691	31	1774	59	0.28128	0.00249	4.48405	0.21862	0.29987	0.00621	0.90	0.74	0.95	
2	1615	12	1698	12	0.29987	0.00621	4.08557	0.05149	0.28475	0.00234	0.90	0.34	0.95	
~~3~~	~~457~~	~~12~~	~~752~~	~~244~~	~~0.28475~~	~~0.00234~~	~~0.65086~~	~~0.08793~~	~~0.0734~~	~~0.00205~~	~~0.90~~	~~0.61~~	~~0.61~~	~~Discordant~~

4	2333	17	2481	9	0.0734	0.00205	9.76019	0.1104	0.43599	0.00375	0.90	0.94	0.94	
5	262	2	268	46	0.43599	0.00375	0.29538	0.00808	0.04153	0.00038	0.90	0.69	0.98	
6	1955	14	1983	9	0.04153	0.00038	5.94764	0.06557	0.35423	0.00285	0.90	0.57	0.99	
~~7~~	~~501~~	~~8~~	~~927~~	~~100~~	~~0.35423~~	~~0.00285~~	~~0.77894~~	~~0.04859~~	~~0.08079~~	~~0.0014~~	~~0.90~~	~~0.05~~	~~0.54~~	~~Discordant~~
8	1725	11	1706	7	0.08079	0.0014	4.42115	0.03654	0.30677	0.00221	0.90	0.33	1.01	
9	1813	13	1856	12	0.30677	0.00221	5.08206	0.06525	0.32481	0.00274	0.90	1.09	0.98	
10	1496	26	1693	55	0.32481	0.00274	3.73852	0.17071	0.26128	0.00509	0.90	0.43	0.88	
11	1830	18	1844	22	0.26128	0.00509	5.10203	0.10573	0.32831	0.00367	0.90	1.41	0.99	
12	1521	21	1485	112	0.32831	0.00367	3.40581	0.18929	0.26603	0.0041	0.89	1.04	1.02	
13	1823	21	1894	27	0.26603	0.0041	5.22077	0.13236	0.32684	0.00422	0.90	2.63	0.96	
14	404	5	389	87	0.32684	0.00422	0.48566	0.0236	0.06473	0.0008	0.90	0.19	1.04	
15	1103	10	1308	59	0.06473	0.0008	2.17829	0.06065	0.18658	0.00181	0.86	0.47	0.84	
~~16~~	~~408~~	~~7~~	~~588~~	~~111~~	~~0.18658~~	~~0.00181~~	~~0.53629~~	~~0.03476~~	~~0.06532~~	~~0.00112~~	~~0.90~~	~~0.65~~	~~0.69~~	~~Discordant~~
17	2069	17	2097	40	0.06532	0.00112	6.78124	0.1356	0.37853	0.00371	0.88	0.58	0.99	
18	1693	23	1836	37	0.37853	0.00371	4.64816	0.15168	0.30039	0.00459	0.90	0.56	0.92	
19	2009	13	2041	7	0.30039	0.00459	6.34622	0.05914	0.36574	0.00277	0.90	0.37	0.98	
20	528	5	606	72	0.36574	0.00277	0.70614	0.02199	0.08528	0.00078	0.85	0.35	0.87	
21	1999	13	2085	8	0.08528	0.00078	6.46454	0.06218	0.36351	0.00278	0.90	0.52	0.96	
22	1676	12	1824	11	0.36351	0.00278	4.56518	0.0567	0.29692	0.00245	0.90	0.44	0.92	
23	2517	18	2535	27	0.29692	0.00245	11.04737	0.14383	0.47761	0.00407	0.89	0.46	0.99	
24	1165	16	1257	116	0.47761	0.00407	2.25219	0.12507	0.19801	0.00306	0.86	0.58	0.93	
25	2205	17	2242	32	0.19801	0.00306	7.93831	0.12483	0.40778	0.00373	0.89	0.40	0.98	
26	1975	15	2025	11	0.40778	0.00373	6.1629	0.07786	0.35845	0.00306	0.90	1.37	0.98	
27	1536	16	1684	28	0.35845	0.00306	3.82934	0.09403	0.26901	0.00319	0.90	0.95	0.91	
28	1690	14	1715	18	0.26901	0.00319	4.34013	0.07319	0.29978	0.00282	0.90	0.65	0.99	
29	965	11	935	98	0.29978	0.00282	1.56302	0.07047	0.1614	0.00201	0.84	0.25	1.03	
~~30~~	~~276~~	~~11~~	~~171~~	~~377~~	~~0.1614~~	~~0.00201~~	~~0.29859~~	~~0.0727~~	~~0.04377~~	~~0.00172~~	~~0.90~~	~~0.80~~	~~1.61~~	~~Reversely Discordant~~
31	1792	12	1869	9	0.04377	0.00172	5.0492	0.05219	0.32048	0.00247	0.90	0.37	0.96	
32	1919	18	1985	19	0.32048	0.00247	5.82962	0.10864	0.34684	0.00368	0.90	1.41	0.97	
33	1783	14	1834	37	0.34684	0.00368	4.92569	0.08635	0.31867	0.00286	0.88	0.38	0.97	
34	1632	15	1700	21	0.31867	0.00286	4.13786	0.07869	0.28811	0.0029	0.90	0.78	0.96	
35	1747	18	1743	27	0.28811	0.0029	4.57739	0.10916	0.31136	0.00361	0.90	0.63	1.00	
~~36~~	~~389~~	~~5~~	~~318~~	~~82~~	~~0.31136~~	~~0.00361~~	~~0.45208~~	~~0.02087~~	~~0.06217~~	~~0.0008~~	~~0.90~~	~~0.22~~	~~1.22~~	~~Reversely Discordant~~
37	1674	15	1797	18	0.06217	0.0008	4.4914	0.07942	0.29659	0.00292	0.90	0.52	0.93	
38	1884	13	1996	8	0.29659	0.00292	5.74217	0.05795	0.33953	0.00262	0.90	0.46	0.94	
39	1733	13	1869	12	0.33953	0.00262	4.8581	0.06216	0.30837	0.00258	0.90	2.78	0.93	
~~40~~	~~409~~	~~4~~	~~376~~	~~43~~	~~0.30837~~	~~0.00258~~	~~0.48855~~	~~0.01295~~	~~0.06549~~	~~0.00059~~	~~0.90~~	~~0.03~~	~~1.09~~	~~Reversely Discordant~~
41	1652	14	1778	19	0.06549	0.00059	4.37507	0.07944	0.29201	0.00287	0.90	0.59	0.93	
42	1520	24	1620	51	0.29201	0.00287	3.65707	0.15203	0.26584	0.00469	0.90	0.51	0.94	
43	2337	15	2357	24	0.26584	0.00469	9.09591	0.10138	0.43703	0.00332	0.91	0.62	0.99	
44	1697	15	1664	47	0.43703	0.00332	4.24385	0.09584	0.30123	0.00298	0.87	0.40	1.02	
45	778	7	858	28	0.30123	0.00298	1.19582	0.02484	0.12826	0.00114	0.90	0.88	0.91	
46	1613	15	1722	45	0.12826	0.00114	4.13397	0.08831	0.28432	0.00292	0.87	0.21	0.94	
~~47~~	~~867~~	~~10~~	~~1540~~	~~39~~	~~0.28432~~	~~0.00292~~	~~1.89796~~	~~0.05901~~	~~0.14402~~	~~0.00186~~	~~0.90~~	~~0.60~~	~~0.56~~	~~Discordant~~
48	2174	15	2243	28	0.14402	0.00186	7.81439	0.10519	0.40109	0.00325	0.91	0.67	0.97	

49	1740	17	1797	54	0.40109	0.00325	4.69272	0.12612	0.30989	0.00352	0.87	0.38	0.97	
50	1524	24	1632	52	0.30989	0.00352	3.69371	0.15534	0.26677	0.00475	0.90	0.15	0.93	Common Pb < det. lim.
51	1573	39	1733	82	0.26677	0.00475	4.03954	0.2709	0.27629	0.00776	0.90	1.16	0.91	Common Pb < det. lim.
52	403	6	489	122	0.27629	0.00776	0.50641	0.03365	0.06452	0.00093	0.90	0.52	0.82	
53	1948	14	1930	29	0.06452	0.00093	5.75113	0.07811	0.35274	0.00291	0.87	0.18	1.01	
54	1730	17	1751	27	0.35274	0.00291	4.54537	0.10786	0.30789	0.00355	0.90	0.60	0.99	
~~55~~	~~250~~	~~2~~	~~212~~	~~34~~	~~0.30789~~	~~0.00355~~	~~0.27499~~	~~0.00578~~	~~0.03961~~	~~0.00032~~	~~0.90~~	~~1.96~~	~~1.18~~	~~Reversely Discordant~~
~~56~~	~~767~~	~~18~~	~~1702~~	~~97~~	~~0.03961~~	~~0.00032~~	~~1.81607~~	~~0.13196~~	~~0.12635~~	~~0.00319~~	~~0.90~~	~~0.44~~	~~0.45~~	~~Discordant~~
57	2153	14	2222	21	0.12635	0.00319	7.62966	0.07127	0.39645	0.00295	0.88	0.09	0.97	
58	1827	17	1960	20	0.39645	0.00295	5.43225	0.10667	0.32772	0.00348	0.90	1.79	0.93	
59	1860	13	1828	10	0.32772	0.00348	5.15068	0.0591	0.33446	0.00267	0.90	1.16	1.02	
60	1387	24	1687	137	0.33446	0.00267	3.42248	0.23828	0.23998	0.0046	0.91	1.54	0.82	
61	359	3	350	47	0.23998	0.0046	0.42255	0.01201	0.05731	0.00053	0.90	1.02	1.03	
62	1452	11	1655	37	0.05731	0.00053	3.54086	0.06328	0.25253	0.00208	0.90	0.75	0.88	
63	1210	23	1435	167	0.25253	0.00208	2.57591	0.21192	0.20654	0.00425	0.89	1.20	0.84	
~~64~~	~~252~~	~~6~~	~~441~~	~~220~~	~~0.20654~~	~~0.00425~~	~~0.30587~~	~~0.03562~~	~~0.03983~~	~~0.00091~~	~~0.90~~	~~1.02~~	~~0.57~~	~~Discordant~~
65	1769	13	1869	31	0.03983	0.00091	4.97527	0.07084	0.3157	0.00266	0.88	0.20	0.95	
66	1653	14	1731	19	0.3157	0.00266	4.26951	0.07758	0.29232	0.00284	0.90	0.81	0.95	
67	1706	20	1689	82	0.29232	0.00284	4.32662	0.17797	0.30298	0.0041	0.89	0.84	1.01	
68	401	4	421	78	0.30298	0.0041	0.48861	0.02149	0.0642	0.00074	0.90	0.68	0.95	
69	1850	12	1964	9	0.0642	0.00074	5.51893	0.05771	0.3323	0.00257	0.90	0.73	0.94	
70	1584	20	1558	96	0.3323	0.00257	3.70756	0.17595	0.27859	0.00406	0.88	0.86	1.02	
71	1712	13	1749	41	0.27859	0.00406	4.48895	0.08975	0.30428	0.00273	0.89	0.67	0.98	
72	1440	18	1682	37	0.30428	0.00273	3.55886	0.10986	0.25023	0.00345	0.90	0.93	0.86	
73	2007	18	2134	38	0.25023	0.00345	6.68062	0.12445	0.36519	0.00374	0.88	0.24	0.94	
74	1648	17	1665	28	0.36519	0.00374	4.10296	0.10055	0.29124	0.00337	0.90	0.82	0.99	
75	664	15	909	129	0.29124	0.00337	1.03671	0.08374	0.10848	0.00252	0.90	0.38	0.73	
76	1758	21	1745	33	0.10848	0.00252	4.61139	0.13169	0.31343	0.00423	0.90	1.04	1.01	
77	1678	16	1688	57	0.31343	0.00423	4.24147	0.1193	0.29727	0.00322	0.88	0.69	0.99	
78	1775	13	1807	12	0.29727	0.00322	4.82557	0.06106	0.31705	0.00262	0.90	0.85	0.98	
79	953	10	1360	73	0.31705	0.00262	1.91108	0.0673	0.15935	0.00181	0.87	0.50	0.70	
80	439	8	584	141	0.15935	0.00181	0.57708	0.04587	0.07042	0.00133	0.90	0.80	0.75	
81	1369	16	1627	67	0.07042	0.00133	3.26807	0.10791	0.23661	0.003	0.86	0.17	0.84	
82	443	4	514	35	0.23661	0.003	0.56492	0.01296	0.07118	0.00061	0.90	0.14	0.86	
83	1627	13	1855	15	0.07118	0.00061	4.48598	0.06949	0.28702	0.00262	0.90	0.22	0.88	
84	1716	22	1841	39	0.28702	0.00262	4.73201	0.157	0.30504	0.00455	0.90	0.73	0.93	
85	2462	18	2575	10	0.30504	0.00455	11.01055	0.13642	0.4652	0.0042	0.90	0.43	0.96	
86	1790	13	1858	12	0.4652	0.0042	5.01089	0.06395	0.32005	0.00266	0.90	0.82	0.96	
87	1527	26	1619	117	0.32005	0.00266	3.6749	0.213	0.26731	0.00515	0.87	0.49	0.94	
88	1665	12	1770	11	0.26731	0.00515	4.39719	0.05203	0.29477	0.00235	0.90	1.92	0.94	
89	413	5	478	80	0.29477	0.00235	0.51593	0.0237	0.0661	0.00081	0.90	0.34	0.86	
90	1809	18	1886	23	0.0661	0.00081	5.14877	0.11082	0.32386	0.00366	0.90	2.33	0.96	
91	1238	18	1743	48	0.32386	0.00366	3.11262	0.12153	0.21173	0.00337	0.90	0.71	0.71	
92	265	3	258	68	0.21173	0.00337	0.2977	0.01119	0.04204	0.00043	0.90	1.61	1.03	
93	1761	11	1862	24	0.04204	0.00043	4.9304	0.05275	0.31411	0.00234	0.89	0.20	0.95	

94	1732	14	1854	14	0.31411	0.00234	4.81675	0.07153	0.30827	0.00276	0.90	1.00	0.93	
95	2787	17	2764	7	0.30827	0.00276	14.35491	0.12732	0.54091	0.00415	0.90	0.48	1.01	
96	1560	28	1590	68	0.54091	0.00415	3.70432	0.19507	0.27372	0.00547	0.90	0.70	0.98	
97	1629	11	2183	8	0.27372	0.00547	5.40863	0.05463	0.28754	0.0022	0.90	0.28	0.75	
98	1629	11	2183	8	0.28754	0.0022	5.40863	0.05463	0.1365	0.0017	0.90	0.28	0.75	
W822-b1; 38°33'29.2"N 98°38'36.3"E (3972 m)														
1	1508	17	1471	71	0.26352	0.0034	3.34921	0.11371	0.09218	0.00335	0.86	0.22	1.03	
2	1598	14	1677	20	0.28125	0.0028	3.99314	0.07427	0.10291	0.00206	0.90	0.66	0.95	
3	1807	17	1808	21	0.32349	0.00344	4.93227	0.09794	0.11051	0.00233	0.90	0.74	1.00	
4	1808	14	1820	14	0.32371	0.00294	4.96845	0.074	0.11125	0.00183	0.90	0.85	0.99	
~~5~~	~~410~~	~~4~~	~~328~~	~~44~~	~~0.06567~~	~~0.0006~~	~~0.47988~~	~~0.0129~~	~~0.05297~~	~~0.00149~~	~~0.90~~	~~0.03~~	~~1.25~~	~~Reversely Discordant~~
6	1778	16	1764	21	0.3177	0.00335	4.72838	0.09247	0.10788	0.00225	0.90	0.87	1.01	
7	1133	17	1192	134	0.19223	0.00317	2.11482	0.13513	0.07979	0.00527	0.87	0.69	0.95	
8	1967	14	1951	10	0.3568	0.00291	5.88992	0.06742	0.11967	0.0016	0.90	0.51	1.01	
9	1570	16	1568	30	0.27577	0.00326	3.69087	0.09293	0.09702	0.00255	0.90	0.71	1.00	
10	807	7	844	31	0.13328	0.00123	1.23558	0.02761	0.06721	0.0016	0.90	0.67	0.96	
11	2467	17	2593	25	0.46631	0.00394	11.16422	0.12992	0.17364	0.0025	0.90	0.34	0.95	
~~12~~	~~420~~	~~4~~	~~327~~	~~40~~	~~0.06734~~	~~0.0006~~	~~0.4919~~	~~0.01218~~	~~0.05296~~	~~0.00138~~	~~0.90~~	~~0.06~~	~~1.28~~	~~Reversely Discordant~~
13	1886	16	1859	17	0.33996	0.00332	5.33159	0.09017	0.1137	0.00208	0.90	0.75	1.01	
14	2028	20	2158	49	0.36967	0.00433	6.85873	0.17206	0.13456	0.00372	0.88	0.65	0.94	
15	1695	14	1696	17	0.30072	0.00282	4.31223	0.07159	0.10397	0.00188	0.90	0.52	1.00	
16	1564	16	1570	30	0.27451	0.00316	3.67732	0.09204	0.09713	0.00254	0.90	0.92	1.00	
17	1677	15	1667	22	0.29712	0.0031	4.19448	0.08494	0.10236	0.0022	0.90	0.69	1.01	
18	407	9	403	248	0.06514	0.00146	0.49204	0.06305	0.05477	0.0071	0.90	0.65	1.01	
19	1457	14	1800	51	0.2536	0.00272	3.84796	0.09749	0.11005	0.00303	0.88	0.53	0.81	
20	1481	16	1599	30	0.2582	0.00312	3.51253	0.09013	0.09865	0.00265	0.90	0.96	0.93	
21	1623	20	1715	36	0.28631	0.0039	4.14671	0.1261	0.10503	0.0033	0.90	0.65	0.95	
22	1781	13	1798	11	0.31825	0.00261	4.82326	0.0583	0.10991	0.00153	0.90	0.08	0.99	
23	1809	13	1953	30	0.32393	0.00269	5.34998	0.07641	0.11978	0.00198	0.90	0.45	0.93	
24	2276	16	2398	33	0.42345	0.00364	9.03165	0.15144	0.15469	0.00291	0.91	1.18	0.95	
25	2391	15	2413	21	0.44896	0.00331	9.65814	0.08948	0.15602	0.00185	0.91	0.36	0.99	
26	1686	17	1848	24	0.29894	0.00342	4.65713	0.10345	0.11298	0.00264	0.90	0.55	0.91	
27	609	14	841	180	0.09909	0.00234	0.91664	0.09546	0.06709	0.0071	0.90	5.26	0.72	
28	1800	16	1793	20	0.32202	0.00333	4.86618	0.0934	0.1096	0.00224	0.90	0.50	1.00	
29	423	4	496	55	0.06785	0.00073	0.53436	0.01797	0.05712	0.002	0.90	0.38	0.85	
~~30~~	~~398~~	~~4~~	~~343~~	~~86~~	~~0.06369~~	~~0.00074~~	~~0.46831~~	~~0.02207~~	~~0.05334~~	~~0.00257~~	~~0.90~~	~~0.27~~	~~1.16~~	~~Reversely Discordant~~
31	1797	17	1788	22	0.32158	0.00355	4.84695	0.10104	0.10933	0.00241	0.90	0.32	1.01	
32	1695	18	1716	30	0.30074	0.00366	4.35756	0.11206	0.1051	0.00281	0.90	0.76	0.99	
33	406	5	470	88	0.06497	0.00082	0.50556	0.02519	0.05645	0.00288	0.90	0.12	0.86	
34	1614	20	1634	39	0.28452	0.00406	3.94254	0.12727	0.10052	0.00334	0.90	1.45	0.99	
35	1726	15	1715	20	0.30703	0.00307	4.44576	0.08362	0.10504	0.00212	0.90	0.67	1.01	
36	1766	16	1765	22	0.31521	0.00332	4.68938	0.09415	0.10792	0.0023	0.90	0.77	1.00	
37	1995	27	1900	38	0.36272	0.00564	5.81416	0.19462	0.11628	0.00397	0.90	3.33	1.05	
~~38~~	~~452~~	~~5~~	~~244~~	~~102~~	~~0.0726~~	~~0.0009~~	~~0.51109~~	~~0.02766~~	~~0.05107~~	~~0.00282~~	~~0.90~~	~~0.79~~	~~1.85~~	~~Reversely Discordant~~

39	426	9	566	234	0.06824	0.00152	0.55477	0.06828	0.05898	0.00734	0.90	0.32	0.75	
40	1739	20	1738	32	0.30965	0.00407	4.54098	0.12784	0.10639	0.0031	0.90	0.80	1.00	
41	821	8	746	48	0.13584	0.00148	1.20069	0.03766	0.06413	0.00209	0.90	0.67	1.10	
42	1801	31	1883	54	0.3223	0.0064	5.11616	0.23466	0.11517	0.00536	0.90	0.24	0.96	
43	1776	19	1788	26	0.31715	0.00379	4.77771	0.11255	0.1093	0.00269	0.90	0.95	0.99	
44	1784	15	1796	16	0.31885	0.003	4.8258	0.07772	0.10981	0.00193	0.90	0.72	0.99	
45	1763	14	1782	14	0.31452	0.00278	4.72223	0.06797	0.10894	0.00175	0.90	1.18	0.99	
46	392	6	400	167	0.06262	0.00102	0.47203	0.04084	0.05469	0.0048	0.90	0.34	0.98	
47	2579	20	2530	10	0.49203	0.00458	11.33584	0.14431	0.16717	0.00238	0.90	0.37	1.02	
~~48~~	~~1590~~	~~15~~	~~1499~~	~~27~~	~~0.27971~~	~~0.00301~~	~~3.60685~~	~~0.08273~~	~~0.09357~~	~~0.00226~~	~~0.90~~	~~0.49~~	~~1.06~~	~~Reversely Discordant~~
49	1813	24	1740	43	0.32482	0.00495	4.76682	0.16906	0.10649	0.00386	0.90	1.64	1.04	
50	393	6	534	110	0.06285	0.00091	0.50343	0.03096	0.05812	0.00365	0.90	0.10	0.74	
51	1249	17	1577	107	0.21388	0.00328	2.875	0.15331	0.09749	0.00541	0.89	1.08	0.79	
52	1790	19	1797	27	0.32015	0.00383	4.84694	0.11732	0.10987	0.00278	0.90	1.59	1.00	
53	1801	14	1789	14	0.32228	0.00283	4.85786	0.06951	0.10939	0.00174	0.90	0.83	1.01	
54	1626	14	1670	21	0.28697	0.00289	4.0522	0.07813	0.10248	0.00211	0.90	0.56	0.97	
55	1933	14	1903	12	0.34965	0.00296	5.61176	0.07166	0.11648	0.00169	0.90	1.18	1.02	
56	1602	13	1589	49	0.28217	0.00263	3.81878	0.09171	0.09816	0.00253	0.90	0.95	1.01	
57	1875	14	1866	12	0.33767	0.00284	5.3088	0.06753	0.11411	0.00166	0.90	1.22	1.00	
58	1812	15	1830	15	0.32462	0.00301	5.00319	0.07807	0.11186	0.00192	0.90	0.52	0.99	
59	2061	14	2079	27	0.37677	0.003	6.68126	0.08291	0.12861	0.0019	0.90	0.39	0.99	
60	1475	11	1586	14	0.25701	0.00217	3.4702	0.04906	0.098	0.00156	0.90	1.09	0.93	Common Pb < det. lim.
61	1717	14	1670	18	0.30512	0.00292	4.30842	0.07431	0.1025	0.00191	0.90	0.66	1.03	
62	1908	18	1935	22	0.34446	0.00385	5.62816	0.11765	0.1186	0.00261	0.90	1.96	0.99	
63	1602	17	1727	30	0.2822	0.00346	4.11021	0.10653	0.10573	0.00286	0.90	0.63	0.93	Common Pb < det. lim.
64	1680	11	1630	10	0.2978	0.00229	4.11599	0.04444	0.10033	0.00129	0.90	0.55	1.03	
65	2286	18	2308	11	0.42572	0.00389	8.60462	0.11438	0.14672	0.00218	0.90	0.65	0.99	
66	1892	15	2031	12	0.34114	0.00302	5.88065	0.08007	0.12514	0.00192	0.90	1.33	0.93	Common Pb < det. lim.
67	2379	18	2383	10	0.44646	0.00402	9.42695	0.11915	0.15328	0.00219	0.90	1.39	1.00	
68	1820	15	1747	16	0.32629	0.003	4.80519	0.07533	0.10691	0.00184	0.90	1.01	1.04	
69	1800	17	1776	23	0.32207	0.00353	4.81796	0.10265	0.1086	0.00244	0.90	1.96	1.01	
70	1808	16	1791	20	0.32366	0.00332	4.88111	0.09277	0.10949	0.00222	0.90	3.23	1.01	
71	1257	15	1675	39	0.21535	0.00289	3.04833	0.09678	0.10277	0.00339	0.90	0.93	0.75	Common Pb < det. lim.
72	1739	17	1828	23	0.30967	0.00349	4.76546	0.10342	0.11173	0.00256	0.90	0.95	0.95	Common Pb < det. lim.
73	1751	14	1757	16	0.3121	0.00292	4.61929	0.07445	0.10746	0.00189	0.90	2.00	1.00	
74	378	7	390	182	0.06037	0.00108	0.45285	0.04289	0.05446	0.00523	0.90	0.03	0.97	
~~75~~	~~402~~	~~4~~	~~366~~	~~61~~	~~0.06433~~	~~0.00066~~	~~0.47742~~	~~0.01675~~	~~0.05389~~	~~0.00196~~	~~0.90~~	~~0.51~~	~~1.10~~	~~Reversely Discordant~~
~~76~~	~~1655~~	~~19~~	~~1538~~	~~38~~	~~0.29266~~	~~0.0039~~	~~3.84999~~	~~0.11871~~	~~0.09552~~	~~0.00304~~	~~0.90~~	~~0.52~~	~~1.08~~	~~Reversely Discordant~~
77	1793	21	1801	30	0.32072	0.00432	4.8633	0.13275	0.11011	0.00311	0.90	2.63	1.00	
78	2312	15	2334	7	0.43141	0.00323	8.84924	0.07781	0.14895	0.00167	0.90	0.53	0.99	
79	1805	11	1792	7	0.32319	0.00229	4.87588	0.03911	0.10955	0.00117	0.90	0.23	1.01	
80	401	4	422	62	0.06411	0.0007	0.48757	0.01778	0.05523	0.00209	0.90	0.34	0.95	
81	1957	18	1991	19	0.35469	0.00385	5.97598	0.11328	0.12236	0.00247	0.90	1.18	0.98	
82	1847	13	1851	10	0.33186	0.00264	5.17099	0.05856	0.11316	0.00151	0.90	0.94	1.00	
83	1718	22	1702	39	0.3053	0.00444	4.38445	0.14263	0.1043	0.00349	0.90	0.60	1.01	

84	1786	15	1727	17	0.31921	0.003	4.64776	0.07701	0.10574	0.00191	0.90	0.58	1.03	
85	2024	15	1992	11	0.36881	0.00313	6.2158	0.07777	0.1224	0.00175	0.90	0.27	1.02	
86	1829	21	1800	30	0.328	0.0043	4.97068	0.13341	0.11006	0.00306	0.90	1.18	1.02	
87	1801	12	1970	8	0.32236	0.00247	5.3674	0.05436	0.12093	0.00149	0.90	0.21	0.91	
~~88~~	~~1879~~	~~20~~	~~1701~~	~~31~~	~~0.33837~~	~~0.00425~~	~~4.85657~~	~~0.12918~~	~~0.10424~~	~~0.00287~~	~~0.90~~	~~0.63~~	~~1.10~~	~~Reversely Discordant~~
89	426	6	530	108	0.06833	0.00105	0.54562	0.0336	0.058	0.00365	0.90	0.00	0.80	
90	1670	16	1640	25	0.29578	0.00322	4.10731	0.09106	0.10086	0.00236	0.90	1.10	1.02	
91	2503	25	2478	16	0.47454	0.00563	10.5899	0.19722	0.1621	0.00316	0.90	0.69	1.01	
92	1797	16	1811	48	0.32143	0.0033	4.90672	0.1151	0.11071	0.00283	0.89	0.58	0.99	
93	1455	12	1461	46	0.2533	0.00237	3.20175	0.06947	0.09168	0.00217	0.87	0.32	1.00	
94	1802	22	1814	34	0.32242	0.00445	4.92054	0.14523	0.11086	0.00337	0.90	0.93	0.99	
~~95~~	~~789~~	~~8~~	~~1274~~	~~68~~	~~0.13019~~	~~0.00139~~	~~1.4932~~	~~0.0485~~	~~0.08318~~	~~0.00284~~	~~0.88~~	~~0.57~~	~~0.62~~	~~Discordant~~
96	1455	28	1466	158	0.25315	0.00537	3.20845	0.24919	0.09192	0.0074	0.88	0.74	0.99	
97	1293	18	1527	99	0.22211	0.0035	2.90816	0.1416	0.09496	0.00486	0.87	0.48	0.85	
98	1887	31	1874	47	0.34015	0.00653	5.36692	0.22054	0.11462	0.00478	0.90	1.11	1.01	
99	2109	19	2054	18	0.38699	0.00413	6.75344	0.1239	0.12678	0.00248	0.90	0.38	1.03	
100	2303	15	2252	8	0.42935	0.00341	8.39268	0.08601	0.14201	0.00175	0.90	0.90	1.02	
W823-b1; 38°32'48.9"N 98°38'56.5"E (4073 m)														
1	427	5	551	73	0.06841	0.00083	0.5519	0.02378	0.05856	0.0026	0.90	0.35	0.77	
2	2154	21	2369	17	0.39663	0.00458	8.3062	0.15422	0.15202	0.00299	0.90	0.71	0.91	Common Pb < det. lim.
3	2355	16	2364	7	0.44097	0.00349	9.21123	0.08881	0.15162	0.00178	0.90	0.43	1.00	
4	2529	15	2483	6	0.48032	0.00355	10.75938	0.08606	0.1626	0.00171	0.90	0.16	1.02	
5	1788	12	1705	9	0.31965	0.00249	4.60121	0.04844	0.10449	0.00132	0.90	0.32	1.05	
6	2013	13	2359	7	0.36656	0.00282	7.6349	0.06996	0.15118	0.00173	0.90	0.76	0.85	
7	2572	17	2473	7	0.49025	0.00391	10.91838	0.10424	0.16165	0.00188	0.90	1.27	1.04	
8	2450	16	2371	7	0.46244	0.0036	9.6971	0.08973	0.1522	0.00174	0.90	0.44	1.03	
9	270	4	819	98	0.04277	0.00068	0.39137	0.02323	0.06641	0.00406	0.90	0.57	0.33	Discordant
10	284	3	298	40	0.04511	0.00041	0.3249	0.00814	0.05228	0.00138	0.90	0.72	0.95	
~~11~~	~~415~~	~~8~~	~~395~~	~~233~~	~~0.06652~~	~~0.00124~~	~~0.50065~~	~~0.04995~~	~~0.05459~~	~~0.00554~~	~~0.86~~	~~0.53~~	~~1.05~~	~~Reversely Discordant~~
12	2389	20	2370	13	0.44853	0.00459	9.39939	0.14408	0.15209	0.00252	0.90	0.88	1.01	
13	2479	16	2475	7	0.46889	0.00374	10.45371	0.10055	0.16181	0.0019	0.90	0.61	1.00	
14	1818	12	1814	7	0.32573	0.00237	4.97746	0.04121	0.1109	0.0012	0.90	0.56	1.00	
15	2519	17	2448	8	0.47803	0.00392	10.49353	0.10744	0.15931	0.00195	0.90	0.35	1.03	
16	2429	14	2456	17	0.45767	0.00315	10.09711	0.07065	0.16001	0.00157	0.89	0.10	0.99	
17	265	3	268	98	0.04199	0.00053	0.29857	0.01573	0.0516	0.00278	0.90	0.65	0.99	
18	1854	13	1875	9	0.33324	0.00262	5.26759	0.05575	0.11471	0.00145	0.90	0.47	0.99	
19	1805	12	1828	25	0.3231	0.00245	4.97938	0.05493	0.11177	0.0015	0.89	0.25	0.99	
20	1747	19	1695	31	0.31132	0.00395	4.45877	0.12055	0.10393	0.00291	0.90	0.52	1.03	
21	2071	15	2134	29	0.37887	0.00319	6.934	0.09771	0.13274	0.00218	0.89	0.43	0.97	
22	2548	20	2551	10	0.48485	0.00452	11.31327	0.14408	0.16933	0.00242	0.90	0.45	1.00	
23	1747	12	1817	10	0.31131	0.00249	4.76363	0.05399	0.11104	0.00148	0.90	0.65	0.96	
24	379	4	383	75	0.06059	0.00069	0.45324	0.01929	0.05429	0.00238	0.90	0.81	0.99	
25	259	3	266	101	0.04094	0.0005	0.29096	0.01556	0.05157	0.00282	0.90	0.99	0.97	
26	317	3	347	43	0.05045	0.00046	0.37142	0.00978	0.05342	0.00148	0.90	0.55	0.91	

27	1862	15	1850	38	0.33492	0.00306	5.22218	0.09703	0.11309	0.00234	0.89	0.55	1.01	
28	274	3	295	84	0.04334	0.0005	0.31195	0.01438	0.05223	0.00247	0.90	0.95	0.93	
29	2527	18	2515	8	0.47984	0.00407	10.96038	0.11926	0.16574	0.00211	0.90	0.77	1.00	
~~30~~	~~297~~	~~6~~	~~470~~	~~152~~	~~0.04713~~	~~0.00095~~	~~0.36656~~	~~0.03085~~	~~0.05644~~	~~0.00486~~	~~0.90~~	~~0.52~~	~~0.63~~	~~Discordant~~
31	1652	12	1733	11	0.29201	0.00238	4.26822	0.05208	0.10606	0.0015	0.90	0.23	0.95	Common Pb < det. lim.
32	1828	12	1857	25	0.32783	0.00249	5.13146	0.05725	0.11353	0.00153	0.90	0.27	0.98	
33	1942	19	2194	44	0.35145	0.00405	6.65452	0.14466	0.13732	0.00338	0.87	0.20	0.89	
34	2525	20	2525	10	0.47955	0.0045	11.01782	0.14289	0.1667	0.00242	0.90	0.77	1.00	
35	2387	14	2398	19	0.4481	0.00325	9.55491	0.07969	0.15465	0.00171	0.88	0.08	1.00	
36	1283	19	1415	54	0.22015	0.00363	2.71601	0.11335	0.08951	0.00384	0.90	0.40	0.91	
37	2044	15	2002	10	0.37312	0.0031	6.33211	0.07517	0.12313	0.00169	0.90	0.47	1.02	
38	1921	17	1998	46	0.3472	0.00354	5.88094	0.13613	0.12285	0.00311	0.90	0.88	0.96	
39	1855	13	1922	30	0.33336	0.00275	5.41195	0.07504	0.11774	0.0019	0.89	0.33	0.97	
40	277	2	380	29	0.04385	0.00036	0.32765	0.00644	0.05422	0.00115	0.90	0.53	0.73	
~~41~~	~~884~~	~~9~~	~~1579~~	~~33~~	~~0.14689~~	~~0.00163~~	~~1.97656~~	~~0.05223~~	~~0.09763~~	~~0.00272~~	~~0.90~~	~~3.57~~	~~0.56~~	~~Discordant~~
42	2494	17	2441	8	0.47236	0.00391	10.3288	0.10964	0.15864	0.00199	0.90	1.20	1.02	
43	2407	25	2391	52	0.45257	0.00556	9.6109	0.25866	0.15402	0.00456	0.91	1.14	1.01	
~~44~~	~~266~~	~~3~~	~~444~~	~~87~~	~~0.04207~~	~~0.00056~~	~~0.32352~~	~~0.01604~~	~~0.05579~~	~~0.00285~~	~~0.90~~	~~0.61~~	~~0.60~~	~~Discordant~~
45	2016	13	2164	7	0.36721	0.00269	6.83322	0.0578	0.135	0.00148	0.90	0.45	0.93	Common Pb < det. lim.
46	1829	12	1803	8	0.32815	0.0025	4.98625	0.04974	0.11024	0.00134	0.90	0.46	1.01	
47	1829	12	1809	9	0.32806	0.00255	4.99986	0.05302	0.11057	0.00141	0.90	0.71	1.01	
48	1752	19	1679	32	0.3123	0.00396	4.43389	0.12104	0.103	0.00291	0.90	0.57	1.04	
49	1854	12	1853	9	0.33313	0.00257	5.20269	0.05343	0.1133	0.00141	0.90	0.33	1.00	
50	2475	24	2480	16	0.46809	0.00556	10.47104	0.19591	0.16228	0.00318	0.90	1.11	1.00	
51	1475	10	1658	26	0.25719	0.00197	3.61222	0.04011	0.10186	0.00137	0.88	0.05	0.89	
52	1746	12	1738	11	0.31114	0.00254	4.56218	0.05604	0.10637	0.00151	0.90	0.87	1.00	
53	2031	13	2227	7	0.37042	0.00277	7.14986	0.06358	0.14002	0.00158	0.90	0.32	0.91	
54	1674	24	1655	95	0.29655	0.00482	4.1565	0.19541	0.10166	0.00506	0.88	0.58	1.01	
~~55~~	~~295~~	~~4~~	~~1639~~	~~54~~	~~0.04676~~	~~0.00064~~	~~0.64983~~	~~0.0262~~	~~0.10081~~	~~0.00426~~	~~0.90~~	~~0.79~~	~~0.18~~	~~Discordant~~
56	1454	12	1590	19	0.25309	0.00238	3.4257	0.06035	0.09819	0.00188	0.90	0.58	0.91	
~~57~~	~~302~~	~~3~~	~~483~~	~~52~~	~~0.04789~~	~~0.00047~~	~~0.3749~~	~~0.01179~~	~~0.05679~~	~~0.00186~~	~~0.90~~	~~0.72~~	~~0.63~~	~~Discordant~~
58	1866	18	1922	22	0.33577	0.00376	5.44891	0.11439	0.11772	0.00261	0.90	0.64	0.97	
59	1760	16	1831	47	0.314	0.00323	4.84525	0.11162	0.11192	0.00282	0.88	0.48	0.96	
60	923	9	1289	61	0.15388	0.00155	1.77938	0.05173	0.08387	0.00258	0.85	0.30	0.72	
61	2233	14	2380	21	0.41394	0.00303	8.73377	0.08312	0.15302	0.00184	0.91	0.39	0.94	
62	1776	14	1832	39	0.31713	0.00281	4.8962	0.0946	0.11198	0.00238	0.90	0.79	0.97	
63	1842	13	1854	10	0.33067	0.00262	5.16792	0.05761	0.11337	0.0015	0.90	0.65	0.99	
64	1709	13	1882	34	0.3035	0.00257	4.81708	0.07924	0.11511	0.00213	0.90	0.63	0.91	
65	402	4	405	44	0.06428	0.00059	0.48584	0.01321	0.05483	0.00157	0.90	0.25	0.99	
66	2448	16	2497	7	0.4618	0.00364	10.43689	0.10073	0.16393	0.00194	0.90	1.28	0.98	
67	1674	11	1790	8	0.29642	0.00222	4.47135	0.04357	0.10942	0.00132	0.90	1.05	0.94	
68	258	3	259	65	0.04089	0.00041	0.28985	0.01052	0.05141	0.00193	0.90	0.79	1.00	
69	1687	16	1700	24	0.29914	0.0032	4.29636	0.09177	0.10418	0.00236	0.90	0.52	0.99	
70	282	3	361	80	0.04478	0.00052	0.33178	0.01488	0.05375	0.00248	0.90	0.75	0.78	
71	279	3	375	77	0.04422	0.00051	0.32982	0.01435	0.0541	0.00243	0.90	0.60	0.74	

72	2441	15	2460	22	0.46024	0.00349	10.18047	0.10277	0.16043	0.00203	0.91	0.40	0.99	
73	1997	20	1993	22	0.36303	0.00418	6.13082	0.13223	0.12249	0.00278	0.90	3.03	1.00	
74	2409	17	2405	30	0.4531	0.00381	9.70247	0.14903	0.15531	0.00272	0.93	1.23	1.00	
75	1853	11	1859	6	0.33294	0.00235	5.21715	0.04112	0.11366	0.00121	0.90	2.94	1.00	
~~76~~	~~266~~	~~3~~	~~213~~	~~95~~	~~0.04212~~	~~0.0005~~	~~0.29267~~	~~0.0148~~	~~0.0504~~	~~0.00261~~	~~0.90~~	~~0.47~~	~~1.25~~	~~Reversely Discordant~~
77	281	4	298	106	0.04449	0.00059	0.32076	0.01823	0.05229	0.00304	0.90	1.43	0.94	
~~78~~	~~262~~	~~8~~	~~1222~~	~~395~~	~~0.04143~~	~~0.00125~~	~~0.46281~~	~~0.08398~~	~~0.08102~~	~~0.0149~~	~~0.90~~	~~0.99~~	~~0.21~~	~~Discordant~~
79	1567	11	1552	11	0.27514	0.00216	3.65051	0.04347	0.09623	0.00134	0.90	0.76	1.01	
80	275	3	333	66	0.04362	0.00045	0.31934	0.012	0.0531	0.00206	0.90	0.66	0.83	
81	294	3	302	86	0.04666	0.00054	0.33699	0.01579	0.05238	0.00252	0.90	1.16	0.97	
82	285	3	330	67	0.04521	0.00048	0.33054	0.01257	0.05303	0.00209	0.90	1.11	0.86	
83	1638	22	1649	93	0.28934	0.00444	4.04392	0.18813	0.10137	0.00497	0.88	0.68	0.99	
84	2314	16	2488	26	0.43177	0.00352	9.7088	0.12499	0.16308	0.00249	0.91	0.76	0.93	
85	1787	18	1806	25	0.31946	0.00373	4.86319	0.11125	0.11041	0.00265	0.90	1.10	0.99	
86	1842	18	2016	20	0.33076	0.00366	5.66077	0.11171	0.12413	0.00261	0.90	1.45	0.91	
87	1683	15	1674	22	0.29828	0.00306	4.22445	0.08479	0.10272	0.0022	0.90	1.16	1.01	
88	2027	21	1963	23	0.36958	0.00436	6.13729	0.13729	0.12044	0.00282	0.90	0.39	1.03	
89	255	3	327	171	0.04035	0.00049	0.29461	0.02157	0.05296	0.00393	0.86	1.00	0.78	
90	1834	11	1858	21	0.32902	0.0023	5.15492	0.04496	0.11363	0.00127	0.89	0.15	0.99	
91	1861	17	1890	20	0.33468	0.00352	5.33722	0.10224	0.11566	0.00237	0.90	1.09	0.98	
92	1791	17	1816	24	0.32035	0.00353	4.90281	0.10607	0.111	0.00254	0.90	0.93	0.99	
93	1745	21	1755	34	0.3109	0.00426	4.60084	0.1352	0.10733	0.00326	0.90	0.74	0.99	
94	264	2	338	49	0.04179	0.00039	0.30668	0.0089	0.05322	0.00162	0.90	0.97	0.78	
95	2562	19	2620	9	0.48808	0.00433	11.87351	0.13975	0.17643	0.00239	0.90	0.81	0.98	Common Pb < det. lim.
96	2440	24	2454	17	0.46006	0.00547	10.14286	0.1928	0.15989	0.00319	0.90	0.65	0.99	
97	303	3	420	50	0.04813	0.00047	0.36618	0.01115	0.05518	0.00176	0.90	1.41	0.72	
98	1574	21	1847	175	0.27655	0.00412	4.30585	0.39711	0.11292	0.01055	0.84	1.25	0.85	
~~99~~	~~275~~	~~3~~	~~422~~	~~50~~	~~0.04362~~	~~0.00042~~	~~0.33233~~	~~0.01002~~	~~0.05525~~	~~0.00175~~	~~0.90~~	~~0.38~~	~~0.65~~	~~Discordant~~
100	2471	14	2460	6	0.46721	0.00328	10.33619	0.07724	0.16044	0.00166	0.90	0.08	1.00	
AY 09-22-11 (4); 38.535194°N 98.969306°E (3850 m)														
1	274	3	274	95	0.04344	0.00054	0.30988	0.01583	0.05174	0.00272	0.90	0.63	1.00	
2	2463	17	2492	9	0.46532	0.00385	10.48427	0.11573	0.16345	0.00216	0.90	0.58	0.99	
3	470	4	471	51	0.07566	0.00075	0.589	0.01823	0.05647	0.00183	0.90	0.39	1.00	
~~4~~	~~440~~	~~3~~	~~1575~~	~~11~~	~~0.07063~~	~~0.00052~~	~~0.94826~~	~~0.01105~~	~~0.09739~~	~~0.00137~~	~~0.90~~	~~0.86~~	~~0.28~~	~~Discordant~~
5	331	4	337	77	0.05262	0.00058	0.38576	0.01645	0.05319	0.00234	0.90	0.68	0.98	
6	443	3	441	30	0.07115	0.00058	0.54646	0.01087	0.05572	0.0012	0.90	0.52	1.00	
~~7~~	~~296~~	~~3~~	~~1075~~	~~30~~	~~0.04695~~	~~0.00041~~	~~0.48707~~	~~0.0106~~	~~0.07525~~	~~0.00177~~	~~0.90~~	~~0.69~~	~~0.28~~	~~Discordant~~
~~8~~	~~337~~	~~3~~	~~1941~~	~~21~~	~~0.05361~~	~~0.0005~~	~~0.87921~~	~~0.01689~~	~~0.11897~~	~~0.00254~~	~~0.90~~	~~0.81~~	~~0.17~~	~~Discordant~~
9	283	3	290	62	0.04487	0.00047	0.32221	0.01146	0.0521	0.00193	0.90	0.79	0.98	
10	285	3	287	104	0.04524	0.00056	0.32444	0.01792	0.05203	0.00294	0.90	0.61	0.99	
~~11~~	~~421~~	~~3~~	~~1120~~	~~18~~	~~0.06753~~	~~0.00052~~	~~0.71621~~	~~0.0108~~	~~0.07694~~	~~0.00132~~	~~0.90~~	~~0.56~~	~~0.38~~	~~Discordant~~
~~12~~	~~459~~	~~4~~	~~691~~	~~31~~	~~0.07385~~	~~0.00062~~	~~0.63613~~	~~0.01352~~	~~0.06249~~	~~0.00143~~	~~0.90~~	~~0.31~~	~~0.66~~	~~Discordant~~
13	272	2	290	42	0.04305	0.00037	0.30921	0.00784	0.0521	0.0014	0.90	0.35	0.94	
14	281	3	295	52	0.04462	0.00043	0.32119	0.00985	0.05222	0.00168	0.90	1.09	0.95	

15	279	6	284	299	0.04428	0.00103	0.31719	0.05093	0.05197	0.00842	0.90	0.79	0.98	
~~16~~	~~286~~	~~2~~	~~1742~~	~~12~~	~~0.04529~~	~~0.00034~~	~~0.66536~~	~~0.00826~~	~~0.10659~~	~~0.00158~~	~~0.90~~	~~0.48~~	~~0.16~~	~~Discordant~~
17	278	4	274	123	0.04404	0.00066	0.31403	0.0206	0.05174	0.00347	0.90	0.57	1.01	
18	267	2	269	48	0.04231	0.00037	0.30104	0.00837	0.05162	0.00151	0.90	0.51	0.99	
~~19~~	~~257~~	~~3~~	~~479~~	~~63~~	~~0.04075~~	~~0.00044~~	~~0.31835~~	~~0.01182~~	~~0.05668~~	~~0.00219~~	~~0.90~~	~~0.57~~	~~0.54~~	~~Discordant~~
20	263	2	282	46	0.0416	0.00037	0.29769	0.00807	0.05192	0.00148	0.90	0.58	0.93	
21	266	3	262	86	0.04205	0.00046	0.29828	0.01369	0.05147	0.00243	0.90	0.73	1.02	
~~22~~	~~404~~	~~3~~	~~345~~	~~28~~	~~0.06473~~	~~0.0005~~	~~0.47621~~	~~0.00875~~	~~0.05338~~	~~0.00108~~	~~0.90~~	~~0.23~~	~~1.17~~	~~Reversely Discordant~~
23	427	4	491	38	0.0684	0.0006	0.53714	0.01299	0.05698	0.00147	0.90	0.37	0.87	
~~24~~	~~435~~	~~4~~	~~646~~	~~36~~	~~0.06973~~	~~0.0006~~	~~0.58819~~	~~0.01392~~	~~0.0612~~	~~0.00154~~	~~0.90~~	~~0.40~~	~~0.67~~	~~Discordant~~
~~25~~	~~272~~	~~3~~	~~503~~	~~76~~	~~0.04304~~	~~0.00049~~	~~0.33988~~	~~0.01489~~	~~0.0573~~	~~0.00259~~	~~0.90~~	~~1.04~~	~~0.54~~	~~Discordant~~
26	271	3	275	63	0.04298	0.00043	0.30664	0.0109	0.05177	0.00191	0.90	1.27	0.99	
27	276	4	284	145	0.04367	0.0006	0.31276	0.02331	0.05196	0.00393	0.90	0.54	0.97	
28	274	4	323	182	0.04344	0.00057	0.31657	0.02475	0.05286	0.00419	0.87	0.99	0.85	
29	255	3	286	66	0.04038	0.00043	0.2895	0.01082	0.05202	0.00202	0.90	0.75	0.89	
30	271	2	276	55	0.04295	0.0004	0.30652	0.00961	0.05178	0.0017	0.90	0.61	0.98	
31	413	4	527	43	0.0661	0.00062	0.52781	0.0143	0.05794	0.00166	0.90	0.68	0.78	
32	416	3	417	22	0.06661	0.0005	0.50584	0.00805	0.05511	0.00098	0.90	0.52	1.00	
33	286	3	281	82	0.04529	0.00051	0.32386	0.01443	0.05189	0.00238	0.90	0.68	1.02	
34	259	2	247	36	0.04095	0.00034	0.28853	0.00642	0.05113	0.00122	0.90	0.44	1.05	
35	268	2	270	44	0.04247	0.00037	0.30234	0.00789	0.05166	0.00143	0.90	0.60	0.99	
36	309	7	350	256	0.04907	0.00113	0.3618	0.04778	0.0535	0.00715	0.90	0.61	0.88	
~~37~~	~~272~~	~~6~~	~~595~~	~~275~~	~~0.04312~~	~~0.00105~~	~~0.35508~~	~~0.05089~~	~~0.05975~~	~~0.00866~~	~~0.90~~	~~0.89~~	~~0.46~~	~~Discordant~~
38	412	3	415	31	0.06604	0.00054	0.50116	0.01016	0.05507	0.00121	0.90	0.30	0.99	
39	288	3	288	52	0.04567	0.00043	0.32771	0.00991	0.05207	0.00165	0.90	0.59	1.00	
40	407	3	468	67	0.0652	0.00052	0.50685	0.01443	0.05638	0.00167	0.81	0.30	0.87	
~~41~~	~~280~~	~~3~~	~~505~~	~~127~~	~~0.04438~~	~~0.0005~~	~~0.351~~	~~0.01925~~	~~0.05736~~	~~0.00321~~	~~0.87~~	~~0.79~~	~~0.55~~	~~Discordant~~
42	427	4	420	50	0.06845	0.00066	0.52074	0.01568	0.0552	0.00174	0.90	0.38	1.02	
43	274	3	275	74	0.04339	0.00047	0.30945	0.01272	0.05176	0.0022	0.90	0.64	1.00	
44	262	3	267	59	0.04147	0.00041	0.29481	0.0099	0.05159	0.00181	0.90	0.86	0.98	
45	282	2	286	42	0.04468	0.00038	0.32029	0.00802	0.05202	0.00138	0.90	0.62	0.99	
46	298	3	295	56	0.04734	0.00047	0.3406	0.01111	0.05221	0.00178	0.90	0.85	1.01	
47	279	3	286	67	0.04421	0.00047	0.31684	0.01193	0.05201	0.00203	0.90	0.67	0.98	
48	288	3	287	53	0.04566	0.00043	0.32737	0.01005	0.05203	0.00167	0.90	0.90	1.00	
49	421	3	423	33	0.06756	0.00056	0.51448	0.01114	0.05526	0.00129	0.90	0.60	1.00	
50	437	3	431	31	0.07019	0.00057	0.53651	0.01087	0.05547	0.00122	0.90	0.32	1.01	
~~51~~	~~272~~	~~3~~	~~1030~~	~~54~~	~~0.04315~~	~~0.00046~~	~~0.43759~~	~~0.01535~~	~~0.07359~~	~~0.00269~~	~~0.90~~	~~0.91~~	~~0.26~~	~~Discordant~~
52	277	2	274	49	0.04392	0.0004	0.31315	0.009	0.05174	0.00156	0.90	0.61	1.01	
53	328	10	311	320	0.05212	0.00156	0.37765	0.06752	0.05258	0.0095	0.90	1.28	1.05	
54	335	3	337	35	0.05328	0.00044	0.39056	0.00866	0.0532	0.00127	0.90	0.86	0.99	
55	274	5	301	365	0.04341	0.00074	0.31315	0.06112	0.05235	0.01025	0.90	0.85	0.91	
56	284	6	301	203	0.0451	0.0009	0.32547	0.03455	0.05236	0.00564	0.90	0.66	0.94	
57	454	4	439	34	0.0729	0.00062	0.55914	0.01227	0.05566	0.00131	0.90	0.33	1.03	
58	449	5	449	66	0.0722	0.0008	0.55638	0.02157	0.05592	0.00224	0.90	0.78	1.00	
59	405	3	408	25	0.06484	0.00049	0.49054	0.00839	0.0549	0.00104	0.90	0.29	0.99	

60	1820	14	1831	14	0.32623	0.00285	5.0316	0.07273	0.11192	0.00182	0.90	0.78	0.99	
61	268	2	281	40	0.04253	0.00036	0.30409	0.00745	0.05189	0.00135	0.90	0.99	0.95	
62	433	4	544	51	0.06955	0.00071	0.55962	0.01764	0.05839	0.00193	0.90	0.20	0.80	
63	297	3	294	73	0.04721	0.00054	0.33958	0.01401	0.0522	0.00223	0.90	0.48	1.01	
64	308	6	330	147	0.04898	0.00092	0.35787	0.02844	0.05302	0.00431	0.90	0.62	0.93	
~~65~~	~~444~~	~~3~~	~~1150~~	~~16~~	~~0.07127~~	~~0.00054~~	~~0.76748~~	~~0.01075~~	~~0.07814~~	~~0.00126~~	~~0.90~~	~~0.44~~	~~0.39~~	~~Discordant~~
~~66~~	~~297~~	~~2~~	~~1251~~	~~16~~	~~0.0472~~	~~0.00035~~	~~0.53492~~	~~0.00745~~	~~0.08224~~	~~0.00132~~	~~0.90~~	~~0.77~~	~~0.24~~	~~Discordant~~
~~67~~	~~314~~	~~3~~	~~810~~	~~31~~	~~0.04992~~	~~0.00043~~	~~0.45483~~	~~0.00997~~	~~0.06612~~	~~0.00157~~	~~0.90~~	~~0.80~~	~~0.39~~	~~Discordant~~
68	301	3	305	43	0.04782	0.00042	0.34557	0.00894	0.05244	0.00144	0.90	0.76	0.99	
69	282	3	336	78	0.04474	0.00055	0.32789	0.01456	0.05318	0.00244	0.90	0.98	0.84	
70	413	3	413	25	0.06611	0.00051	0.50117	0.00871	0.05501	0.00106	0.90	0.27	1.00	
71	322	6	320	142	0.05117	0.00097	0.37223	0.02884	0.05279	0.00419	0.90	0.52	1.01	
72	439	3	441	20	0.07044	0.00052	0.54077	0.008	0.05571	0.00093	0.90	0.33	1.00	
~~73~~	~~356~~	~~3~~	~~772~~	~~35~~	~~0.05673~~	~~0.00051~~	~~0.50759~~	~~0.01207~~	~~0.06493~~	~~0.00165~~	~~0.90~~	~~0.31~~	~~0.46~~	~~Discordant~~
74	461	3	466	34	0.07406	0.00056	0.57506	0.01226	0.05634	0.00128	0.90	0.33	0.99	
75	339	3	348	48	0.05393	0.0005	0.3972	0.0114	0.05344	0.00161	0.90	0.60	0.97	
~~76~~	~~426~~	~~4~~	~~403~~	~~45~~	~~0.06831~~	~~0.00062~~	~~0.51568~~	~~0.01412~~	~~0.05478~~	~~0.00158~~	~~0.90~~	~~0.46~~	~~1.06~~	~~Reversely Discordant~~
77	428	3	413	29	0.06873	0.00055	0.52108	0.0101	0.05502	0.00116	0.90	0.35	1.04	
78	434	4	434	50	0.06957	0.00068	0.53245	0.01617	0.05554	0.00177	0.90	0.81	1.00	
79	284	3	292	59	0.04498	0.00045	0.32317	0.01088	0.05214	0.00183	0.90	0.59	0.97	
~~80~~	~~355~~	~~7~~	~~627~~	~~150~~	~~0.05668~~	~~0.00118~~	~~0.47382~~	~~0.04057~~	~~0.06066~~	~~0.00531~~	~~0.90~~	~~0.97~~	~~0.57~~	~~Discordant~~
~~81~~	~~251~~	~~2~~	-	~~345~~	~~0.03978~~	~~0.00037~~	~~0.25256~~	~~0.05181~~	~~0.04605~~	~~0.00946~~	~~0.11~~	~~0.49~~	~~0.00~~	~~Discordant~~
82	295	3	295	59	0.04683	0.00044	0.33695	0.01124	0.05221	0.00181	0.90	0.81	1.00	
~~83~~	~~436~~	~~3~~	~~409~~	~~20~~	~~0.07003~~	~~0.00051~~	~~0.52993~~	~~0.00791~~	~~0.05491~~	~~0.00093~~	~~0.90~~	~~0.31~~	~~1.07~~	~~Reversely Discordant~~
84	281	3	286	70	0.04463	0.00049	0.31994	0.01265	0.05202	0.00213	0.90	0.61	0.98	
85	326	3	324	36	0.05195	0.00043	0.37855	0.00855	0.05288	0.00128	0.90	0.65	1.01	
86	285	2	281	54	0.04522	0.0004	0.32336	0.00997	0.05189	0.00167	0.90	0.72	1.01	
87	292	4	288	106	0.04634	0.00066	0.3324	0.01914	0.05205	0.00308	0.90	0.72	1.01	
~~88~~	~~278~~	~~4~~	~~1231~~	~~74~~	~~0.044~~	~~0.00063~~	~~0.49358~~	~~0.02435~~	~~0.08139~~	~~0.00416~~	~~0.90~~	~~0.65~~	~~0.23~~	~~Discordant~~
~~89~~	~~341~~	~~3~~	~~965~~	~~44~~	~~0.05436~~	~~0.00056~~	~~0.53381~~	~~0.01585~~	~~0.07125~~	~~0.00223~~	~~0.90~~	~~0.62~~	~~0.35~~	~~Discordant~~
90	277	3	268	59	0.04395	0.00044	0.31255	0.01061	0.0516	0.00183	0.90	0.45	1.03	
AY 09-22-11 (1); 38°33' 21.2"N, 98°55' 43.7"E (3793 m)														
1	448	4	479	36	0.07204	0.00059	0.56297	0.0128	0.05669	0.00137	0.90	0.68	0.94	
2	526	4	527	26	0.08505	0.00067	0.67906	0.01219	0.05792	0.00114	0.90	0.85	1.00	
3	460	4	464	30	0.07395	0.0006	0.57373	0.01152	0.05629	0.00122	0.90	0.54	0.99	
~~4~~	~~473~~	~~3~~	~~440~~	~~23~~	~~0.07613~~	~~0.00058~~	~~0.58428~~	~~0.0097~~	~~0.05568~~	~~0.00103~~	~~0.90~~	~~0.39~~	~~1.08~~	~~Reversely Discordant~~
5	519	4	532	19	0.08386	0.00062	0.6711	0.00974	0.05805	0.00096	0.90	0.59	0.98	
~~6~~	~~414~~	~~3~~	~~843~~	~~21~~	~~0.06629~~	~~0.00052~~	~~0.61384~~	~~0.01006~~	~~0.06718~~	~~0.00123~~	~~0.90~~	~~1.10~~	~~0.49~~	~~Discordant~~
7	740	7	738	42	0.12167	0.00123	1.07169	0.02976	0.0639	0.00186	0.90	0.61	1.00	
8	441	4	442	44	0.07076	0.00067	0.54356	0.01484	0.05573	0.0016	0.90	0.61	1.00	
9	458	5	460	58	0.07363	0.00077	0.57039	0.01967	0.0562	0.00201	0.90	0.62	1.00	
10	462	3	463	24	0.07431	0.00058	0.57649	0.00991	0.05628	0.00107	0.90	0.71	1.00	
11	433	4	421	35	0.06954	0.0006	0.52919	0.01205	0.05521	0.00134	0.90	0.62	1.03	
12	1654	10	1675	7	0.29248	0.00203	4.14326	0.03397	0.10277	0.00113	0.90	0.46	0.99	

13	511	4	514	31	0.08256	0.00069	0.65521	0.01366	0.05758	0.00129	0.90	0.73	0.99	
~~14~~	~~497~~	~~4~~	~~717~~	~~33~~	~~0.0801~~	~~0.0007~~	~~0.69843~~	~~0.0158~~	~~0.06326~~	~~0.00153~~	~~0.90~~	~~0.81~~	~~0.69~~	~~Discordant~~
15	516	5	515	46	0.08329	0.00081	0.6614	0.01895	0.05761	0.00173	0.90	0.89	1.00	
16	454	5	462	65	0.07301	0.00086	0.56607	0.02192	0.05625	0.00226	0.90	0.42	0.98	
17	472	3	467	22	0.07591	0.00058	0.58987	0.00945	0.05637	0.00101	0.90	0.51	1.01	
18	545	4	531	28	0.08821	0.00073	0.70546	0.01381	0.05802	0.00123	0.90	0.63	1.03	
19	481	4	480	30	0.0774	0.00064	0.60494	0.01234	0.0567	0.00125	0.90	0.50	1.00	
20	1747	14	1747	16	0.3112	0.00285	4.58517	0.07309	0.10689	0.00188	0.90	0.40	1.00	
21	438	3	436	27	0.07026	0.00056	0.53847	0.00989	0.0556	0.00112	0.90	0.74	1.00	
22	460	4	460	31	0.0739	0.00061	0.57241	0.0118	0.05619	0.00125	0.90	0.85	1.00	
23	441	3	446	24	0.07084	0.00055	0.54529	0.00936	0.05584	0.00106	0.90	0.49	0.99	
24	465	4	465	46	0.07483	0.0007	0.58098	0.01644	0.05633	0.00167	0.90	0.56	1.00	
~~25~~	~~338~~	~~2~~	~~1585~~	~~10~~	~~0.05391~~	~~0.00038~~	~~0.72767~~	~~0.00746~~	~~0.09793~~	~~0.00125~~	~~0.90~~	~~1.69~~	~~0.21~~	~~Discordant~~
26	452	5	454	67	0.0727	0.00084	0.56163	0.02211	0.05604	0.00228	0.90	1.06	1.00	
27	469	4	472	24	0.07554	0.00059	0.58847	0.01009	0.05651	0.00107	0.90	0.51	0.99	
28	533	5	534	45	0.08618	0.00082	0.69024	0.01936	0.0581	0.00171	0.90	1.05	1.00	
29	478	4	476	45	0.07702	0.00073	0.60105	0.01686	0.05661	0.00167	0.90	0.52	1.00	
30	680	5	829	18	0.11131	0.00085	1.0238	0.01508	0.06672	0.00111	0.90	1.10	0.82	
31	500	4	502	37	0.08066	0.00071	0.63683	0.01509	0.05728	0.00145	0.90	0.93	1.00	
32	468	4	470	33	0.07536	0.00064	0.58647	0.01279	0.05645	0.00132	0.90	0.73	1.00	
33	477	4	481	25	0.07684	0.0006	0.6007	0.01045	0.05672	0.00109	0.90	0.69	0.99	
34	469	4	471	27	0.07552	0.0006	0.58784	0.01093	0.05647	0.00115	0.90	0.52	1.00	
35	450	4	452	33	0.07235	0.00061	0.55827	0.01214	0.05598	0.00131	0.90	0.71	1.00	
36	518	5	519	50	0.08371	0.00085	0.66592	0.02047	0.05771	0.00186	0.90	0.54	1.00	
37	500	6	511	85	0.08064	0.00097	0.63923	0.03076	0.05751	0.00284	0.90	0.70	0.98	
38	499	5	497	44	0.0804	0.00078	0.63325	0.01754	0.05714	0.00167	0.90	1.61	1.00	
39	449	3	451	20	0.07206	0.00053	0.55579	0.00826	0.05596	0.00094	0.90	0.87	1.00	
40	475	4	469	36	0.07641	0.00067	0.59418	0.01389	0.05642	0.00141	0.90	0.37	1.01	
41	511	4	512	24	0.08242	0.00064	0.65375	0.01113	0.05754	0.00108	0.90	0.69	1.00	
~~42~~	~~477~~	~~3~~	~~932~~	~~12~~	~~0.07674~~	~~0.00055~~	~~0.74163~~	~~0.00847~~	~~0.07011~~	~~0.00097~~	~~0.90~~	~~0.93~~	~~0.51~~	~~Discordant~~
~~43~~	~~443~~	~~3~~	~~1011~~	~~13~~	~~0.07118~~	~~0.00051~~	~~0.7151~~	~~0.00859~~	~~0.07288~~	~~0.00104~~	~~0.90~~	~~1.02~~	~~0.44~~	~~Discordant~~
44	478	4	475	28	0.07689	0.00062	0.59969	0.01157	0.05658	0.00119	0.90	0.49	1.01	
45	465	4	461	51	0.07487	0.00075	0.58008	0.01804	0.05621	0.00183	0.90	0.41	1.01	
~~46~~	~~467~~	~~4~~	~~736~~	~~32~~	~~0.07506~~	~~0.00065~~	~~0.66029~~	~~0.01445~~	~~0.06382~~	~~0.0015~~	~~0.90~~	~~0.75~~	~~0.63~~	~~Discordant~~
47	490	4	502	32	0.07903	0.00067	0.62405	0.0133	0.05728	0.00131	0.90	0.64	0.98	
48	469	4	474	32	0.0755	0.00062	0.58842	0.01228	0.05654	0.00127	0.90	0.33	0.99	
49	480	4	607	34	0.07735	0.00067	0.64075	0.01442	0.06009	0.00145	0.90	0.49	0.79	
50	453	4	432	32	0.07288	0.0006	0.55736	0.01174	0.05548	0.00126	0.90	0.76	1.05	
51	517	5	532	52	0.08351	0.00084	0.66842	0.02134	0.05806	0.00193	0.90	0.62	0.97	
52	457	4	458	28	0.07346	0.00059	0.56841	0.01077	0.05614	0.00116	0.90	0.45	1.00	
53	500	4	504	17	0.08071	0.00059	0.63784	0.00861	0.05733	0.00089	0.90	0.55	0.99	
54	502	4	489	23	0.08093	0.00062	0.63506	0.01057	0.05693	0.00105	0.90	0.46	1.03	
55	513	4	483	24	0.0828	0.00064	0.64791	0.01098	0.05677	0.00106	0.90	0.68	1.06	
56	474	4	465	50	0.07634	0.00074	0.59264	0.01803	0.05632	0.00179	0.90	0.59	1.02	
57	450	4	454	31	0.07238	0.0006	0.55908	0.01161	0.05604	0.00126	0.90	0.52	0.99	

58	432	4	436	50	0.06928	0.00068	0.53076	0.01616	0.05558	0.00177	0.90	0.37	0.99	
59	508	5	514	44	0.08205	0.00076	0.6512	0.01785	0.05758	0.00166	0.90	1.05	0.99	
60	518	5	517	50	0.0837	0.00081	0.66543	0.0202	0.05767	0.00183	0.90	0.60	1.00	
61	503	4	502	17	0.08112	0.00059	0.64044	0.0086	0.05727	0.00089	0.90	0.75	1.00	
62	473	4	474	32	0.07605	0.00063	0.59285	0.01264	0.05655	0.00129	0.90	0.46	1.00	
63	490	4	492	31	0.07905	0.00066	0.62129	0.01297	0.05702	0.00128	0.90	0.58	1.00	
64	790	5	784	10	0.1304	0.00091	1.17407	0.01186	0.06531	0.00082	0.90	0.27	1.01	
65	444	3	442	30	0.07128	0.00057	0.54781	0.01081	0.05575	0.00119	0.90	0.53	1.00	
66	460	4	458	31	0.07396	0.00061	0.57227	0.01172	0.05613	0.00124	0.90	0.53	1.00	
67	529	4	572	30	0.08547	0.00072	0.69673	0.01447	0.05914	0.00132	0.90	0.42	0.92	
68	481	4	460	35	0.07746	0.00067	0.59989	0.0136	0.05619	0.00136	0.90	0.47	1.05	
69	2478	16	2463	7	0.46875	0.0036	10.38489	0.09959	0.16072	0.00193	0.90	0.36	1.01	
70	527	5	526	51	0.08519	0.00085	0.67975	0.02124	0.05789	0.00189	0.90	0.43	1.00	
71	770	8	793	47	0.12693	0.0014	1.1474	0.0361	0.06558	0.00215	0.90	0.81	0.97	
72	457	4	456	33	0.07346	0.00061	0.56789	0.01225	0.05608	0.0013	0.90	0.60	1.00	
73	495	4	493	34	0.07973	0.00068	0.62703	0.0141	0.05705	0.00137	0.90	0.40	1.00	
74	458	4	462	37	0.07364	0.00065	0.57087	0.01371	0.05624	0.00144	0.90	1.75	0.99	
75	501	4	507	21	0.08089	0.00061	0.63989	0.00997	0.05739	0.001	0.90	0.45	0.99	
76	509	4	512	16	0.08214	0.00059	0.65152	0.00841	0.05754	0.00087	0.90	0.55	0.99	
~~77~~	~~437~~	~~3~~	~~1391~~	~~12~~	~~0.07018~~	~~0.00051~~	~~0.85502~~	~~0.01003~~	~~0.08839~~	~~0.00125~~	~~0.90~~	~~1.47~~	~~0.31~~	~~Discordant~~
78	472	3	474	22	0.07603	0.00057	0.59263	0.00933	0.05654	0.001	0.90	0.53	1.00	
79	469	3	465	23	0.07541	0.00058	0.58555	0.00953	0.05633	0.00102	0.90	0.43	1.01	
80	490	4	548	36	0.07904	0.0007	0.6372	0.01511	0.05848	0.00148	0.90	1.01	0.89	
81	441	4	439	33	0.07079	0.00059	0.54325	0.01163	0.05567	0.00128	0.90	0.50	1.00	
82	777	6	780	19	0.1281	0.00098	1.1508	0.01715	0.06517	0.0011	0.90	0.41	1.00	
83	430	3	427	29	0.06903	0.00055	0.52671	0.0101	0.05536	0.00116	0.90	0.76	1.01	
~~84~~	~~416~~	~~3~~	~~724~~	~~28~~	~~0.06673~~	~~0.00056~~	~~0.58373~~	~~0.01169~~	~~0.06346~~	~~0.00138~~	~~0.90~~	~~0.73~~	~~0.57~~	~~Discordant~~
85	471	5	467	50	0.07579	0.00076	0.58906	0.018	0.05638	0.0018	0.90	0.64	1.01	
~~86~~	~~363~~	~~3~~	~~1240~~	~~46~~	~~0.05797~~	~~0.00045~~	~~0.65359~~	~~0.01408~~	~~0.08177~~	~~0.00187~~	~~0.87~~	~~0.76~~	~~0.29~~	~~Discordant~~
~~87~~	~~415~~	~~3~~	~~1118~~	~~10~~	~~0.06645~~	~~0.00047~~	~~0.70407~~	~~0.0073~~	~~0.07686~~	~~0.00099~~	~~0.90~~	~~0.85~~	~~0.37~~	~~Discordant~~
88	467	4	469	27	0.07505	0.00059	0.58368	0.01081	0.05642	0.00114	0.90	0.36	1.00	
~~89~~	~~414~~	~~3~~	~~877~~	~~60~~	~~0.06635~~	~~0.00054~~	~~0.62463~~	~~0.01699~~	~~0.06828~~	~~0.00194~~	~~0.84~~	~~0.55~~	~~0.47~~	~~Discordant~~
AY 09-26-11 (12)														
1	500	4	505	25	0.08065	0.0007	0.63761	0.01161	0.05735	0.00112	0.90	0.38	0.99	
2	512	4	510	31	0.08266	0.00073	0.65476	0.01372	0.05747	0.00127	0.90	0.48	1.00	
3	534	4	540	26	0.08631	0.00074	0.69312	0.01284	0.05826	0.00115	0.90	0.51	0.99	
4	507	5	512	39	0.08185	0.0008	0.64896	0.01657	0.05752	0.00154	0.90	0.44	0.99	
5	496	5	497	41	0.07996	0.00078	0.62987	0.01653	0.05715	0.00157	0.90	0.55	1.00	
6	528	6	539	68	0.08543	0.00101	0.68582	0.02796	0.05824	0.00244	0.90	0.63	0.98	
7	510	4	513	33	0.08232	0.00075	0.65304	0.01454	0.05755	0.00135	0.90	0.44	0.99	
8	507	4	517	25	0.08181	0.00071	0.65017	0.0119	0.05766	0.00113	0.90	0.46	0.98	
9	485	5	498	76	0.07817	0.00088	0.61583	0.02666	0.05716	0.00253	0.90	0.60	0.97	
10	722	6	799	31	0.11853	0.00112	1.07437	0.02411	0.06576	0.00155	0.90	0.46	0.90	Common Pb < det. lim.
11	689	7	811	50	0.11282	0.00119	1.02883	0.03315	0.06616	0.0022	0.90	0.57	0.85	Common Pb < det. lim.

12	1246	9	1323	9	0.21325	0.00171	2.50804	0.02505	0.08533	0.00101	0.90	0.42	0.94	Common Pb < det. lim.
13	463	4	525	36	0.07453	0.0007	0.59452	0.01415	0.05787	0.00145	0.90	0.47	0.88	
14	497	4	498	34	0.08008	0.00071	0.63089	0.01424	0.05716	0.00135	0.90	0.46	1.00	
15	501	5	504	53	0.08078	0.00079	0.63834	0.02044	0.05733	0.00189	0.90	0.51	0.99	
16	472	4	472	32	0.07602	0.00068	0.59205	0.01292	0.0565	0.0013	0.90	0.55	1.00	
17	509	4	507	28	0.08217	0.00072	0.6502	0.01288	0.0574	0.00121	0.90	0.55	1.00	
18	512	4	508	14	0.08258	0.00067	0.6536	0.00829	0.05742	0.00082	0.90	0.47	1.01	
19	442	4	494	32	0.07093	0.00063	0.55801	0.01218	0.05707	0.00131	0.90	0.70	0.89	
20	505	4	505	22	0.08141	0.0007	0.64348	0.01094	0.05734	0.00105	0.90	0.50	1.00	
21	507	4	510	33	0.08174	0.00074	0.64765	0.01439	0.05748	0.00134	0.90	0.42	0.99	
22	522	4	527	15	0.08433	0.00069	0.67334	0.00872	0.05793	0.00084	0.90	0.39	0.99	
23	502	5	502	78	0.08094	0.00088	0.6391	0.02805	0.05728	0.00256	0.90	0.37	1.00	
24	495	4	494	28	0.07981	0.00072	0.62785	0.01238	0.05707	0.0012	0.90	0.65	1.00	
25	496	4	490	35	0.07991	0.00073	0.62733	0.01448	0.05695	0.00138	0.90	0.58	1.01	
26	465	4	467	44	0.07473	0.00073	0.58053	0.0162	0.05636	0.00163	0.90	0.53	1.00	
~~27~~	~~502~~	~~6~~	~~1668~~	~~98~~	~~0.08106~~	~~0.00106~~	~~1.14466~~	~~0.05707~~	~~0.10241~~	~~0.00528~~	~~0.84~~	~~0.41~~	~~0.30~~	~~Discordant~~
28	397	4	398	47	0.06353	0.00058	0.47846	0.01354	0.05464	0.0016	0.90	0.70	1.00	
29	510	4	513	35	0.08241	0.00075	0.65385	0.01513	0.05756	0.0014	0.90	0.53	0.99	
30	504	4	505	28	0.08134	0.00072	0.64311	0.01274	0.05736	0.00121	0.90	0.47	1.00	
31	495	5	499	55	0.07982	0.0008	0.62927	0.02082	0.05719	0.00195	0.90	0.51	0.99	
32	501	4	507	30	0.08089	0.00073	0.64011	0.01338	0.05741	0.00127	0.90	0.68	0.99	
33	509	4	517	22	0.08218	0.00071	0.65329	0.01097	0.05767	0.00105	0.90	0.40	0.98	
34	478	4	483	42	0.07699	0.0007	0.60254	0.01583	0.05678	0.00155	0.90	0.45	0.99	
35	494	4	495	26	0.07962	0.0007	0.62648	0.0117	0.05708	0.00114	0.90	0.41	1.00	
36	488	4	488	21	0.07865	0.00067	0.6169	0.00995	0.0569	0.00099	0.90	0.42	1.00	
37	277	3	337	91	0.0439	0.0005	0.32196	0.0158	0.0532	0.00266	0.90	0.82	0.82	
38	491	4	502	54	0.0791	0.00075	0.62435	0.02	0.05726	0.00189	0.90	0.47	0.98	
39	492	4	500	30	0.07939	0.00071	0.6262	0.01307	0.05722	0.00126	0.90	0.41	0.98	
40	480	5	508	56	0.07723	0.00091	0.61145	0.02129	0.05743	0.00207	0.90	0.56	0.94	
41	491	5	488	56	0.07913	0.00079	0.62081	0.02081	0.05692	0.00196	0.90	0.51	1.01	
42	476	4	473	50	0.07667	0.00073	0.59748	0.01811	0.05653	0.00177	0.90	0.60	1.01	
43	485	4	495	39	0.07818	0.00074	0.61534	0.01568	0.0571	0.00152	0.90	0.39	0.98	
44	485	4	492	34	0.07819	0.0007	0.61452	0.01396	0.05701	0.00136	0.90	0.48	0.99	
45	504	4	508	38	0.08132	0.00073	0.64364	0.01584	0.05742	0.00147	0.90	0.71	0.99	
46	1320	10	1359	9	0.22732	0.00185	2.72398	0.02738	0.08693	0.00103	0.90	0.15	0.97	
47	494	4	500	27	0.07962	0.00071	0.62814	0.01222	0.05723	0.00118	0.90	0.55	0.99	
48	495	5	510	48	0.07978	0.00082	0.63214	0.01903	0.05748	0.00179	0.90	0.47	0.97	
49	490	5	491	38	0.07897	0.00076	0.62019	0.01539	0.05698	0.00148	0.90	0.43	1.00	
50	1199	9	1284	9	0.20441	0.00166	2.35696	0.02385	0.08365	0.00099	0.90	0.15	0.93	
51	483	4	498	24	0.0778	0.00069	0.61319	0.01111	0.05717	0.00111	0.90	0.37	0.97	
52	502	4	501	16	0.08098	0.00068	0.63902	0.00869	0.05724	0.00086	0.90	0.36	1.00	
53	490	4	500	24	0.07902	0.00068	0.62337	0.01096	0.05722	0.00107	0.90	0.45	0.98	
~~54~~	~~1150~~	~~9~~	~~1303~~	~~12~~	~~0.19528~~	~~0.00166~~	~~2.27317~~	~~0.02853~~	~~0.08444~~	~~0.00119~~	~~0.90~~	~~0.58~~	~~0.88~~	~~Common Pb < det. lim.~~
55	482	4	489	32	0.07757	0.0007	0.60884	0.01318	0.05694	0.0013	0.90	0.40	0.99	
56	485	4	482	32	0.07808	0.00071	0.61082	0.01321	0.05675	0.00129	0.90	0.56	1.01	

57	470	4	476	30	0.07571	0.00068	0.59058	0.01238	0.05659	0.00125	0.90	0.58	0.99	
~~58~~	~~486~~	~~4~~	~~461~~	~~32~~	~~0.07823~~	~~0.00073~~	~~0.60637~~	~~0.01332~~	~~0.05623~~	~~0.0013~~	~~0.90~~	~~0.54~~	~~1.05~~	~~Reversely Discordant~~
59	481	4	483	24	0.07749	0.00067	0.60659	0.01071	0.05679	0.00107	0.90	0.40	1.00	
60	485	4	488	18	0.07813	0.00066	0.61303	0.00886	0.05692	0.0009	0.90	0.36	0.99	
61	493	4	497	21	0.07942	0.00069	0.62556	0.0103	0.05714	0.00102	0.90	0.36	0.99	
62	498	5	504	34	0.08032	0.00076	0.63474	0.0147	0.05733	0.00139	0.90	0.61	0.99	
63	484	4	516	56	0.07794	0.00075	0.61925	0.0207	0.05764	0.00198	0.90	0.51	0.94	
64	1300	10	1399	34	0.22342	0.00193	2.73364	0.04182	0.08874	0.00156	0.90	0.35	0.93	
65	455	4	560	18	0.07312	0.00062	0.59277	0.00869	0.05881	0.00094	0.90	0.39	0.81	Common Pb < det. lim.
66	487	4	472	28	0.07852	0.00071	0.61147	0.01213	0.05649	0.00119	0.90	0.40	1.03	
67	487	5	584	44	0.0784	0.00082	0.64277	0.01831	0.05947	0.00176	0.90	0.57	0.83	Common Pb < det. lim.
68	488	5	485	42	0.07867	0.00077	0.61631	0.0166	0.05683	0.00159	0.90	0.36	1.01	
69	467	4	505	56	0.07516	0.00067	0.59433	0.0137	0.05735	0.00142	0.88	0.37	0.92	
70	495	4	495	23	0.07989	0.00071	0.62893	0.01101	0.0571	0.00107	0.90	0.44	1.00	
71	485	4	483	14	0.07816	0.00065	0.61172	0.00769	0.05677	0.0008	0.90	0.36	1.00	
72	494	4	492	17	0.07958	0.00068	0.62551	0.00904	0.05702	0.0009	0.90	0.53	1.00	
73	1138	9	1232	10	0.19306	0.0016	2.16753	0.0231	0.08144	0.001	0.90	0.30	0.92	Common Pb < det. lim.
74	497	5	507	41	0.08012	0.00081	0.63397	0.017	0.0574	0.0016	0.90	0.32	0.98	
75	413	4	588	22	0.06609	0.00058	0.54271	0.00912	0.05956	0.00108	0.90	0.57	0.70	Common Pb < det. lim.
~~76~~	~~375~~	~~3~~	~~731~~	~~29~~	~~0.05986~~	~~0.00056~~	~~0.52562~~	~~0.01125~~	~~0.06369~~	~~0.00144~~	~~0.90~~	~~0.53~~	~~0.51~~	~~Discordant~~
77	503	5	501	33	0.08111	0.00078	0.63999	0.01439	0.05724	0.00135	0.90	0.29	1.00	
78	493	4	500	16	0.07955	0.00067	0.62737	0.00851	0.05721	0.00086	0.90	0.30	0.99	
79	491	4	497	21	0.07917	0.00068	0.62374	0.01013	0.05715	0.001	0.90	0.35	0.99	
80	489	4	497	14	0.07889	0.00066	0.62139	0.00796	0.05713	0.00081	0.90	0.37	0.98	
81	483	4	490	23	0.07786	0.00068	0.61149	0.01046	0.05697	0.00104	0.90	0.41	0.99	
82	498	4	495	33	0.08025	0.00075	0.63161	0.01427	0.05709	0.00135	0.90	0.33	1.01	
83	498	6	517	82	0.08029	0.00107	0.63827	0.03067	0.05766	0.00284	0.90	0.37	0.96	
~~84~~	~~1097~~	~~9~~	~~1321~~	~~17~~	~~0.18548~~	~~0.00173~~	~~2.17913~~	~~0.03436~~	~~0.08522~~	~~0.00145~~	~~0.90~~	~~0.38~~	~~0.83~~	~~Common Pb < det. lim.~~
85	1351	10	1323	9	0.23315	0.00193	2.74181	0.02723	0.08531	0.00099	0.90	0.06	1.02	
86	479	4	491	34	0.07709	0.00071	0.60559	0.01375	0.05699	0.00135	0.90	0.33	0.98	
87	483	4	509	34	0.07786	0.00074	0.61674	0.01433	0.05746	0.0014	0.90	0.41	0.95	
88	493	4	493	27	0.07946	0.00073	0.62498	0.01228	0.05705	0.00119	0.90	0.41	1.00	
89	493	4	540	20	0.07952	0.00069	0.63869	0.01012	0.05826	0.001	0.90	0.42	0.91	
90	975	8	1073	11	0.16327	0.00138	1.69187	0.0199	0.07517	0.00099	0.90	0.44	0.91	Common Pb < det. lim.
AY 09-26-11 (9B)														
1	910	7	888	19	0.1516	0.00117	1.43456	0.02169	0.06865	0.00117	0.90	0.51	1.02	Common Pb < det. lim.
2	877	6	853	16	0.14572	0.00107	1.35584	0.01788	0.0675	0.00104	0.90	0.33	1.03	Common Pb < det. lim.
3	1563	12	1572	15	0.27435	0.00229	3.67704	0.05365	0.09723	0.0016	0.90	1.25	0.99	
4	897	6	879	11	0.14933	0.00103	1.40683	0.01493	0.06835	0.0009	0.90	0.22	1.02	
5	1527	11	1528	14	0.26725	0.00213	3.49924	0.0468	0.09499	0.00146	0.90	0.65	1.00	
6	913	6	918	15	0.15212	0.00112	1.46056	0.01932	0.06966	0.00107	0.90	0.70	0.99	
7	2685	18	2665	8	0.51657	0.00417	12.90824	0.13229	0.18129	0.00226	0.90	0.33	1.01	
8	897	6	891	16	0.14927	0.00111	1.41453	0.01919	0.06875	0.00108	0.90	0.69	1.01	
9	753	5	816	19	0.12392	0.00093	1.13268	0.01676	0.06631	0.00112	0.90	0.37	0.92	

10	1543	10	1542	10	0.27041	0.00196	3.56779	0.03752	0.09572	0.00124	0.90	0.59	1.00	
11	2281	14	2299	7	0.42444	0.00305	8.53977	0.07503	0.14597	0.00168	0.90	0.46	0.99	
12	1792	14	1755	16	0.32039	0.00287	4.74234	0.07377	0.10738	0.00186	0.90	0.96	1.02	Common Pb < det. lim.
13	1569	10	1546	8	0.2755	0.00191	3.6423	0.03336	0.09591	0.00114	0.90	0.37	1.01	
14	1579	11	1545	14	0.27747	0.00223	3.66643	0.04984	0.09586	0.0015	0.90	0.81	1.02	Common Pb < det. lim.
15	1747	12	1747	10	0.31138	0.00236	4.58882	0.05175	0.10691	0.00145	0.90	0.88	1.00	
16	1479	10	1480	11	0.25782	0.00192	3.29046	0.03804	0.09259	0.00128	0.90	0.51	1.00	
17	1569	11	1563	14	0.27564	0.00223	3.67642	0.05027	0.09676	0.00152	0.90	0.80	1.00	
18	2643	21	2579	11	0.50672	0.00482	12.02863	0.16168	0.17221	0.00259	0.90	0.51	1.02	
19	884	5	862	8	0.14693	0.00096	1.37316	0.01099	0.0678	0.00075	0.90	0.21	1.03	
20	903	6	902	8	0.15029	0.001	1.43161	0.01227	0.06911	0.00079	0.90	0.54	1.00	
21	1155	15	1113	53	0.19625	0.00275	2.07423	0.07805	0.07668	0.00298	0.90	1.61	1.04	
22	916	6	911	13	0.15264	0.00108	1.46035	0.01677	0.06941	0.00096	0.90	0.27	1.01	
23	905	6	875	13	0.15074	0.00106	1.41717	0.01629	0.0682	0.00095	0.90	0.19	1.03	
24	861	6	867	14	0.14294	0.00102	1.33861	0.01635	0.06794	0.00099	0.90	0.39	0.99	
25	1816	11	2227	21	0.32543	0.00233	6.28212	0.06133	0.14001	0.0017	0.89	0.14	0.82	
26	1495	12	1495	20	0.26096	0.0024	3.35829	0.06008	0.09336	0.00182	0.90	0.74	1.00	
27	895	6	893	10	0.14895	0.00101	1.41287	0.0141	0.06881	0.00087	0.90	0.29	1.00	
28	923	7	917	19	0.15395	0.00119	1.47739	0.02241	0.06962	0.00119	0.90	0.44	1.01	
29	918	6	889	10	0.15298	0.00104	1.44823	0.01419	0.06868	0.00086	0.90	0.14	1.03	
30	927	6	930	12	0.15467	0.00108	1.49349	0.01669	0.07005	0.00095	0.90	0.13	1.00	
31	876	6	876	17	0.14555	0.00108	1.36903	0.01919	0.06824	0.0011	0.90	0.43	1.00	
32	1619	11	1601	14	0.28556	0.00229	3.8874	0.05224	0.09876	0.00153	0.90	0.90	1.01	
~~33~~	~~925~~	~~6~~	~~869~~	~~17~~	~~0.15423~~	~~0.00115~~	~~1.44584~~	~~0.02029~~	~~0.06801~~	~~0.0011~~	~~0.90~~	~~0.32~~	~~1.06~~	~~Reversely Discordant~~
34	888	6	884	14	0.14772	0.00105	1.39499	0.01697	0.06851	0.00099	0.90	0.36	1.00	
~~35~~	~~938~~	~~6~~	~~893~~	~~16~~	~~0.1567~~	~~0.00116~~	~~1.48607~~	~~0.02013~~	~~0.0688~~	~~0.00108~~	~~0.90~~	~~0.32~~	~~1.05~~	~~Reversely Discordant~~
36	2826	17	2809	6	0.55011	0.00408	15.00649	0.1302	0.1979	0.00225	0.90	0.68	1.01	
37	900	6	884	10	0.14975	0.00101	1.41437	0.01345	0.06852	0.00084	0.90	0.28	1.02	
38	1459	10	1454	11	0.25401	0.00186	3.19922	0.0362	0.09137	0.00125	0.90	0.55	1.00	
39	822	5	866	12	0.13604	0.00094	1.27355	0.01384	0.06791	0.00091	0.90	0.33	0.95	
40	987	6	949	9	0.16548	0.0011	1.61308	0.01439	0.07072	0.00083	0.90	0.06	1.04	
41	1452	10	1451	12	0.25265	0.00187	3.1767	0.03698	0.09121	0.00128	0.90	0.78	1.00	
42	921	6	888	14	0.1535	0.0011	1.45233	0.01806	0.06864	0.00101	0.90	0.33	1.04	
43	926	6	929	11	0.15456	0.00107	1.49151	0.01608	0.07001	0.00093	0.90	0.16	1.00	
44	919	6	923	10	0.1533	0.00105	1.47514	0.01493	0.06981	0.00089	0.90	0.36	1.00	
45	1419	11	1412	17	0.24625	0.00203	3.03314	0.04588	0.08935	0.00152	0.90	0.74	1.00	
46	1606	16	1659	27	0.28299	0.00324	3.97557	0.09404	0.10191	0.00254	0.90	0.85	0.97	Common Pb < det. lim.
47	920	6	909	16	0.15343	0.00113	1.46685	0.01991	0.06936	0.00109	0.90	0.35	1.01	
48	763	5	809	15	0.12557	0.0009	1.14391	0.01443	0.06608	0.00099	0.90	0.45	0.94	Common Pb < det. lim.
49	881	6	884	11	0.14648	0.001	1.38325	0.01416	0.06851	0.00088	0.90	0.31	1.00	
50	899	6	901	16	0.1497	0.0011	1.42512	0.01927	0.06906	0.00108	0.90	0.39	1.00	
51	836	5	831	28	0.13845	0.00092	1.27466	0.01414	0.06677	0.00086	0.89	0.19	1.01	
52	525	4	508	22	0.08491	0.00063	0.67208	0.01065	0.05742	0.00102	0.90	0.50	1.03	
53	901	6	900	9	0.14994	0.001	1.42691	0.01305	0.06904	0.00083	0.90	0.31	1.00	
54	911	6	906	11	0.15174	0.00104	1.44823	0.01483	0.06924	0.00089	0.90	0.08	1.01	

55	887	6	882	17	0.14749	0.00109	1.39118	0.01934	0.06843	0.0011	0.90	0.54	1.01	
56	914	6	913	15	0.15225	0.0011	1.45846	0.01858	0.06949	0.00104	0.90	0.36	1.00	
57	948	7	973	15	0.15836	0.00117	1.56182	0.02083	0.07155	0.00111	0.90	0.36	0.97	
58	1079	7	1096	13	0.18219	0.00131	1.90993	0.02259	0.07605	0.00108	0.90	0.35	0.98	
59	1858	12	1882	9	0.33398	0.00248	5.30141	0.05565	0.11515	0.0015	0.90	0.92	0.99	
60	503	3	497	12	0.08113	0.00054	0.63896	0.00654	0.05714	0.00074	0.90	0.45	1.01	
61	1442	10	1488	13	0.25067	0.00192	3.21352	0.04046	0.093	0.00138	0.90	1.14	0.97	
62	893	6	890	13	0.14864	0.00105	1.40772	0.01665	0.0687	0.00098	0.90	0.31	1.00	
63	894	6	859	12	0.14867	0.00102	1.38737	0.01488	0.0677	0.0009	0.90	0.25	1.04	
64	2572	16	2587	7	0.49036	0.00366	11.69172	0.10778	0.17297	0.00205	0.90	0.26	0.99	
65	548	3	779	10	0.08878	0.00059	0.79732	0.00748	0.06515	0.0008	0.90	0.22	0.70	Common Pb < det. lim.
66	935	6	936	16	0.15608	0.00114	1.51147	0.02005	0.07025	0.00109	0.90	0.30	1.00	
67	918	6	921	11	0.15308	0.00105	1.47195	0.01514	0.06976	0.0009	0.90	0.44	1.00	
68	1010	14	1192	331	0.16959	0.00256	1.86583	0.29035	0.07979	0.01248	0.84	0.78	0.85	
69	919	6	917	12	0.15323	0.00106	1.47073	0.01628	0.06963	0.00095	0.90	0.28	1.00	
70	1729	11	1734	10	0.30762	0.00227	4.50054	0.04867	0.10614	0.00141	0.90	0.45	1.00	
71	1287	8	1277	11	0.22097	0.00158	2.53874	0.02814	0.08335	0.00113	0.90	0.12	1.01	
72	1172	9	1196	19	0.19941	0.00162	2.1977	0.03511	0.07995	0.00143	0.90	0.57	0.98	
73	910	6	927	10	0.15154	0.00102	1.46132	0.01399	0.06996	0.00087	0.90	0.24	0.98	
74	1548	11	1580	14	0.27136	0.00218	3.65321	0.05058	0.09767	0.00156	0.90	0.85	0.98	
75	1161	7	1186	11	0.19734	0.00139	2.16375	0.02359	0.07955	0.00107	0.90	0.27	0.98	
76	1502	10	1503	13	0.26239	0.00203	3.39157	0.04393	0.09377	0.00142	0.90	1.04	1.00	
77	885	5	887	9	0.14719	0.00097	1.3917	0.01225	0.0686	0.00081	0.90	0.55	1.00	
78	917	6	925	12	0.15278	0.00106	1.47153	0.01631	0.06988	0.00095	0.90	0.08	0.99	
~~79~~	~~1365~~	~~2478~~	~~5761~~	~~10572~~	~~0.23591~~	~~0.4751~~	~~47.37977~~	~~65.55048~~	~~1.45701~~	~~3.12851~~	~~0.90~~	~~0.27~~	~~0.24~~	~~Discordant~~
80	1792	11	1783	9	0.32045	0.00228	4.81431	0.04698	0.10899	0.00136	0.90	0.27	1.01	
AY 09-26-11 (7E)														
1	462	5	458	71	0.07422	0.00089	0.57451	0.02391	0.05615	0.00242	0.90	0.02	1.01	
2	492	4	503	27	0.07928	0.00063	0.62607	0.01154	0.05729	0.00116	0.90	0.21	0.98	
3	800	6	803	15	0.13216	0.00097	1.20014	0.01511	0.06588	0.00097	0.90	0.56	1.00	
4	471	4	470	31	0.07586	0.00063	0.59022	0.01229	0.05644	0.00127	0.90	0.04	1.00	
5	860	6	875	18	0.14277	0.00111	1.34241	0.01976	0.06821	0.00114	0.90	0.47	0.98	
6	784	6	782	23	0.1294	0.00105	1.16387	0.01999	0.06525	0.00124	0.90	0.28	1.00	
7	887	6	897	15	0.1475	0.0011	1.40139	0.01836	0.06893	0.00105	0.90	0.31	0.99	
8	469	5	473	67	0.07554	0.00089	0.58847	0.02343	0.05652	0.00233	0.90	0.10	0.99	
9	591	5	626	25	0.09598	0.00077	0.80209	0.0144	0.06062	0.0012	0.90	0.24	0.94	
10	901	6	905	14	0.15003	0.0011	1.43127	0.01746	0.06921	0.001	0.90	0.48	1.00	
11	796	6	832	21	0.13138	0.00106	1.20973	0.02015	0.0668	0.00124	0.90	0.36	0.96	
12	474	4	506	43	0.07631	0.00072	0.60363	0.01632	0.05738	0.00164	0.90	0.15	0.94	
13	639	5	757	17	0.10416	0.00078	0.92576	0.01305	0.06447	0.00104	0.90	0.32	0.84	Common Pb < det. lim.
14	760	6	782	26	0.12504	0.00105	1.12449	0.02127	0.06524	0.00135	0.90	0.35	0.97	
15	556	6	599	49	0.09012	0.00094	0.74385	0.02316	0.05988	0.00195	0.90	0.16	0.93	
16	461	6	454	74	0.07408	0.00093	0.5722	0.02485	0.05603	0.00251	0.90	0.05	1.02	
17	493	5	497	48	0.07941	0.00081	0.62541	0.01888	0.05713	0.00181	0.90	0.20	0.99	

18	779	6	846	21	0.12848	0.00103	1.19117	0.01953	0.06726	0.00123	0.90	0.44	0.92	Common Pb < det. lim.
19	692	5	777	12	0.11325	0.00081	1.01604	0.01146	0.06508	0.00089	0.90	0.40	0.89	Common Pb < det. lim.
20	729	6	758	33	0.11965	0.0011	1.06396	0.02447	0.06451	0.00159	0.90	0.25	0.96	
21	702	6	703	26	0.11507	0.00096	0.99703	0.01897	0.06286	0.0013	0.90	0.38	1.00	
22	702	6	715	37	0.11501	0.0011	1.00187	0.02517	0.0632	0.00168	0.90	0.34	0.98	
23	806	5	817	12	0.13327	0.00095	1.21877	0.01362	0.06634	0.0009	0.90	0.39	0.99	
24	555	7	556	69	0.08984	0.00117	0.72712	0.03067	0.05871	0.00256	0.90	0.13	1.00	
25	489	7	487	95	0.07876	0.00113	0.61759	0.0336	0.05689	0.00317	0.90	0.10	1.00	
26	857	7	886	28	0.14215	0.00127	1.34402	0.02768	0.06859	0.00152	0.90	0.40	0.97	
27	842	6	840	12	0.13952	0.00101	1.29016	0.01477	0.06708	0.00092	0.90	0.43	1.00	
28	878	6	892	16	0.14594	0.0011	1.38363	0.01849	0.06878	0.00106	0.90	0.31	0.98	
29	637	5	651	28	0.10391	0.00087	0.87858	0.01719	0.06134	0.0013	0.90	0.36	0.98	
30	690	6	747	28	0.11306	0.00097	0.99986	0.01996	0.06416	0.00139	0.90	0.36	0.92	Common Pb < det. lim.
31	827	7	907	57	0.13685	0.00128	1.30692	0.03308	0.06926	0.00187	0.87	0.13	0.91	
32	534	6	528	67	0.08634	0.00106	0.68968	0.02778	0.05795	0.00242	0.90	0.08	1.01	
33	917	6	910	9	0.15292	0.00106	1.46256	0.01357	0.06938	0.00083	0.90	0.51	1.01	
34	554	4	697	16	0.08976	0.00066	0.77538	0.01018	0.06267	0.00096	0.90	0.39	0.79	Common Pb < det. lim.
35	622	6	677	70	0.10131	0.001	0.86714	0.02637	0.06208	0.00199	0.86	0.14	0.92	
36	451	5	452	59	0.07251	0.0008	0.55978	0.01982	0.056	0.00206	0.90	0.05	1.00	
37	653	5	691	17	0.10668	0.0008	0.91892	0.01278	0.06249	0.001	0.90	0.30	0.95	
38	464	4	468	51	0.07457	0.00075	0.57957	0.01814	0.05639	0.00185	0.90	0.03	0.99	
39	500	6	498	66	0.08067	0.00098	0.63573	0.02526	0.05717	0.00236	0.90	0.08	1.00	
40	455	5	452	76	0.0732	0.00087	0.56495	0.02459	0.05599	0.00251	0.90	0.03	1.01	
41	492	5	500	51	0.07938	0.00083	0.62607	0.01982	0.05722	0.0019	0.90	0.08	0.98	
42	744	6	772	26	0.1224	0.00103	1.09565	0.0207	0.06494	0.00134	0.90	0.40	0.96	
43	562	4	665	23	0.09115	0.00073	0.77566	0.01336	0.06173	0.00118	0.90	0.39	0.85	Common Pb < det. lim.
44	740	5	792	16	0.12164	0.0009	1.09901	0.01442	0.06555	0.001	0.90	0.49	0.93	Common Pb < det. lim.
45	625	5	739	19	0.10177	0.00078	0.89656	0.01347	0.06391	0.00109	0.90	0.40	0.85	Common Pb < det. lim.
46	468	6	484	76	0.07525	0.00096	0.58921	0.02632	0.05681	0.00262	0.90	0.04	0.97	
47	792	6	845	16	0.13077	0.00099	1.2117	0.01672	0.06722	0.00107	0.90	0.44	0.94	Common Pb < det. lim.
48	899	7	907	17	0.14972	0.00116	1.42989	0.02071	0.06928	0.00114	0.90	0.48	0.99	
49	495	6	491	78	0.07976	0.00104	0.62651	0.02866	0.05698	0.00269	0.90	0.02	1.01	
50	479	6	482	74	0.07718	0.00096	0.60394	0.02615	0.05676	0.00254	0.90	0.08	0.99	
51	801	6	803	25	0.13238	0.00111	1.20245	0.02227	0.0659	0.00133	0.90	0.32	1.00	
52	482	6	543	78	0.07766	0.00104	0.62461	0.02906	0.05835	0.0028	0.90	0.03	0.89	
53	831	6	850	14	0.13755	0.00101	1.27775	0.01563	0.06739	0.00097	0.90	0.45	0.98	
54	823	6	840	23	0.13625	0.00112	1.25948	0.02187	0.06706	0.00128	0.90	0.36	0.98	
55	480	6	514	69	0.07722	0.00096	0.61293	0.02533	0.05758	0.00246	0.90	0.05	0.93	
56	492	5	493	60	0.07929	0.00089	0.62347	0.02256	0.05704	0.00215	0.90	0.05	1.00	
57	873	6	878	9	0.14498	0.00101	1.36513	0.01291	0.06831	0.00083	0.90	0.43	0.99	
58	729	5	713	44	0.1197	0.0009	1.04201	0.01931	0.06314	0.00126	0.88	0.40	1.02	
59	800	5	829	35	0.13213	0.00096	1.21521	0.01755	0.0667	0.00108	0.88	0.21	0.97	
60	488	5	493	57	0.07862	0.00085	0.61813	0.02138	0.05704	0.00205	0.90	0.03	0.99	
61	456	8	512	130	0.07329	0.00136	0.58127	0.04284	0.05754	0.00434	0.90	0.03	0.89	
62	733	6	773	26	0.12045	0.00101	1.07878	0.02032	0.06497	0.00134	0.90	0.32	0.95	

63	819	6	866	17	0.1355	0.00104	1.2687	0.01806	0.06793	0.0011	0.90	0.44	0.95	
64	474	5	484	66	0.07622	0.0009	0.59685	0.02361	0.05681	0.00233	0.90	0.04	0.98	
65	498	7	568	112	0.08035	0.00109	0.65383	0.03159	0.05901	0.00296	0.86	0.07	0.88	
66	525	4	536	24	0.08484	0.00066	0.68019	0.01166	0.05816	0.0011	0.90	0.28	0.98	
67	698	5	699	26	0.11433	0.00095	0.98842	0.01859	0.06272	0.00129	0.90	0.31	1.00	
68	776	6	775	22	0.12798	0.00102	1.1469	0.01897	0.06501	0.0012	0.90	0.44	1.00	
69	490	7	527	96	0.07896	0.00122	0.63046	0.03548	0.05793	0.00335	0.90	0.03	0.93	
70	831	6	841	17	0.13767	0.00105	1.27371	0.01781	0.06712	0.00108	0.90	0.37	0.99	
71	713	6	718	28	0.11699	0.00101	1.02052	0.02064	0.06328	0.00139	0.90	0.17	0.99	
72	481	4	483	42	0.07748	0.00073	0.60655	0.01614	0.05679	0.0016	0.90	0.34	1.00	
73	789	6	813	25	0.13022	0.00109	1.1885	0.02187	0.06621	0.00133	0.90	0.42	0.97	
74	758	5	771	17	0.12473	0.00094	1.11578	0.01554	0.06489	0.00104	0.90	0.43	0.98	
75	923	6	916	10	0.15396	0.00108	1.47662	0.01463	0.06958	0.00087	0.90	0.12	1.01	
76	486	4	485	41	0.0783	0.00072	0.61339	0.01605	0.05683	0.00157	0.90	0.05	1.00	
77	770	5	811	15	0.1269	0.00095	1.15704	0.01523	0.06615	0.00101	0.90	0.43	0.95	Common Pb < det. lim.
78	766	6	768	27	0.12621	0.00108	1.12763	0.02209	0.06481	0.00138	0.90	0.27	1.00	
79	476	5	488	51	0.0767	0.00078	0.60181	0.01894	0.05692	0.00187	0.90	0.04	0.98	
80	844	6	878	17	0.13994	0.00108	1.31782	0.01895	0.06831	0.00112	0.90	0.44	0.96	
81	854	6	869	19	0.14162	0.00112	1.32753	0.02046	0.068	0.00118	0.90	0.41	0.98	
82	620	5	620	53	0.10089	0.00085	0.84095	0.01879	0.06045	0.00144	0.86	0.12	1.00	
83	796	6	815	16	0.13148	0.00099	1.20125	0.01636	0.06628	0.00104	0.90	0.50	0.98	
84	596	5	640	32	0.09693	0.00085	0.81543	0.01775	0.06103	0.00143	0.90	0.37	0.93	
85	815	6	889	23	0.1347	0.00112	1.2752	0.02265	0.06868	0.00134	0.90	0.23	0.92	
86	901	6	901	13	0.15009	0.0011	1.42913	0.01721	0.06908	0.00099	0.90	0.49	1.00	
87	728	6	839	27	0.11952	0.00103	1.10437	0.02172	0.06703	0.00143	0.90	0.40	0.87	
88	823	6	814	15	0.13625	0.00101	1.24388	0.01608	0.06623	0.001	0.90	0.44	1.01	
89	827	6	837	23	0.13691	0.00113	1.26429	0.02247	0.06699	0.00131	0.90	0.35	0.99	
90	716	6	730	25	0.11749	0.00097	1.03066	0.01877	0.06364	0.00127	0.90	0.22	0.98	
91	747	6	811	23	0.12286	0.001	1.12019	0.01941	0.06614	0.00127	0.90	0.33	0.92	
92	488	5	490	62	0.07862	0.00088	0.61742	0.02291	0.05697	0.00219	0.90	0.04	1.00	
AY 09-21-11 (1); 38°42' 58.5"N, 98°35' 49.7"E (3508 m)														
1	1505	20	1568	45	0.26287	0.00401	3.5156	0.12691	0.09703	0.00361	0.90	0.92	0.96	
2	1771	13	1802	13	0.31624	0.00266	4.80201	0.06623	0.11017	0.00173	0.90	0.47	0.98	
~~3~~	~~243~~	~~4~~	~~298~~	~~132~~	~~0.03848~~	~~0.00063~~	~~0.27726~~	~~0.0196~~	~~0.05228~~	~~0.00378~~	~~0.90~~	~~0.43~~	~~0.82~~	~~Common Pb < det. lim.~~
4	1535	13	1482	22	0.26893	0.00258	3.43608	0.06673	0.0927	0.00194	0.90	1.00	1.04	
5	1429	11	1567	44	0.24809	0.0022	3.31768	0.07072	0.09699	0.00224	0.88	0.55	0.91	
6	2453	16	2475	8	0.46311	0.00371	10.33183	0.10925	0.16186	0.00208	0.90	0.88	0.99	
7	1561	11	1687	30	0.27401	0.00216	3.90776	0.0545	0.10343	0.00166	0.88	0.16	0.93	
8	1632	12	1672	15	0.28802	0.00244	4.07469	0.05962	0.10264	0.00169	0.90	0.63	0.98	
9	1661	11	1671	11	0.29397	0.00227	4.15485	0.04976	0.10254	0.00145	0.90	0.84	0.99	
~~10~~	~~1606~~	~~11~~	~~2444~~	~~9~~	~~0.28292~~	~~0.00222~~	~~6.19544~~	~~0.06695~~	~~0.15888~~	~~0.0021~~	~~0.90~~	~~0.49~~	~~0.66~~	~~Common Pb < det. lim.~~
11	1386	10	1442	17	0.23992	0.002	3.00146	0.04596	0.09076	0.00156	0.90	0.54	0.96	
12	1202	9	1393	15	0.20499	0.00162	2.49956	0.03473	0.08847	0.00141	0.90	1.22	0.86	
13	1849	15	1878	16	0.33224	0.00309	5.26009	0.08443	0.11487	0.00203	0.90	0.74	0.98	

14	1530	12	1631	17	0.26794	0.00232	3.7071	0.05787	0.10038	0.00174	0.90	0.55	0.94
15	1221	9	1202	47	0.20849	0.00175	2.30562	0.04955	0.08021	0.00185	0.88	0.53	1.02
16	1413	11	1443	42	0.24505	0.00218	3.06949	0.06042	0.09085	0.00196	0.87	0.27	0.98
17	1470	12	1473	19	0.25618	0.00226	3.25746	0.05428	0.09225	0.0017	0.90	0.74	1.00
18	1729	18	1726	28	0.30761	0.00367	4.4813	0.10963	0.10569	0.00271	0.90	0.79	1.00
19	1728	12	1723	33	0.30737	0.00252	4.47222	0.0693	0.10553	0.00185	0.88	0.28	1.00
20	2264	17	2279	12	0.42075	0.00379	8.36826	0.11289	0.1443	0.0022	0.90	0.43	0.99
21	2199	22	2246	49	0.40654	0.00488	7.93473	0.19983	0.14155	0.00395	0.89	0.65	0.98
22	2492	19	2522	30	0.47194	0.00434	10.82764	0.15935	0.1664	0.00289	0.89	0.42	0.99
23	2427	16	2467	23	0.45716	0.00354	10.15071	0.11208	0.16104	0.00217	0.90	0.34	0.98
24	1819	14	1833	15	0.32606	0.0029	5.03563	0.07574	0.11205	0.00188	0.90	0.71	0.99
25	1140	15	1357	47	0.19348	0.00272	2.31534	0.0822	0.08682	0.0032	0.90	0.45	0.84
26	1273	13	1392	32	0.21828	0.00238	2.66056	0.06693	0.08843	0.00235	0.90	1.07	0.91
27	2005	25	2104	29	0.36489	0.00532	6.55937	0.18364	0.13042	0.00376	0.90	0.30	0.95
28	2014	24	2019	29	0.36671	0.00516	6.2833	0.17109	0.12431	0.00349	0.90	0.25	1.00
29	1700	13	1694	39	0.3017	0.0026	4.32049	0.0807	0.10386	0.00214	0.89	0.56	1.00
30	1493	12	1498	21	0.26059	0.00243	3.35848	0.0614	0.0935	0.00186	0.90	0.38	1.00
31	1770	14	1756	17	0.31599	0.00291	4.67729	0.07603	0.10739	0.00192	0.90	0.86	1.01
32	1665	10	1676	23	0.2948	0.00205	4.18046	0.04284	0.10285	0.00127	0.88	0.18	0.99
33	2101	13	2089	8	0.38529	0.00285	6.86932	0.06655	0.12935	0.00158	0.90	0.27	1.01
34	2006	14	2015	10	0.36494	0.0029	6.23872	0.07194	0.12403	0.0017	0.90	0.27	1.00
35	1299	10	1328	20	0.22318	0.00194	2.63226	0.04506	0.08557	0.00161	0.90	0.95	0.98
36	1876	13	1861	11	0.33772	0.00264	5.2971	0.06148	0.11379	0.00157	0.90	0.29	1.01
37	1252	9	1261	16	0.21438	0.00169	2.44268	0.03439	0.08267	0.00133	0.90	0.74	0.99
38	1705	13	1704	16	0.30273	0.00265	4.35658	0.06659	0.10441	0.00178	0.90	0.55	1.00
39	2393	15	2406	23	0.44945	0.00341	9.62939	0.10574	0.15539	0.00207	0.89	0.36	0.99
40	1638	13	1677	17	0.28927	0.00259	4.10358	0.06584	0.10292	0.00183	0.90	0.33	0.98
41	1477	12	1429	20	0.25758	0.00232	3.20068	0.0563	0.09015	0.00173	0.90	0.86	1.03
42	1484	16	1491	31	0.25892	0.00305	3.32412	0.08591	0.09314	0.00252	0.90	0.79	1.00
43	1420	46	1485	200	0.24633	0.0088	3.15312	0.41839	0.09287	0.01242	0.90	0.55	0.96
~~44~~	~~979~~	~~8~~	~~1929~~	~~19~~	~~0.16405~~	~~0.00152~~	~~2.67277~~	~~0.04714~~	~~0.1182~~	~~0.00231~~	~~0.90~~	~~0.28~~	~~0.51~~	~~Discordant~~
45	2195	14	2263	23	0.40572	0.00308	7.99557	0.08406	0.14293	0.00185	0.88	0.12	0.97
46	1862	14	2244	29	0.33482	0.00286	6.52478	0.08978	0.14134	0.00229	0.88	0.18	0.83
47	1692	12	1784	12	0.30007	0.0024	4.51273	0.0571	0.1091	0.00161	0.90	0.67	0.95
48	1297	9	1284	13	0.22288	0.00167	2.56991	0.03185	0.08365	0.00122	0.90	0.43	1.01
49	1371	11	1502	18	0.23706	0.00207	3.06224	0.05055	0.09372	0.00171	0.90	0.70	0.91
50	1402	16	1389	39	0.24297	0.0031	2.95754	0.09077	0.08831	0.00281	0.90	1.07	1.01
51	1864	13	1834	12	0.33532	0.00272	5.18246	0.06542	0.11212	0.00164	0.90	0.30	1.02
52	1811	12	1821	10	0.32439	0.00247	4.97706	0.0552	0.11131	0.00149	0.90	0.21	0.99
53	2056	16	1882	14	0.37561	0.00331	5.96003	0.08543	0.11512	0.00185	0.90	0.27	1.09
54	1510	10	1513	11	0.26398	0.00199	3.42881	0.04006	0.09423	0.00131	0.90	0.60	1.00
55	1486	11	1420	18	0.2592	0.00223	3.20543	0.0514	0.08972	0.0016	0.90	0.31	1.05
56	1454	11	1437	15	0.2531	0.00205	3.15827	0.04516	0.09053	0.00147	0.90	0.27	1.01
57	1654	14	1758	17	0.29245	0.00272	4.33412	0.07268	0.10752	0.00198	0.90	0.67	0.94
58	1236	15	1607	37	0.21135	0.0028	2.88631	0.08756	0.09908	0.00314	0.90	1.07	0.77

59	1285	11	1324	22	0.22066	0.00202	2.59729	0.04879	0.08539	0.00174	0.90	2.89	0.97	
60	1817	11	1804	7	0.32558	0.00226	4.94939	0.04292	0.11029	0.00126	0.90	0.27	1.01	
61	1626	12	1640	14	0.28694	0.00239	3.98965	0.05659	0.10087	0.00162	0.90	0.73	0.99	
62	1630	12	1668	14	0.28774	0.00241	4.06145	0.05775	0.1024	0.00165	0.90	0.37	0.98	
63	1763	15	1770	20	0.31444	0.00313	4.69192	0.08735	0.10825	0.00217	0.90	0.61	1.00	
64	1634	13	1679	16	0.28841	0.0025	4.09379	0.06178	0.10298	0.00174	0.90	0.82	0.97	
65	1616	11	1683	13	0.28495	0.00227	4.05515	0.05196	0.10324	0.00153	0.90	0.44	0.96	
~~66~~	~~483~~	~~4~~	~~1080~~	~~21~~	~~0.07783~~	~~0.00062~~	~~0.80922~~	~~0.01371~~	~~0.07543~~	~~0.00142~~	~~0.90~~	~~0.41~~	~~0.45~~	~~Common Pb < det. lim.~~
67	1805	21	1940	28	0.32318	0.00427	5.29678	0.1377	0.1189	0.00322	0.90	0.81	0.93	
68	1799	13	1767	14	0.32191	0.0027	4.79415	0.06624	0.10804	0.0017	0.90	0.57	1.02	
69	1314	11	1519	22	0.22607	0.00212	2.94646	0.05541	0.09455	0.00193	0.90	0.53	0.87	
70	1744	13	1860	33	0.31074	0.0026	4.87319	0.07761	0.11374	0.00205	0.89	0.41	0.94	
71	1683	13	1708	17	0.29824	0.00269	4.30186	0.06981	0.10464	0.00187	0.90	0.87	0.99	
72	1580	13	1584	18	0.27768	0.00249	3.74566	0.06228	0.09786	0.00179	0.90	0.66	1.00	
73	1768	11	1791	8	0.31556	0.00228	4.76275	0.04664	0.10949	0.00135	0.90	1.00	0.99	
74	1757	11	1760	9	0.31328	0.0023	4.64945	0.04805	0.10767	0.00137	0.90	0.77	1.00	
75	2071	21	2063	50	0.37883	0.00455	6.65577	0.16603	0.12742	0.00353	0.88	0.30	1.00	
76	2436	23	2461	16	0.45927	0.00526	10.16034	0.18412	0.16049	0.00308	0.90	0.33	0.99	
77	1437	12	1432	20	0.24981	0.00225	3.11017	0.05466	0.09032	0.00173	0.90	0.89	1.00	
78	1424	11	1432	19	0.24713	0.00219	3.07593	0.05219	0.0903	0.00168	0.90	0.67	0.99	
79	2732	30	2810	44	0.52777	0.00714	14.40656	0.32084	0.19798	0.00516	0.89	0.43	0.97	
80	1791	12	1716	12	0.3203	0.00254	4.63971	0.05783	0.10509	0.00152	0.90	0.22	1.04	
81	1681	18	1770	27	0.29802	0.00358	4.44637	0.10761	0.10824	0.00275	0.90	0.29	0.95	
82	1702	15	1768	19	0.30216	0.00296	4.50454	0.0824	0.10815	0.00214	0.90	0.45	0.96	
83	1705	13	1699	15	0.3028	0.00261	4.34677	0.06489	0.10414	0.00174	0.90	0.84	1.00	
84	2947	35	3093	45	0.57952	0.00866	18.84981	0.43501	0.23591	0.00649	0.90	0.52	0.95	
85	1408	15	1436	33	0.24406	0.00292	3.04401	0.08215	0.09048	0.00255	0.90	0.61	0.98	
86	1346	14	1319	35	0.23217	0.00267	2.72577	0.07384	0.08517	0.00241	0.90	0.65	1.02	
87	1385	11	1465	18	0.23971	0.00208	3.0368	0.05008	0.0919	0.00167	0.90	0.71	0.95	

Notes: Analyses that were >30% discordant or >5% reversely discordant were rejected (e.g., Gehrels et al., 2011).
*Conc.--Concordance

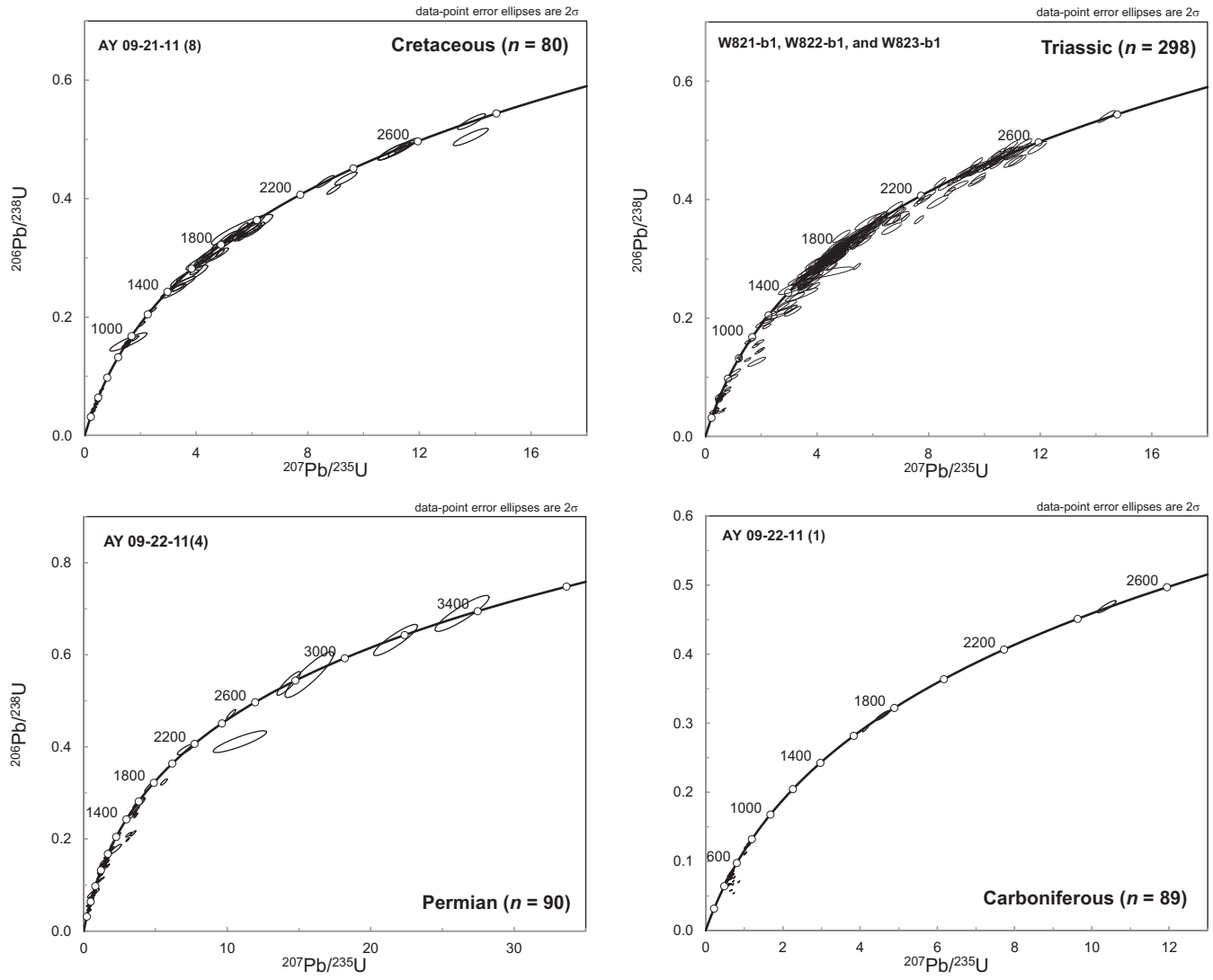

Figure DR4. Concordia diagrams from detrital zircon analyses.

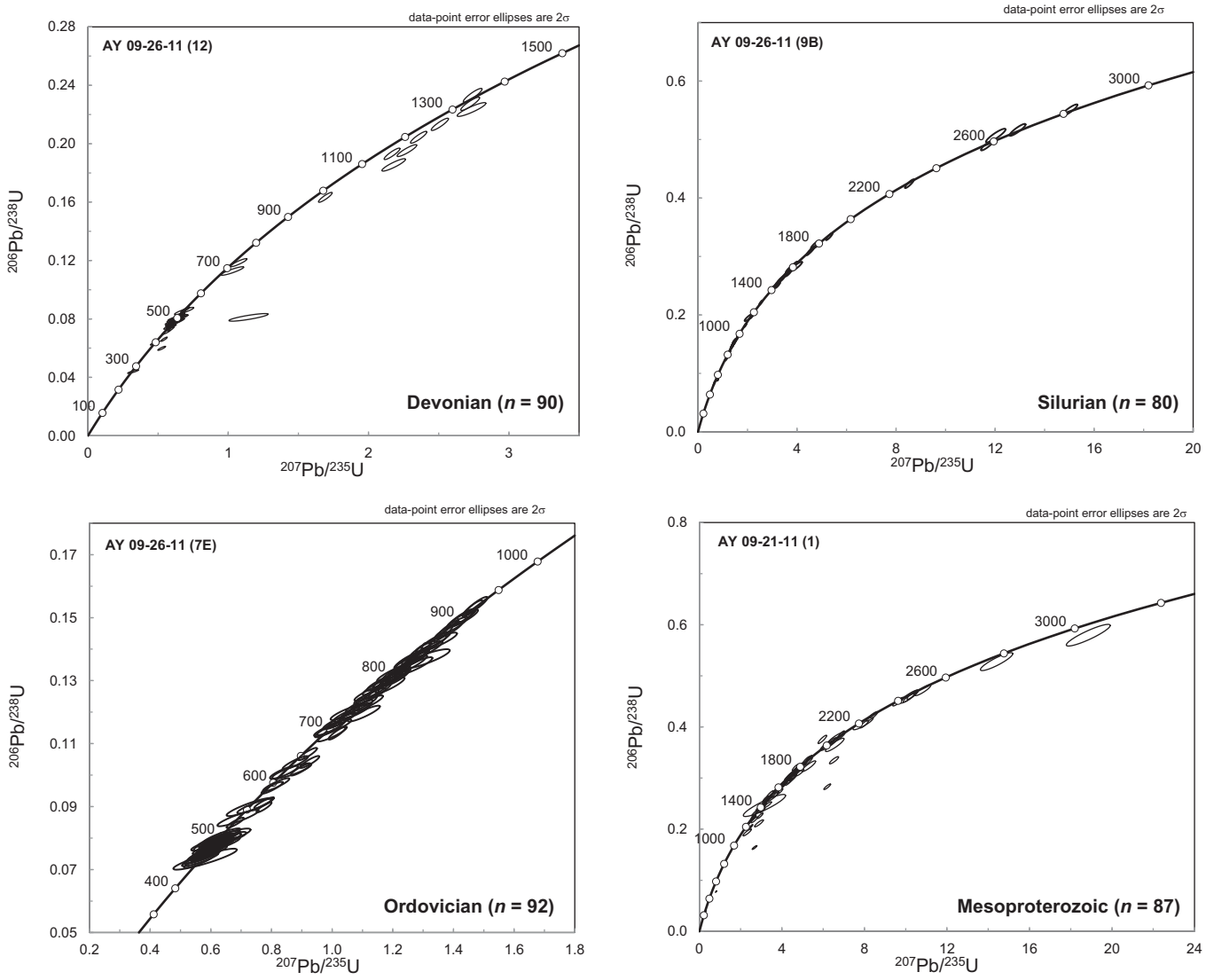

Figure DR4 (*continued*). Concordia diagrams from detrital zircon analyses.

WHOLE-ROCK GEOCHEMISTRY

Expanded Methods

Major and trace element geochemistry data were obtained from several plutonic bodies to determine their source and tectonic setting, and from several metamorphic rock samples to constrain their protoliths. Three samples were analyzed by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) and Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) at Activation Laboratories in Ontario, Canada, whereas the other samples were analyzed by X-ray fluorescence (XRF) at Pomona College.

Samples were crushed and powdered to <75 μm (i.e., 200 mesh) for bulk whole rock geochemical analysis. Three plutonic samples [RR 05-03-12 (6), AZ 04-30-12 (11), and AZ 07-17-13 (4)] were sent for analysis to Activation Labratories Ltd. (Actlabs) in Ancaster, Ontario, Canada. Powders were dissolved via a lithium metaborate/tetraborate fusion technique. Major- and minor-element abundances and loss on ignition (LOI) values were measured by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) with a detection limit of ~0.01%. ICP-OES was also used to analyze the trace elements Sc, Be, V, Sr, Y, Zr, and Ba at a detection limit of 1 to 5 ppm. Other trace elements were analyzed by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) with a detection limit of 0.05 to 5 ppm for most elements, except for Cr, Ni, Cu, and Zn, which have detection limits of 10 to 30 ppm.

The remaining geochemical analyses were performed by X-ray fluorescence (XRF) at Pomona College following the methods of Johnson et al. (1999). Representative powdered samples and flux (i.e., dilithium tetraborate: $Li_2B_4O_7$) were mixed at a 2:1 ratio, around 3.5 grams powder to 7.0 grams flux. The mixture was fused to a glass bead in a graphite crucible at 1000°C for 10 minutes, reground, and fused a second time. The bead was then polished on

diamond laps, and analyzed. The Pomona Lab analyzes major and minor, and selected trace elements (V, Cr, Ni, Rb, Sr, Y, Zr, Nb, Ba, La, Ce, Nd, Cu, Pb, Zn, Th, U, Ga) on the same fused beat using a 3.0 kW Panalytical Axios WD-XRF equipped with PE, LiF 200, LiF 220, GE, and PX1 crystals. Concentrations are determined using reference calibration curves defined by fifty-five certified reference materials that span a range of natural igneous, metamorphic, and sedimentary rock compositions. Initial LOI values were determined during the first analysis for each sample.

Ideally, the summation of major- and trace-element oxide abundances and the LOI percent should be equal ~100%. The totals for all analyses range from 98.31% to 100.4% (Table DR3), which suggests that these results are reliable. For sample comparison and classification, all measured major- and trace-element oxide abundances were normalized so that their sum equals 100% without including LOI values (not shown in Table DR3). Trace element data presented in Table DR3 has also been normalized.

Expanded Results and Discussion

The geochemistry of the plutonic samples is briefly discussed in the main text. Below is a more thorough analysis of the (1) early Paleozoic granitoid samples and (2) Neoproterozoic granitoid samples, as well as discussion of the (1) diabase dike and serpentinite samples (i.e., AZ 05-05-12 [7] and AZ 05-03-12 [13]) and (2) metamorphic samples (i.e., garnet amphibolite and garnet-mica schist rocks).

Early Paleozoic Granitoid Samples

Samples RR 05-03-12 (6), AZ 04-30-12 (11), and AZ 07-17-13 (4), collected from three separate undeformed granitoid bodies, are classified as alkali feldspar granite, granite (syenogranite), and alkali feldspar granite respectively, based on their normative quartz-alkali feldspar-plagioclase mineralogy (see Fig. 9 for sample locations). All of these samples are felsic (SiO2 63-75 wt%) and highly peraluminous ($Al_2O_3/[Na_2O + CaO + K_2O] > 1.30$) (Table DR3). Based on their weight percentage of silica and alkaline elements (SiO_2 versus Na_2O+K_2O), their geochemical classifications span quartz monzonite to granite (Table DR3). The samples are all calc-alkaline (Fig. 14A). On the granite classification diagrams of Pearce (1984), samples plot mostly in the volcanic-arc field, with minor overlap on the syn-collisional and within-plate boundaries (Fig. 14B).

All three samples display steep rare earth element (REE) (La/Yb > 15) patterns (Fig. DR5A), and sample AZ 07-17-13 (4) (i.e., the alkali feldspar granite) has the highest light REE enrichment (La/Yb 42) (Table DR3). This LREE enrichment suggests continental crustal melt source. Samples are characterized by negative Ba, Nb, P, and Ti anomalies (Fig. DR5B), which is indicative of an arc/subduction setting for the original melt. Two samples show weak negative Eu anomalies, indicating minor involvement of plagioclase in fractional melting, whereas sample AZ 04-30-12 (11) displays no Eu anomaly (Fig. DR5A).

Neoproterozoic Foliated Granitoid Samples

The foliated granitoid samples are felsic (SiO_2 ~72 wt%) and highly peraluminous ($Al_2O_3/[Na_2O + CaO + K_2O] > 1.58$) (Table DR3). The normative quartz-alkali feldspar-plagioclase mineralogy of samples AZ 07-21-13 (7) and AY 09-21-11 (3) classifies them as

alkali feldspar granite and quartz diorite respectively. Based on their weight percentage of silica and alkaline elements (SiO_2 versus $Na_2O + K_2O$), they are classified as granite (Table DR3). Both samples are calc-alkaline (Fig. 14A). On the classification diagrams of Pearce (1984), both samples plot in the volcanic-arc and joint volcanic arc/syn collisional granite fields (Fig. 14B). The samples display relatively flat (La/Yb 5-10) REE patterns (Fig. DR5A), and are characterized by negative Ba, Nb, P, and Ti anomalies (Fig. DR5B), which is indicative of an arc/subduction setting for the melt. Sample AZ 07-21-13 (7) shows a negative Eu anomaly (Fig. DR5A), indicating involvement of plagioclase in fractional melting, whereas sample AY 09-21-11 (3) has no Eu anomaly (Fig. DR5A), which is consistent with their respective mineralogies. These granitoids were likely generated in a volcanic-arc setting, although we note that more thorough geochemical analysis is required to draw more definitive conclusions.

Diabase and serpentinite samples

The diabase dike sample AZ 05-05-12 (7) is mafic (SiO_2 48 wt% and MgO 8 wt%) and follows a subalkaline/tholeiitic trend ($Na_2O + K_2O$ 2.1 wt %) (Table DR3). Geochemical analyses of similar diabase and pillow basalt samples led Song et al. (2013) to suggest that these mafic rocks were formed in a supra-subduction zone (SSZ) environment.

The serpentinite sample AZ 05-03-12 (13) has a high LOI content (15.2 wt%), and therefore only its normalized geochemistry is discussed (not shown in Table DR3). The ultramafic rock (normalized SiO_2 39 wt% and MgO 47 wt%) rock has a high Mg# value (i.e., $MgO/[MgO + Fe_2O_3] \times 100$) of 79 and contains very low TiO_2 (0.01 wt%) and alkalinity ($Na_2O + K_2O$ values below the detection limit) (Table DR3). The concentrations of Cr (4684 ppm) and

Ni (2076 ppm) are very high. According to the classification scheme of Jensen (1976), this sample is an ultramafic komatiite (due to its high MgO values), whereas in the classification scheme of Winchester and Floyd (1977), it plots in the basanite/nephelinite field (Nb/Y > 2-3 and SiO > 45). Overall, the geochemistry of this serpentinite sample indicates that it represents altered ultramafic rock that is part of the Yushigou ophiolite complex.

Metamorphic samples

The two garnet-mica schist samples AZ 04-18-12 (4b) and AY 09-21-11 (2) both plot along the pelite trend in a K_2O/Al_2O_3 versus Na_2O/Al_2O_3 diagram (Garrels and MacKenzie, 1971) (Fig. DR5C). Additionally, protolith classification diagrams indicate that the sedimentary protoliths may have been deposited in an active continental margin (Figs. DR5D and DR5E) (Roser and Korsch, 1986; Herron, 1988).

The three garnet amphibolite samples are compositionally similar to gabbro/basalt (SiO_2 50-53 wt%) and they follow a subalkaline/tholeiitic trend ($Na_2O + K_2O$ <2.7 wt %) (Table DR3). In a K_2O/Al_2O_3 versus Na_2O/Al_2O_3 diagram, the samples plot in the field of a mafic igneous rock protolith (Garrels and MacKenzie, 1971) (Fig. DR5C). The protoliths of these garnet amphibolites were likely mafic dikes intruding a supracrustal sequence.

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Table DR3. Whole-rock geochemistry data

Sample:	RR 05-03-12 (6)	AZ 04-30-12 (11)	AZ 07-17-13 (4)	AZ 05-05-12 (7)	AZ 07-21-13 (7)	AY 09-21-11 (3)
Rock type:	Alkali feldspar granite	Syenogranite	Alkali feldspar granite	Diabase	Foliated K-feldspar granite	Foliated granitoid
Location:	38.49025° N 98.90364° E 3982 m	38.5745° N 98.96725° E 3911 m	38.4758° N 98.83137° E 4290 m	38.56992° N 98.91741° E 3827 m	38.75413° N 98.49783° E 3441 m	38.697° N 98.64175° E 3540 m
Major and minor elements (wt %)						
SiO_2	75.45	62.72	70.55	46.16	71.08	69.34
Al_2O_3	13.18	14.04	14.14	13.50	13.37	15.01
Fe_2O_3	1.69	4.37	2.85	14.24	3.01	2.59
MnO	0.05	0.07	0.05	0.24	0.03	0.05
MgO	0.34	1.93	0.73	7.69	0.47	0.84
CaO	0.80	3.17	1.15	10.56	1.68	2.72
Na_2O	3.24	3.13	3.80	1.94	2.54	3.18
K_2O	4.65	4.42	3.97	0.12	4.82	3.06
TiO_2	0.18	0.49	0.30	1.55	0.42	0.31
P_2O_5	0.05	0.17	0.12	0.12	0.08	0.07
LOI[@]	0.78	3.81	0.87	3.76	2.35	2.69
Total[#]	100.4	98.31	98.51	99.88	99.85	99.86
Trace elements (ppm)						
Sc	4	10	4	55	7	9
Be	5	2	3	-	-	-
V	11	88	24	408	31	45
Cr	40	50	40	254	50	70
Co	2	10	4	73	5	5
Ni	< 20	< 20	< 20	136	< 20	< 20
Cu	< 10	< 10	20	105	< 10	< 10
Zn	30	40	50	147	50.0	50.0
Ga	18	14	17	17	18.0	19.0
Ge	2	2	2	-	2	2
As	< 5	6	< 5	8	14	7
Rb	347	192	142	4	204	115
Sr	101	397	310	196	82	157
Y	27	15	11	29	39	20
Zr	121	155	145	93	228	126
Nb	30	18	16	16	9	7
Mo	< 2	< 2	< 2	3	0	3
Ag	1	1.2	1.2	-	0.5	< 0.5
In	< 0.2	< 0.2	< 0.2	-	< 0.2	< 0.2
Sn	10	1	3	-	3.0	3.0
Sb	0.6	6.2	3.4	-	0.7	0.6
Cs	15.1	6.4	2.9	1.0	6.7	4.1
Ba	360	1014	579	37	839	566
La	44.7	42.8	46.7	0	39.4	13.3
Ce	82.5	72.4	79.8	19	78.2	26.3
Pr	8.41	7.09	7.59	2	8.3	3.0

Table DR3. Whole-rock geochemistry data (*continued*)

Sample:	RR 05-03-12 (6)	AZ 04-30-12 (11)	AZ 07-17-13 (4)	AZ 05-05-12 (7)	AZ 07-21-13 (7)	AY 09-21-11 (3)
Rock type:	Alkali feldspar granite	Syenogranite	Alkali feldspar granite	Diabase	Foliated alkali feldspar granite	Foliated granitoid
Location:	38.49025° N 98.90364° E 3982 m	38.5745° N 98.96725° E 3911 m	38.4758° N 98.83137° E 4290 m	38.56992° N 98.91741° E 3827 m	38.75413° N 98.49783° E 3441 m	38.697° N 98.64175° E 3540 m
Nd	29	25	24	17	31	12
Sm	6	4	4	4	6	3
Eu	0.5	1.1	0.7	-	0.8	0.7
Gd	4.2	2.9	2.4	-	6.5	2.7
Tb	0.7	0.4	0.3	-	1.0	0.5
Dy	4.4	2.5	1.8	-	6.1	3.1
Ho	0.8	0.5	0.4	-	1.3	0.7
Er	2.4	1.4	1.1	-	3.8	2.1
Tm	0.4	0.22	0.15	-	0.6	0.4
Yb	2.7	1.5	1.1	-	3.8	2.4
Lu	0.4	0.24	0.17	-	0.6	0.4
Hf	3.4	3.6	3	2.1	6.1	3.4
Ta	3.7	1.2	1.1	7.3	1.0	0.9
W	< 1	3	4	-	-	-
Tl	2.2	0.9	0.9	-	1.4	0.8
Pb	46	19	25	5.2	33.0	25.0
Bi	< 0.4	< 0.4	< 0.4	-	< 0.4	0.4
Th	38.4	18.3	25	1.0	16.9	4.8
U	4.8	4.2	3.3	7.3	2.3	1.6
S	-	-	-	< dl	< dl	90.4
Ti*	1073	2944	1793	9648	2577	1910
K*	38600	36693	32957	1034	40951	26105
P*	218	742	524	544	358	314

Table DR3. Whole-rock geochemistry data (*continued*)

Sample:	RR 05-05-12 (8)	AZ 05-03-12 (13)
Rock type:	Mylonitic gneiss	Serpentinite
Location:	38.58889° N 98.5402° E 4215 m	38.60758° N 98.99772° E 4360 m
SiO_2	72.62	33.28
Al_2O_3	13.11	0.91
Fe_2O_3	2.91	10.57
MnO	0.11	0.07
MgO	0.55	39.36
CaO	1.24	0.03
Na_2O	1.74	0.00
K_2O	4.61	0.00
TiO_2	0.33	0.01
P_2O_5	0.15	0.00
LOI[@]	2.44	15.24
Total[#]	99.81	99.47
Sc	10	4
Be	-	-
V	44	22
Cr	70	4684
Co	5	185
Ni	5	2076
Cu	37	27
Zn	50	122
Ga	17	1
Ge	2	-
As	< 5	0
Rb	170	0
Sr	102	0
Y	37	2
Zr	135	13
Nb	8	9
Mo	3	2
Ag	< 0.5	-
In	< 0.2	-
Sn	3.0	-
Sb	0.8	-
Cs	7.1	2.4
Ba	822.0	0.0
La	32.0	0.0
Ce	67.4	0.0
Pr	7.4	3.5

Table DR3. Whole-rock geochemistry data (*continued*)

Sample:	RR 05-05-12 (8)	AZ 05-03-12 (13)
Rock type:	Mylonitic gneiss	Serpentinite
Location:	38.58889° N 98.5402° E 4215 m	38.60758° N 98.99772° E 4360 m
Nd	28	13
Sm	6	1
Eu	1	-
Gd	6	-
Tb	1	-
Dy	6	-
Ho	1	-
Er	4	-
Tm	1	-
Yb	5	-
Lu	1	-
Hf	4	0
Ta	1	0
W	-	-
Tl	1	-
Pb	39	0
Bi	< 0.4	-
Th	16	0
U	3	0
S	238	712
Ti*	2028	71
K*	39228	0
P*	671	0

"< dl" Below lower detection limit
"-" Not measured or below detection limit
*Calculated from oxide wt %
[@] Loss on ignition (LOI) values
[#] Summed major-element oxide abundances, including LOI values
Trace element concentrations have been normalized

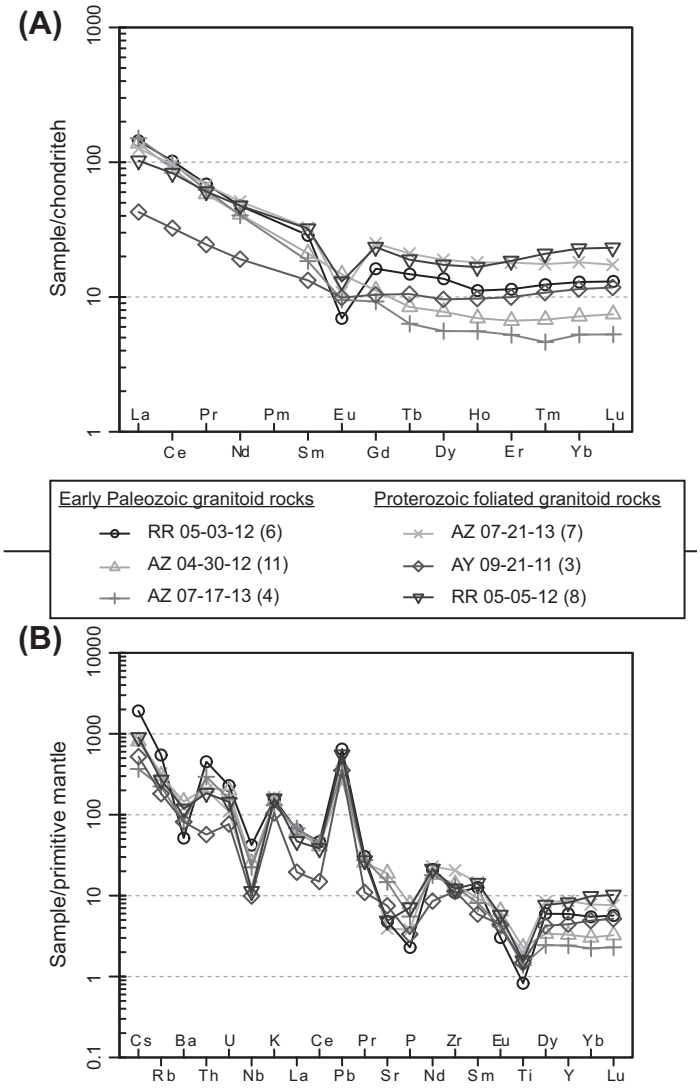

Figure DR5. (A) Rare earth element plot normalized to chondrite of Boynton (1984). (B) Trace element plot normalized to primitive mantle values of Sun and McDonough (1989).

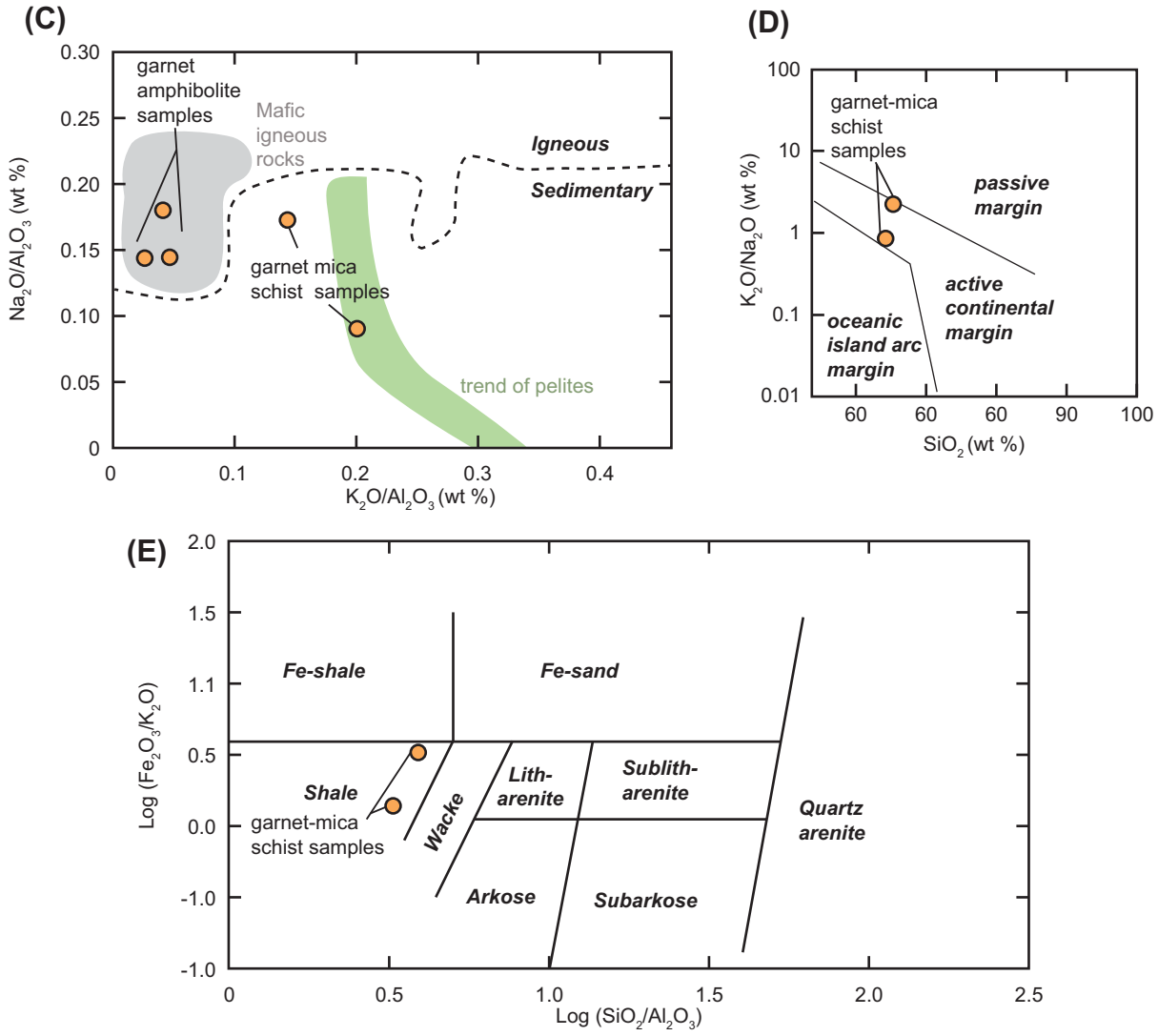

Figure DR5 (*continued*). (C-E) Geochemical discrimination diagrams for the metamorphic rock samples. (C) K_2O/Al_2O3 versus Na_2O/Al_2O_3 from Garrels and MacKenzie (1971). The thick dashed line is the lower limited for most igneous rock compositions. (D) Depositional tectonic setting discrimination diagram from Roser and Korsch (1986). (E) SandClass system for geochemical classification of terrigenous sands and shales from Herron (1988).

THERMOBAROMETRY

Expanded Methods

Thin sections of the selected samples were first examined to characterize the representative mineral assemblages and to assess the phases that grew together in equilibrium. Next, doubly-polished thin sections were analyzed on the JEOL JXA-8200 electron microprobe at UCLA. X-ray compositional maps of Ca, Na, Mg, Mn, and K were made for selected garnet porphyroblasts using an accelerating voltage of 15 kV and a current of ~100 nA with 5-10 μm pixels and a dwell time of 30 ms per pixel (Fig. DR6). These maps were used to assess compositional zoning patterns, as well as to aid in mineral identification, especially for the garnet inclusions. Analytical traverses were made across the garnet to quantitatively identify zonation patterns, particularly in samples that have undergone retrogression (Fig. DR6). For these traverses and individual mineral analysis, a <1 μm spot size was used with a 15 kV accelerating voltage and a current of 10 nA for all phases except Na-rich plagioclase and the micas, which required a 5 μm spot size. Calibrations were performed periodically using natural and synthetic standards. The JEOL software applied a ZAF correction.

P-T estimates were determined from the chemical data by using the average P-T mode of THERMOCALC 3.37 (Holland and Powell, 1998), with the most up-to-date internally-consistent thermodynamic dataset (i.e., dataset 62: Holland and Powell, 2011), to determine the intersection between exchange reaction geothermometers (e.g., garnet-biotite and garnet-hornblende; Hodges and Spear, 1982; Graham and Powell, 1984; Bhattacharya et al., 1992) and net transfer geobarometers (e.g., garnet-plagioclase-muscovite-biotite, garnet-plagioclase-hornblende-quartz, and garnet-plagioclase-rutile-ilmenite-quartz; Bohlen and Liotta, 1986; Kohn and Spear, 1989, 1990; Dale et al., 2000) equilibria. The activity coefficients for each phase were calculated with

the AX program (Tim Holland: http://www.esc.cam.ac.uk/research/researchgroups/holland/ax). Additional geothermometers provided additional constraints, including the fluid-independent Ti-in-biotite calibration of Henry et al. (2005) and the hornblende-plagioclase thermometer of Holland and Blundy (1994), calibrated for silica-saturated rocks. Amphibole phases were classified using the Excel spreadsheet of Locock (2014) following the latest nomenclature and classification of the International Mineralogical Association (IMA) published by Hawthorne et al. (2012) (Fig. DR7). The program also estimates iron allocation between Fe^{2+} and Fe^{3+}.

Sample description

Sample locations are shown in Figure 9 of the main text. The representative phase compositions for the samples are listed in Table DR4.

AY 09-21-11 (1A): garnet-mica schist

Sample AY 09-21-2011 (1A) was collected from a garnet-mica schist outcrop just south of the Tuo Lai River. The metapelite has Fe-rich garnet porphyroblasts (X_{Mg} = 0.08-0.11). Foliation is defined by biotite (X_{Mg} = 0.45, Ti = 0.09-0.07 apfu), white mica (X_{Mg} = 0.46-0.39, Si = 3.02-2.99 apfu), and minor chlorite (X_{Mg} = 0.48, Fe = 2.32 apfu). Additional present minerals include quartz, minor plagioclase (An_{18-20}), spinel, rutile, and tourmaline. Garnet exhibits prograde growth zoning compositions that range between 79-70% almadine, 16-8% grossular, 10-3% spessartine, and 8-4% pyrope (Fig. DR6). Quartz is almost completely recrystallized: grain boundary migration has become the dominant mechanism with minor subgrain rotation crystallization, suggesting peak temperatures of ~500-550°C (Hirth and Tullis, 1992). Garnet

inclusions include zircon, magnetite, and minor monazite. The prograde growth zoning in the garnet suggests peak temperatures of less than 650°C.

AZ 04-18-12 (4b): garnet-mica schist

Sample AZ 04-18-12 (4b) was collected from an outcrop of garnet-mica schist in the Proterozoic gneiss unit along the southern flank of the Tuo Lai Nan Shan (Fig. 9). Within this same outcrop was a lens of amphibolite gneiss from which sample AZ 04-18-12 (4) was collected. The metapelite sample AZ 04-18-12 (4b) has Fe-rich garnet porphyroblasts (X_{Mg} = 0.13-0.15). Foliation is defined by biotite (X_{Mg} = 0.40, Ti = 0.16 apfu), white mica (not analyzed), and minor chlorite (not analyzed). Additional present phases include quartz, plagioclase feldspar, and alkali feldspar. Garnet exhibits relatively flat compositional zoning with Mn enrichment at the rims (Fig. DR6), which may indicate diffusional zoning at temperatures greater than 600°C and subsequent retrogression. Quartz has been fully recrystallized and with lobate, interfingering grain boundaries that indicate peak temperatures >500°C (Hirth and Tullis, 1992). Garnet compositions range between 75-72% almadine, ~4% grossular, 13-12% spessartine, and 13-11% pyrope (Table A.8).

AZ 04-18-12 (4): garnet-epidote amphibolite gneiss

Sample AZ 04-18-2012 (4) was collected adjacent to sample AZ 04-18-12 (4b) from a lense of epidote-amphibolite gneiss (Fig. 9). The gneiss has Fe-rich garnet porphyroblasts (X_{Mg} = 0.07-0.09), and foliation is defined by bands of calcic amphibole ($Ca_B \geq 1.50$) and plagioclase (An_{79-82}). Amphibole are classified as Fe-hornblende (X_{Mg} = ~0.45, $[Na+K]_A < 0.50$) and Fe-pargasite (X_{Mg} = ~0.45, $[Na+K]_A \geq 0.50$, Si < 6.5 apfu) (Fig. DR7) (Leake et al., 2004). In the

mafic foliation bands, plagioclase is very minor and clinozoisite is common. Additional phases include quartz, biotite, magnetite, and ilmenite. Amphibole hosts inclusions of zircon. Titanite and rutile are not observed. Garnet grains exhibit flat diffusional zoning profiles with minor Mn enrichment near the rims, which may indicate late retrograde metamorphism (Fig. DR6).

AY 09-21-11 (6): garnet amphibolite

This sample was collected from an outcrop of foliated garnet amphibolite in the Tuo Lai River valley (Fig. 9). At this outcrop, amphibolite is interlayered with garnet-mica schist rocks. In thin section, this sample has a granofelsic texture with nearly equant hornblende grains, which suggests that this sample experienced contact metamorphism. This sample has Fe-rich garnet porphyroblasts (X_{Mg} = 0.15), and foliation is defined by bands of calcic amphibole ($Ca_B \geq 1.50$) and plagioclase (An_{60-30}). Amphibole are classified as Mg-hornblende (X_{Mg} = >0.5, $[Na+K]_A <$ 0.50) and edenite-pargasite (X_{Mg} = >0.5, $[Na+K]_A \geq 0.50$) (Fig. DR7) (Leake et al., 2004). Quartz is also present. Garnet compositions show very minor prograde growth zoning, but they are relatively flat compared to other samples (Fig. DR6). Garnet compositions range from 59-56% almadine, 33-29% grossular, 3-1% spessartine, and 12-8% pyrope (Fig. DR6). Because of the observed zoning profiles (Fig. DR6), the sample likely experienced peak conditions at or greater than ~600°C.

RR 05-05-12 (12): garnet amphibolite

Sample RR 05-05-2012 (12) was collected from a lense of foliated garnet amphibolite (Fig. 9). In thin section, the rock displays a nearly granofelsic texture with equant mineral grains that suggests the sample experienced minor contact metamorphism. The sample consists of

calcic amphiboles ($Ca_B > 1.50$)—classified as Mg-hornblende ($X_{Mg} > 0.50$, $[Na+K]_A < 0.50$), edenite ($X_{Mg} > 0.50$, $[Na+K]_A \geq 0.50$), and pargasite ($X_{Mg} > 0.50$, $[Na+K]_A \geq 0.50$, Si > 6.5 apfu) (Fig. DR7) (Leake et al., 2004)—plagioclase (An_{54-41}), quartz, minor ilmenite, and garnet (X_{Mg} = 0.18-0.12) with diffusional zoning compositions that range between 60-55% almadine, 33-30% grossular, 6-1% spessartine, and 11-6% pyrope (Fig. DR6). Quartz, amphibole, and garnet host fluid and solid inclusions. Garnets display prograde Mn-growth zoning (Fig. DR6), suggesting peak temperatures of less than 650°C. There are only minor compositional deflections at the rims, which indicates that the sample experienced minor retrogression.

AZ 07-21-13 (5): garnet amphibolite

Sample AZ 07-21-13 (5), collected along the northern bank of the Shule River valley (Fig. 9), was part of a large outcrop of vertically foliated schist, quartzite, and amphibolite. Foliation is defined by plagioclase (An_{33-22}) and calcic amphibole ($Ca_B > 1.50$), and there are also Fe-rich garnet porphyroblasts (X_{Mg} = 0.06-0.04). Amphibole are classified as Fe-hornblende ($X_{Mg} < 0.50$, $[Na+K]_A < 0.50$), and Fe-edenite-pargasite ($X_{Mg} < 0.50$, $[Na+K]_A \geq 0.50$, Si > 6.0 apfu) (Fig. DR7) (Leake et al., 2004). Garnet compositions show minor prograde growth zoning, especially for Fe and Mn, however the overall compositional profile is relatively flat (Fig. DR6). Garnet compositions range from 62-55% almadine, 31-26% grossular, 13-7% spessartine, and 4-3% pyrope.

RR 05-05-12 (8): quartzofeldspathic mylonitic gneiss

Sample RR 05-05-12 (8) is a quartzofeldspathic mylonitic gneiss, collected from the near the Tuo Lai Nan Shan range crest (Fig. 9), that exhibits well-defined stretching lineations.

Observed phases include potassium feldspar (Or_{96-92}), plagioclase feldspar (An_{27-12}), biotite (X_{Mg} = 0.28, Ti = 018 apfu), white mica (X_{Mg} = 0.35, Si = 3.0 apfu), ilmenite, and garnet (X_{Mg} = 0.10-0.04) with flat diffusional zoning compositions that range between 76-70% almadine, 5-4% grossular, 20-10% spessartine, and 8-5% pyrope (Fig. DR6). Quartz has been fully recrystallized and with lobate, interfingering grain boundaries that indicate peak temperatures > 500°C. Small garnet inclusions include quartz, plagioclase, zircon, and monazite. There is little to no compositional zoning in the garnets and there are minor deflections at the garnet rims (Fig. DR6), indicating diffusional zoning at temperatures greater than 600°C and late-stage retrogression.

THERMOCALC *P-T* histories

Effective and accurate use the average P-T mode of THERMOCALC 3.37 (Holland and Powell, 1998) requires that the mineral phases of interest are in equilibrium, which was initially verified by petrological examination. However, this task is complicated by the fact that minerals may have experienced prograde and retrograde growth during metamorphism that can cause single mineral grains to exhibit significant compositional variation, particularly the plagioclase, garnet, biotite, and amphibole phases (e.g., Figs. DR6 and DR7). In such cases, we examined the compositional variation within each phase to determine what compositions are representative of interest were recording peak, early, or late stages of metamorphism. For example, reverse zoning of Ca in plagioclase (i.e., Ca increases toward the rim), suggests that rim analyses are more representative of peak metamorphic conditions. Conversely, low-Ca plagioclase cores may represent early stages of metamorphism and/or relict pre-metamorphic grains. Similarly, increasing Ti in biotite generally corresponds to increasing metamorphic grade (e.g., Henry et al.,

2005). For garnet, peak conditions may be best represented by spots with lowest Mn (spessartine) and highest Fe (almandine) (Fig. DR6), whereas early metamorphic conditions are found in the cores with highest Ca (grossular) and lowest Mn (spessartine). Calculated *P-T* data for all analyzed samples are shown in Table 4.

The metapelite sample AY 09-21-11 (1A) experienced peak metamorphic temperatures of 552 ± 35ºC and pressures of 7.2 ± 1.2 kbar (~26 km) (Fig. 15). This range overlaps the 569 ± 24ºC estimates found using the Ti-in-bt geothermometer of Henry et al. (2005) (Table 4). The quartzofeldspathic gneiss sample RR 05-05-12 (8) records slightly higher temperatures but similar pressures: 725 ± 85ºC and 6.8 ± 1.0 kbar (~24 km) respectively (Fig. 15). The Ti-in-bt geothermometer of Henry et al. (2005) yields a peak temperature estimate of 678 ± 24ºC, which corroborates the THERMOCALC results (Table 4).

Garnet-amphibolite sample AY 09-21-11 (6) shows signs of early- and late-stage metamorphism. Estimates using garnet-core and early-stage amphibole analyses suggest early metamorphic conditions of 614 ± 49ºC and 7.2 ± 0.9 kbar (~26 km) (Fig. 15). Peak metamorphic conditions involved temperatures of 725 ± 53ºC and pressures of 7.9 ± 0.9 kbar (~28 km) (Fig. 15). This apparently isobaric increase in temperature correlates with the granofelsic texture of this sample. The sample may either record relatively high pressure (~7-8 kbar) contact metamorphism—possibly caused by the intrusion of nearby plutons—or two segments of a prograde-retrograde clockwise *P-T* path. Another garnet amphibolite sample, RR 05-05-12 (12), yields *P-T* estimates of 696 ± 41ºC and 7.3 ± 0.8 kbar (~26 km) (Fig. 15). Garnet amphibolite sample AZ 07-21-13 (5) shows a large range of peak temperature estimates, and overall, this sample has large uncertainties for its *P-T* estimates: 576 ± 88ºC and 5.4 ± 1.6 kbar (~19 km) (Fig. 15).

Garnet-epidote amphibolite gneiss sample, AZ 04-18-12 (4) was collected from a different valley from the other samples (i.e., the Shule River Valley; Fig. 9). This sample records peak metamorphic temperatures of 615 ± 47ºC and pressures with high uncertainties of 8.1 ± 2.7 kbar (~29 ± 9.5 km) (Fig. 15). To verify these estimates, we examined preliminary data from adjacent metapelite sample AZ 04-18-12 (4b), which indicates that the rocks experienced peak temperatures of 625 ± 23ºC.

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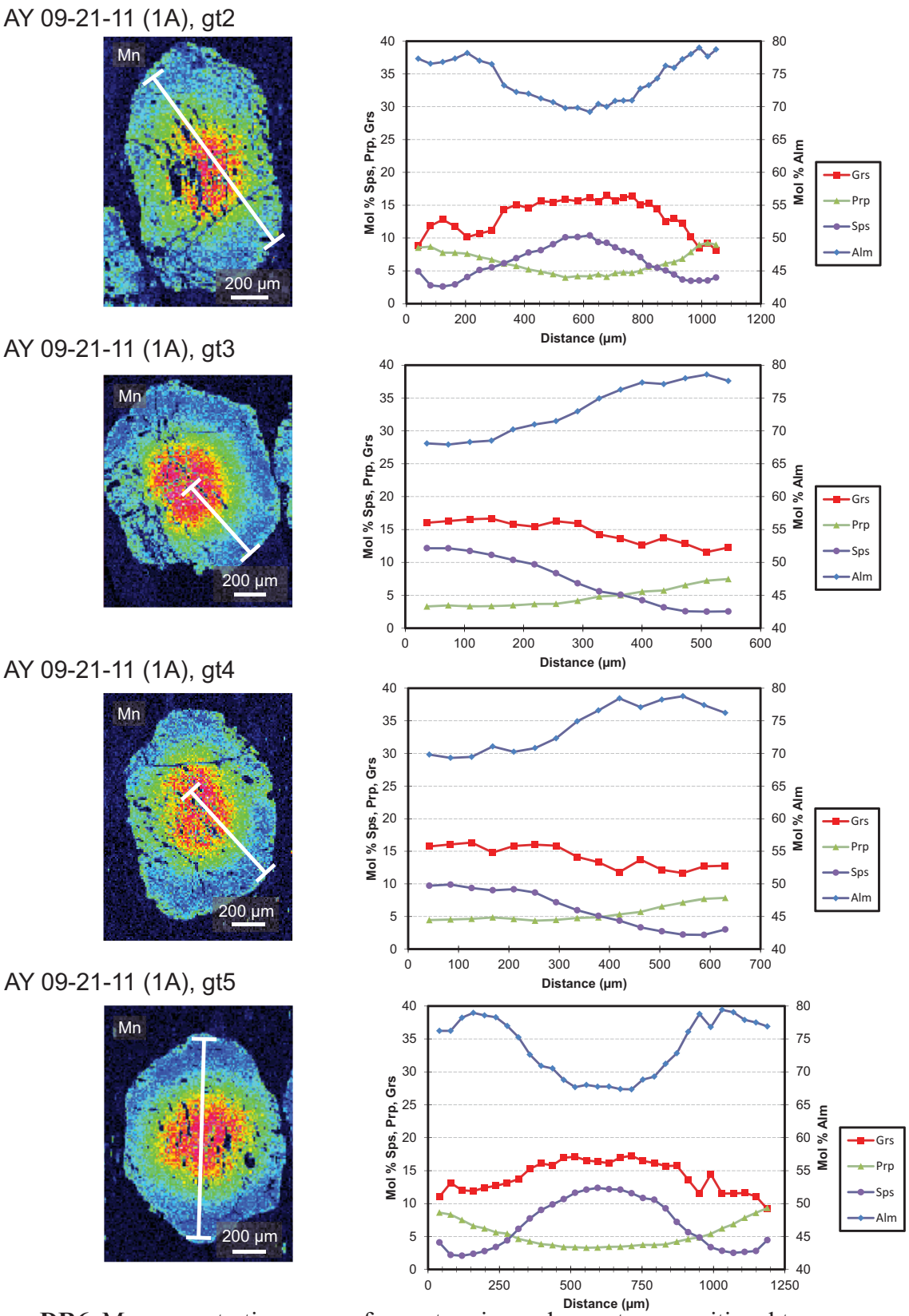
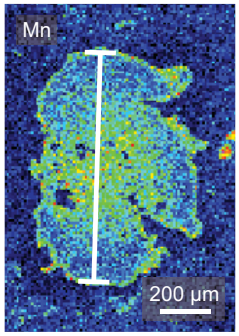
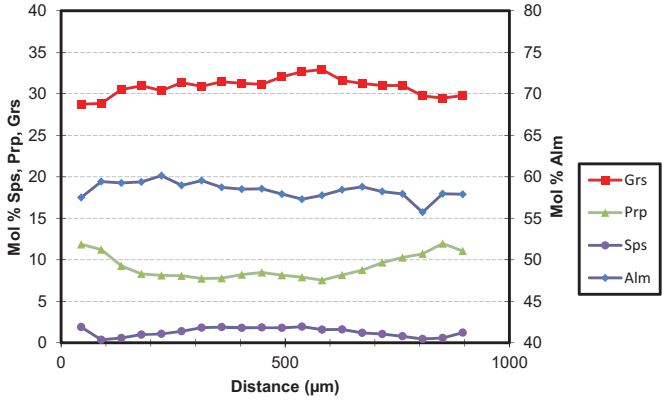


Figure DR6. Mn concentration maps of garnet grains and garnet compositional traverses. Grs—grossular, Prp—pyrope, Sps—spessartine, Alm—almadine.

AY 09-21-11 (6), gt2





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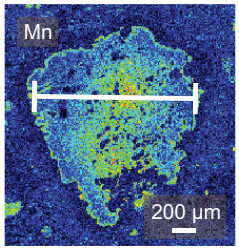

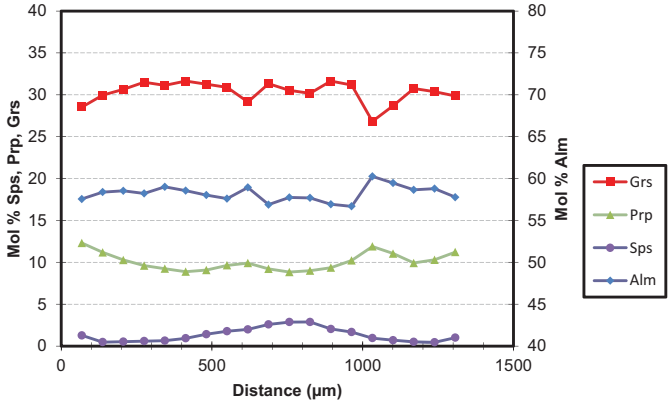

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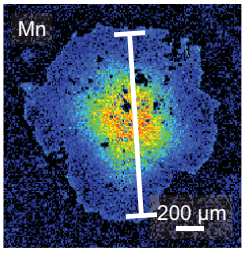

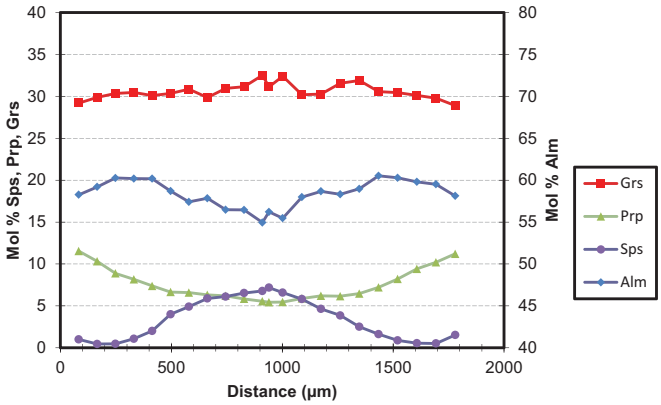

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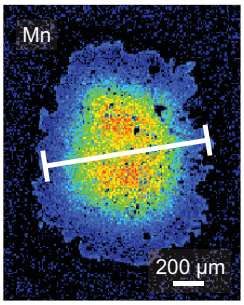


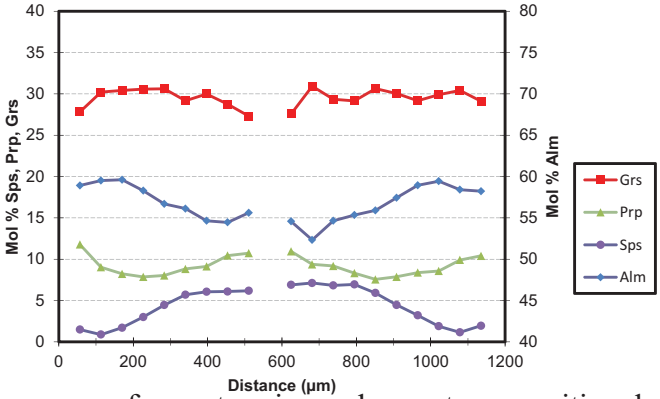
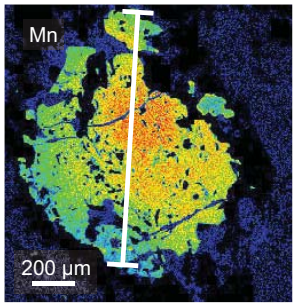
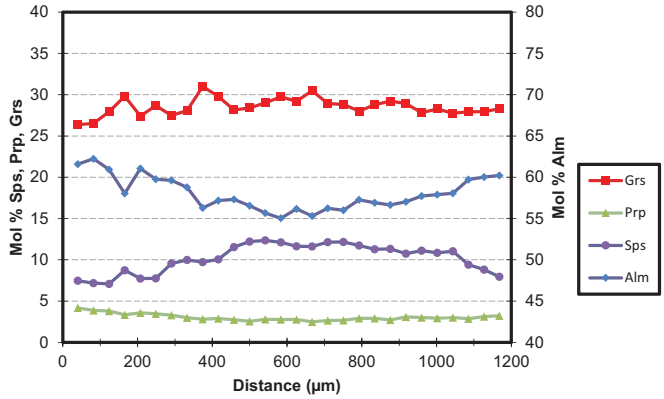


Figure DR6 (*continued*). Mn concentration maps of garnet grains and garnet compositional traverses. Grs—grossular, Prp—pyrope, Sps—spessartine, Alm—almadine.

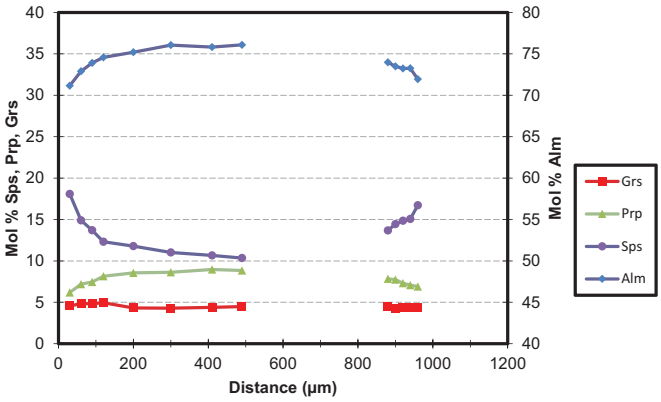
AZ 07-21-13 (5), gt 1





RR 05-05-12 (8), gt1

No Map



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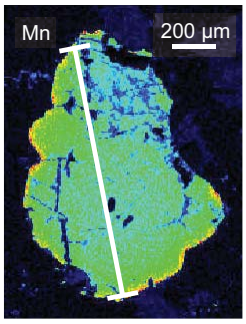

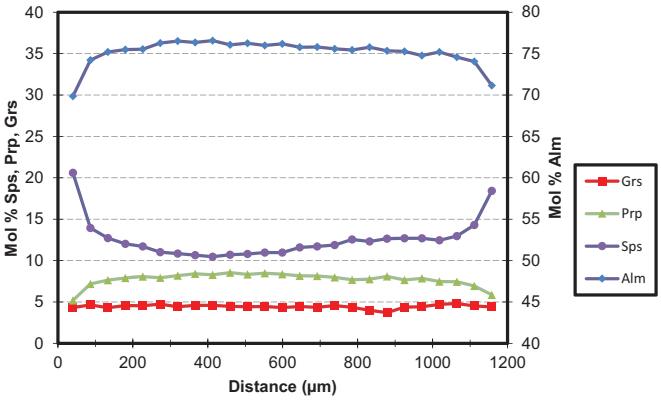

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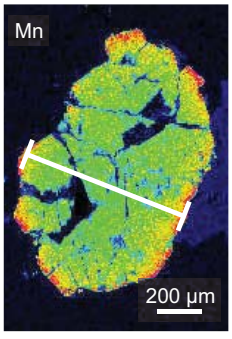


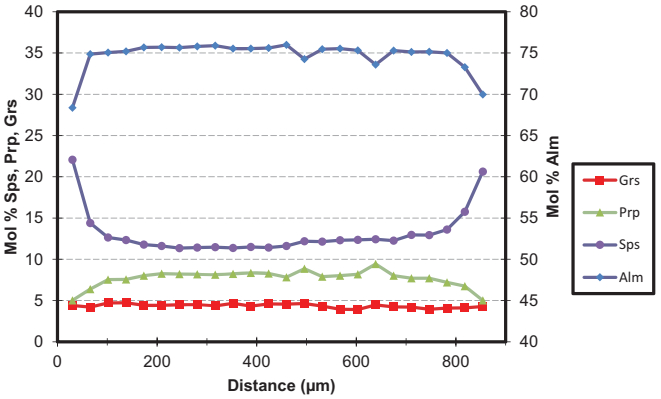
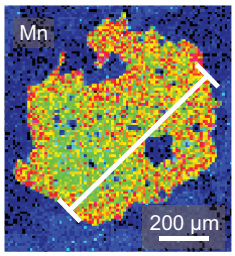
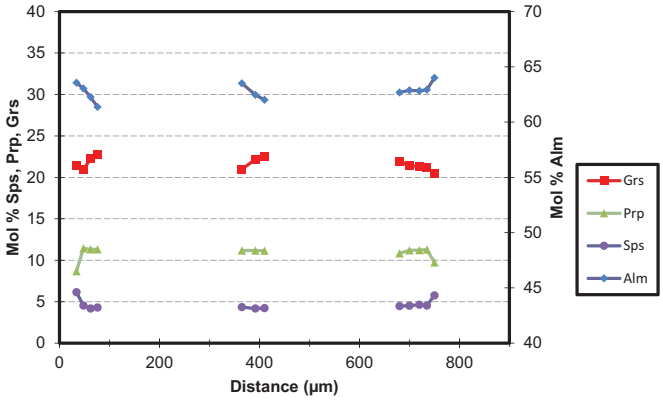


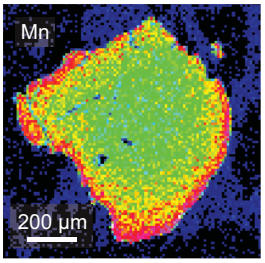
Figure DR6 (*continued*). Mn concentration maps of garnet grains and garnet compositional traverses. Grs—grossular, Prp—pyrope, Sps—spessartine, Alm—almadine.

AZ 04-18-12 (4), gt1





AZ 04-18-12 (4b), gt1



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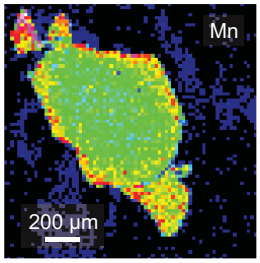

Figure DR6 (*continued*). Mn concentration maps of garnet grains and garnet compositional traverses. Grs—grossular, Prp—pyrope, Sps—spessartine, Alm—almadine.

Table DR4. Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	AY 09-21-11 (1A) [garnet-mica schist]																		
Mineral	Grt	Bt	Ms	Pl	Grt	Bt	Ms	Grt	Bt	Ms	Pl	Grt	Chl	Ms	Pl	Grt	Bt	Ms	Pl
Descr.[#]	1; p	1; mean hi Ti	1; low-Si	1, 2; adj. grt	2; p	2; mean hi-Ti	2; mean low-Si	3; p	3; mean hi-Ti	3; mean low-Si	3; adj. grt	4; p	4; mean	4; mean low-Si	4; adj. grt, hi-Ca	5; p	5; hi-Ti, low Al(vi)	5; mean low-si	5; mean hi-Ca
Interp.[1]	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
n*	1	3	1	5	1	2	3	1	4	2	2	1	5	2	1	1	1	3	2
SiO_2	37.16	34.82	44.98	62.55	37.08	35.42	45.11	36.36	35.11	46.05	63.25	37.12	24.38	45.52	62.20	37.06	35.41	45.82	63.80
TiO_2	0.05	1.50	0.35	0.02	0.08	1.27	0.39	0.06	1.47	0.41	0.02	0.13	0.07	0.38	0.01	0.08	1.68	0.47	0.00
Al_2O_3	21.90	19.76	37.05	23.08	22.01	19.75	36.50	21.39	20.00	37.20	22.72	21.63	23.62	36.76	23.36	21.57	20.20	37.76	23.02
Cr_2O_3	0.00	0.06	0.07	0.02	0.00	0.08	0.08	0.03	0.14	0.10	0.05	0.00	0.12	0.06	0.00	0.08	0.06	0.07	0.02
FeO	35.22	20.24	1.86	0.26	35.08	20.94	1.12	35.25	20.48	1.00	0.13	35.77	26.45	1.20	0.08	35.67	20.28	1.08	0.09
MgO	1.82	9.17	0.68	0.00	2.36	9.55	0.43	1.85	9.20	0.49	0.01	1.82	13.74	0.49	0.00	1.74	9.27	0.52	0.00
CaO	4.05	0.01	0.02	3.83	3.36	0.03	0.02	4.11	0.01	0.01	3.37	4.13	0.02	0.03	3.93	4.07	0.00	0.03	3.29
MnO	1.11	0.03	0.00	0.02	1.68	0.05	0.01	1.25	0.04	0.01	0.01	0.99	0.07	0.00	0.02	1.13	0.04	0.01	0.00
Na_2O	0.02	0.34	1.41	9.58	0.00	0.28	1.55	0.02	0.31	1.51	9.83	0.04	0.01	1.39	9.51	0.00	0.33	1.27	9.86
K_2O	0.02	8.77	8.52	0.07	0.04	8.76	9.24	0.03	8.75	9.11	0.06	0.00	0.03	9.03	0.09	0.01	8.99	8.78	0.09
Total	101.3	94.7	94.9	99.4	101.7	96.1	94.4	100.4	95.52	95.9	99.5	101.6	88.5	94.9	99.2	101.4	96.3	95.8	100.2
No. O	12	11	11	8	12	11	11	12	11	11	8	12	14	11	8	12	11	11	8
Si	2.96	2.67	2.99	2.79	2.94	2.68	3.02	2.94	2.67	3.02	2.81	2.95	2.56	3.02	2.78	2.96	2.67	3.00	2.81
Ti	0.00	0.09	0.02	0.00	0.00	0.07	0.02	0.00	0.08	0.02	0.00	0.01	0.01	0.02	0.00	0.00	0.10	0.02	0.00
Al	2.06	1.79	2.90	1.21	2.06	1.76	2.88	2.04	1.79	2.88	1.19	2.02	2.92	2.88	1.23	2.03	1.79	2.92	1.20
Cr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Fe	2.35	1.30	0.10	0.01	2.33	1.32	0.06	2.38	1.30	0.06	0.01	2.37	2.32	0.07	0.00	2.38	1.28	0.06	0.00
Mg	0.22	1.05	0.07	0.00	0.28	1.08	0.04	0.22	1.04	0.05	0.00	0.24	2.15	0.05	0.00	0.21	1.04	0.05	0.00
Ca	0.35	0.00	0.00	0.18	0.29	0.00	0.00	0.36	0.00	0.00	0.16	0.39	0.00	0.00	0.19	0.35	0.00	0.00	0.16
Mn	0.08	0.00	0.00	0.00	0.11	0.00	0.00	0.09	0.00	0.00	0.00	0.07	0.01	0.00	0.00	0.08	0.00	0.00	0.00
Na	0.00	0.05	0.18	0.83	0.00	0.04	0.20	0.00	0.05	0.19	0.85	0.00	0.00	0.18	0.82	0.00	0.05	0.16	0.84
K	0.00	0.86	0.72	0.00	0.00	0.85	0.79	0.00	0.85	0.76	0.00	0.00	0.00	0.77	0.01	0.00	0.86	0.74	0.00
Cations	8.01	7.80	6.99	5.02	8.02	7.81	7.02	8.04	7.80	6.99	5.02	8.03	9.98	6.99	5.02	8.02	7.79	6.96	5.01
XMg	0.08	0.45	0.39	0.02	0.11	0.45	0.41	0.09	0.44	0.46	0.10	0.09	0.48	0.42	0.00	0.08	0.45	0.46	0.00
XCa	-	-	-	0.18	-	-	-	-	-	-	0.16	-	-	-	0.19	-	-	-	0.15
Al(iv)	-	1.33	1.01	-	-	1.32	0.98	-	1.33	0.98	-	-	1.44	0.98	-	-	1.33	1.00	-
Al(vi)	-	0.46	1.89	-	-	0.44	1.90	-	0.46	1.90	-	-	1.48	1.90	-	-	0.46	1.92	-
Alm	0.79	-	-	-	0.77	-	-	0.78	-	-	-	0.77	-	-	-	0.79	-	-	-
Prp	0.07	-	-	-	0.09	-	-	0.07	-	-	-	0.08	-	-	-	0.07	-	-	-
Grs	0.12	-	-	-	0.10	-	-	0.12	-	-	-	0.13	-	-	-	0.12	-	-	-
Sps	0.03	-	-	-	0.04	-	-	0.03	-	-	-	0.02	-	-	-	0.03	-	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

Table DR4 (*continued*). Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	AZ 04-18-12 (4b) [garnet-mica schist]				AZ 07-21-13 (5) [garnet amphibolite]								
Mineral	Grt	Bt	Grt	Bt	Grt	Pl	Amph	Grt	Pl	Amph	Grt	Pl	Amph
Descr.[#]	1; p	1; mean hi-Ti	2; p	2; mean hi-Ti	1; p	1; hi-Ca	1	2; p	2	2; rim	3; Core	3; matrix relict	3; low-Al core
Interp.[1]	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Late	Late	Late	Early	Early	Early
n*	2	4	2	4	2	7	10	1	2	2	15	3	2
SiO_2	36.95	33.60	36.99	34.81	37.08	59.32	42.12	37.29	61.04	42.98	37.15	58.46	42.72
TiO_2	0.01	1.73	0.01	2.85	0.15	0.01	0.75	0.10	0.02	0.68	0.22	0.02	0.66
Al_2O_3	22.08	21.44	21.85	20.46	21.44	25.16	11.83	21.56	23.77	10.81	21.32	25.79	11.23
Cr_2O_3	0.00	0.01	0.01	0.04	0.00	0.01	0.03	0.01	0.00	0.03	0.02	0.01	0.07
FeO	33.48	21.54	32.48	20.31	27.89	0.19	21.78	27.58	0.22	21.62	25.55	0.13	21.48
MgO	3.37	7.85	2.90	7.60	0.98	0.00	6.79	1.05	0.01	7.11	0.71	0.00	7.05
CaO	1.30	0.04	1.30	0.01	9.63	6.27	11.41	9.22	4.73	11.41	10.27	7.14	11.42
MnO	3.90	0.29	5.47	0.23	3.19	0.01	0.29	3.31	0.02	0.28	5.11	0.02	0.29
Na_2O	0.00	0.08	0.00	0.22	0.04	8.48	1.43	0.07	9.41	1.39	0.04	7.88	1.35
K_2O	0.01	8.19	0.00	9.79	0.00	0.05	0.71	0.00	0.06	0.59	0.01	0.06	0.64
Total	101.1	94.8	101.0	96.3	100.4	99.5	97.1	100.2	99.3	96.9	100.4	99.5	96.9
No. O	12	11	12	11	12	8	23	12	8	23	12	8	23
Si	2.94	2.58	2.96	2.64	2.96	2.66	6.50	2.98	2.73	6.63	2.97	2.63	6.59
Ti	0.00	0.10	0.00	0.16	0.01	0.00	0.09	0.01	0.00	0.08	0.01	0.00	0.08
Al	2.07	1.94	2.06	1.83	2.02	1.33	2.15	2.03	1.26	1.97	2.01	1.37	2.04
Cr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Fe	2.23	1.39	2.17	1.29	1.86	0.01	2.81	1.84	0.01	2.79	1.71	0.00	2.77
Mg	0.40	0.90	0.35	0.86	0.12	0.00	1.56	0.12	0.00	1.63	0.08	0.00	1.62
Ca	0.11	0.00	0.11	0.00	0.82	0.30	1.89	0.79	0.23	1.89	0.88	0.34	1.89
Mn	0.26	0.02	0.37	0.02	0.22	0.00	0.04	0.22	0.00	0.04	0.35	0.00	0.04
Na	0.00	0.01	0.00	0.03	0.01	0.74	0.43	0.01	0.82	0.42	0.01	0.69	0.40
K	0.00	0.80	0.00	0.95	0.00	0.00	0.14	0.00	0.00	0.12	0.00	0.00	0.13
Cations	8.02	7.75	8.01	7.77	8.02	5.04	15.61	8.01	5.05	15.57	8.02	5.03	15.57
XMg	0.15	0.39	0.14	0.40	0.06	0.02	0.36	0.06	0.10	0.37	0.05	0.02	0.37
XCa	-	-	-	-	-	0.29	-	-	0.22	-	-	0.33	-
Al(iv)	-	1.42	-	1.36	-	-	1.50	-	-	1.37	-	-	1.41
Al(vi)	-	0.53	-	0.47	-	-	0.66	-	-	0.60	-	-	0.64
Alm	0.74	-	0.72	-	0.62	-	-	0.62	-	-	0.56	-	-
Prp	0.13	-	0.12	-	0.04	-	-	0.04	-	-	0.03	-	-
Grs	0.04	-	0.04	-	0.27	-	-	0.26	-	-	0.29	-	-
Sps	0.09	-	0.12	-	0.07	-	-	0.07	-	-	0.11	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

Table DR4 (*continued*). Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	AZ 04-18-12 (4) [garnet-epidote amphibolite gneiss]						
Mineral	Grt	Pl	Amph	Ep	Grt	Pl	Amph
Descr.[#]	1; p	1; hi-Ca	1	1;2	2; p	2; hi-Ca	2; low-Al
Interp.[1]	Peak	Peak	Peak		Peak	Peak	Peak
n*	4	4	3	10	3	6	3
SiO_2	37.77	46.80	43.10	41.14	37.73	46.99	43.13
TiO_2	0.06	0.02	1.39	0.03	0.03	0.02	1.33
Al_2O_3	22.05	34.11	13.00	31.82	22.00	34.01	12.74
Cr_2O_3	0.02	0.00	0.00	0.02	0.02	0.01	0.02
FeO	28.81	0.13	18.63	2.54	28.60	0.12	19.25
MgO	2.86	0.00	8.68	0.02	2.93	0.00	8.43
CaO	7.69	16.79	11.13	22.65	7.89	16.67	10.93
MnO	2.06	0.03	0.23	0.04	1.97	0.02	0.26
Na_2O	0.00	2.05	1.20	0.72	0.01	2.13	1.24
K_2O	0.00	0.02	0.93	0.05	0.00	0.03	0.84
Total	101.3	100.0	98.3	99.0	101.2	100.0	98.2
No. O	12	8	23	12.5	12	8	23
Si	2.96	2.15	6.45	3.10	2.96	2.16	6.48
Ti	0.00	0.00	0.16	0.00	0.00	0.00	0.15
Al	2.04	1.85	2.29	2.83	2.04	1.84	2.25
Cr	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fe	1.89	0.00	2.33	0.16	1.88	0.00	2.42
Mg	0.33	0.00	1.94	0.00	0.34	0.00	1.89
Ca	0.65	0.83	1.78	1.83	0.66	0.82	1.76
Mn	0.14	0.00	0.03	0.00	0.13	0.00	0.03
Na	0.00	0.18	0.35	0.10	0.00	0.19	0.36
K	0.00	0.00	0.18	0.00	0.00	0.00	0.16
Cations	8.01	5.02	15.51	8.04	8.02	5.02	15.50
XMg	0.15	0.05	0.45	0.02	0.15	0.04	0.44
XCa	-	0.82	-	0.94	-	0.81	-
Al(iv)	-	-	1.55	-	-	-	1.52
Al(vi)	-	-	0.75	-	-	-	0.73
Alm	0.63	-	-	-	0.62	-	-
Prp	0.11	-	-	-	0.11	-	-
Grs	0.21	-	-	-	0.22	-	-
Sps	0.05	-	-	-	0.04	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

Table DR4 (*continued*). Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	RR 05-05-12 (8) [quartzofeldspathic mylonitic gneiss]												
Mineral	Grt	Bt	Ms	Pl	Kfs	Grt	Bt	Ms	Grt	Bt	Ms	Pl	Kfs
Descr.[#]	1; p	1	1; low-Si	1,2; high Ca	1,2,3	2; p	2; mean hi-Ti	2; low-Si	3; p	3; Mean hi-Ti	3; low-Si	3; high Ca	3
Interp.[1]	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
n*	3	1	1	2	4	2	2	1	5	2	3	5	2
SiO_2	37.05	33.21	45.00	60.62	63.67	37.03	34.30	45.63	36.83	33.12	45.18	61.75	63.40
TiO_2	0.07	3.05	0.71	0.01	0.03	0.02	3.67	0.95	0.02	3.36	0.30	0.03	0.03
Al_2O_3	21.87	19.30	36.16	24.80	18.87	21.80	19.20	36.29	21.67	18.63	35.06	23.98	18.82
Cr_2O_3	0.00	0.12	0.01	0.00	0.00	0.03	0.03	0.03	0.02	0.01	0.03	0.00	0.00
FeO	32.36	25.59	1.35	0.09	0.25	32.97	24.35	1.14	33.81	23.91	1.55	0.16	0.25
MgO	1.73	5.31	0.41	0.00	0.00	1.95	5.46	0.42	2.05	5.54	0.63	0.00	0.00
CaO	1.65	0.00	0.03	6.21	0.04	1.52	0.00	0.01	1.58	0.02	0.02	4.89	0.02
MnO	6.84	0.50	0.03	0.04	0.06	6.21	0.32	0.02	4.69	0.39	0.03	0.01	0.05
Na_2O	0.02	0.03	0.53	8.76	0.69	0.01	0.11	0.55	0.01	0.05	0.48	9.28	0.60
K_2O	0.01	9.18	11.01	0.26	16.04	0.00	9.66	11.08	0.01	9.09	10.79	0.18	16.24
Total	101.6	96.3	95.2	100.8	99.6	101.5	97.1	96.1	100.7	94.1	94.1	100.3	99.4
No. O	12	11	11	8	8	12	11	11	12	11	11	8	8
Si	2.96	2.56	3.01	2.69	2.96	2.96	2.64	3.02	2.97	2.63	3.06	2.74	2.96
Ti	0.00	0.17	0.04	0.00	0.00	0.00	0.21	0.05	0.00	0.20	0.02	0.00	0.00
Al	2.06	1.79	2.85	1.30	1.04	2.06	1.74	2.83	2.06	1.74	2.80	1.25	1.04
Cr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fe	2.16	1.73	0.08	0.00	0.01	2.21	1.56	0.06	2.28	1.59	0.09	0.01	0.01
Mg	0.21	0.67	0.04	0.00	0.00	0.23	0.63	0.04	0.25	0.65	0.06	0.00	0.00
Ca	0.14	0.00	0.00	0.29	0.00	0.13	0.00	0.00	0.14	0.00	0.00	0.23	0.00
Mn	0.46	0.03	0.00	0.00	0.00	0.42	0.02	0.00	0.32	0.03	0.00	0.00	0.00
Na	0.00	0.01	0.07	0.75	0.06	0.00	0.02	0.07	0.00	0.01	0.06	0.80	0.05
K	0.00	0.81	0.94	0.01	0.95	0.00	0.95	0.94	0.00	0.92	0.93	0.01	0.97
Cations	8.01	7.78	7.03	5.05	5.03	8.01035	7.76	7.02	8.01	7.77	7.02	5.04	5.03
XMg	0.09	0.28	0.35	0.04	0.00	0.10	0.29	0.40	0.10	0.29	0.42	0.04	0.00
XCa	-	-	-	0.28	0.94^	-	-	-	-	-	-	0.22	0.95^
Al(iv)	-	1.44	0.99	-	-	-	1.36	0.98	-	1.37	0.94	-	-
Al(vi)	-	0.35	1.86	-	-	-	0.37	1.86	-	0.37	1.86	-	-
Alm	0.73	-	-	-	-	0.74	-	-	0.76	-	-	-	-
Prp	0.07	-	-	-	-	0.08	-	-	0.08	-	-	-	-
Grs	0.05	-	-	-	-	0.04	-	-	0.05	-	-	-	-
Sps	0.16	-	-	-	-	0.14	-	-	0.11	-	-	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

^ XK or Or# instead of XCa

Table DR4 (*continued*). Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	RR 05-05-12 (12) [garnet amphibolite]												
Mineral	Grt	Pl	Amph	Grt	Pl	Amph	Grt	Pl	Grt	Pl	Grt	Pl	Amph
Descr.[#]	1; p	1; Hi-Ca	1	4; p	4; Adj. to grt	4	1; core	1; Low-Ca core	4; core	4; core	1; rim	1; rim	1
Interp.[1]	Peak	Peak		Peak	Peak		Early	Early	Early	Early	Late	Late	Late
n*	3	1	1	1	2	3	4	3	2	3	2	2	1
SiO_2	38.00	56.88	43.55	38.30	54.47	43.11	38.12	58.23	37.82	58.18	38.01	54.47	48.35
TiO_2	0.08	0.03	0.49	0.14	0.02	1.52	0.16	0.01	0.10	0.04	0.08	0.02	0.30
Al_2O_3	22.00	27.93	12.81	22.17	29.59	12.33	21.90	27.11	21.79	26.83	21.98	29.59	8.32
Cr_2O_3	0.00	0.02	0.08	0.00	0.01	0.01	0.02	0.00	0.03	0.02	0.00	0.01	0.00
FeO	27.80	0.32	17.64	26.89	0.30	17.83	26.57	0.48	27.71	0.49	27.12	0.30	15.18
MgO	2.70	0.00	9.77	2.92	0.01	9.42	1.65	0.01	1.99	0.00	2.97	0.01	13.06
CaO	10.93	9.31	11.49	10.85	11.31	11.57	10.71	8.23	11.30	8.19	10.57	11.31	11.71
MnO	0.26	0.00	0.10	0.37	0.01	0.06	2.87	0.01	0.95	0.00	0.58	0.01	0.06
Na_2O	0.01	6.13	1.45	0.02	5.07	1.54	0.04	6.96	0.02	7.00	0.02	5.07	1.00
K_2O	0.00	0.12	1.03	0.01	0.18	1.12	0.02	0.10	0.00	0.07	0.01	0.18	0.48
Total	101.8	100.7	98.4	101.7	101.0	98.5	102.1	101.1	101.7	100.8	101.3	101.0	98.5
No. O	12	8	23	12	8	23	12	8	12	8	12	8	23
Si	2.96	2.54	6.49	2.97	2.44	6.44	2.97	7.74	2.96	2.59	2.96	2.44	7.04
Ti	0.00	0.00	0.05	0.01	0.00	0.17	0.01	0.00	0.01	0.00	0.00	0.00	0.03
Al	2.02	1.47	2.25	2.03	1.56	2.17	2.01	4.25	2.01	1.41	2.02	1.56	1.43
Cr	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fe	1.81	0.01	2.20	1.74	0.01	2.23	1.73	0.05	1.81	0.02	1.77	0.01	1.85
Mg	0.31	0.00	2.17	0.34	0.00	2.10	0.19	0.00	0.23	0.00	0.35	0.00	2.84
Ca	0.91	0.44	1.84	0.90	0.54	1.85	0.90	1.17	0.95	0.39	0.88	0.54	1.83
Mn	0.02	0.00	0.01	0.02	0.00	0.01	0.19	0.00	0.06	0.00	0.04	0.00	0.01
Na	0.00	0.53	0.42	0.00	0.44	0.45	0.01	1.80	0.00	0.60	0.00	0.44	0.28
K	0.00	0.01	0.20	0.00	0.01	0.21	0.00	0.02	0.00	0.00	0.00	0.01	0.09
Cations	8.03	5.00	15.63	8.01	5.01	15.63	8.02	15.04	8.03	5.01	8.03	5.01	15.40
XMg	0.15	0.00	0.50	0.16	0.04	0.48	0.10	0.03	0.11	0.01	0.16	0.04	0.61
XCa	-	0.45	-	-	0.55	-	-	0.39	-	0.39	-	0.55	-
Al(iv)	-	-	1.51	-	-	1.56	-	-	-	-	-	-	0.96
Al(vi)	-	-	0.74	-	-	0.61	-	-	-	-	-	-	0.47
Alm	0.59	-	-	0.58	-	-	0.57	-	0.59	-	0.58	-	-
Prp	0.10	-	-	0.11	-	-	0.06	-	0.08	-	0.11	-	-
Grs	0.30	-	-	0.30	-	-	0.30	-	0.31	-	0.29	-	-
Sps	0.01	-	-	0.01	-	-	0.06	-	0.02	-	0.01	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

Table DR4 (*continued*). Representative electron-microprobe analyses metamorphic samples for thermobarometry

Sample	AY 09-21-11 (6A) [garnet amphibolite]								
Mineral	Grt	Amph	Pl	Grt	Amph	Pl	Grt	Amph	Pl
Descr.[#]	1; p	1	1; adj. grt; hi-Ca	2; p	2	2; hi-Ca	3; core	3	3; inclusion
Interp.[1]	Peak	Peak	Peak	Peak	Peak	Peak	Early	Early	Early
n*	2	3	2	2	2	2	2	1	2
SiO_2	37.58	44.35	52.95	38.16	42.94	52.91	37.86	47.96	58.36
TiO_2	0.11	0.63	0.00	0.13	1.92	0.01	0.09	1.05	0.00
Al_2O_3	21.87	12.31	30.26	22.01	12.68	30.85	21.85	8.34	26.75
Cr_2O_3	0.07	0.04	0.06	0.01	0.13	0.02	0.00	0.01	0.01
FeO	27.60	15.55	0.41	27.82	16.16	0.38	28.88	16.79	0.68
MgO	2.81	10.61	0.01	2.70	9.26	0.01	2.68	11.12	0.01
CaO	10.12	11.65	12.04	10.79	11.63	12.47	9.60	11.18	7.86
MnO	0.63	0.08	0.02	0.32	0.05	0.03	0.59	0.08	0.01
Na_2O	0.05	1.29	4.66	0.03	1.43	4.43	0.02	0.95	7.07
K_2O	0.00	0.93	0.10	0.01	1.19	0.11	0.01	0.58	0.10
Total	100.8	97.4	100.5	102.0	97.4	101.2	101.6	98.1	100.9
No. of O	12	23	8	12	23	8	12	23	8
Si	2.95	6.59	2.39	2.96	6.44	2.37	2.96	7.06	2.59
Ti	0.01	0.07	0.00	0.01	0.22	0.00	0.01	0.12	0.00
Al	2.02	2.16	1.61	2.01	2.24	1.63	2.01	1.45	1.40
Cr	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Fe	1.81	1.93	0.02	1.81	2.03	0.01	1.89	2.07	0.03
Mg	0.33	2.35	0.00	0.31	2.07	0.00	0.31	2.44	0.00
Ca	0.85	1.86	0.58	0.90	1.87	0.60	0.80	1.76	0.37
Mn	0.04	0.01	0.00	0.02	0.01	0.00	0.04	0.01	0.00
Na	0.01	0.37	0.41	0.00	0.42	0.38	0.00	0.27	0.61
K	0.00	0.18	0.01	0.00	0.23	0.01	0.00	0.11	0.01
Cations	8.03	16.28	5.01	8.03	15.54	5.01	8.03	15.29	5.01
XMg	0.15	0.55	0.03	0.15	0.51	0.03	0.14	0.54	0.03
XCa	-	-	0.58	-	-	0.60	-	-	0.38
Al(iv)	-	1.41	-	-	1.56	-	-	0.94	-
Al(vi)	-	0.75	-	-	0.68	-	-	0.51	-
Alm	0.60	-	-	0.59	-	-	0.62	-	-
Prp	0.11	-	-	0.10	-	-	0.10	-	-
Grs	0.28	-	-	0.30	-	-	0.26	-	-
Sps	0.01	-	-	0.01	-	-	0.01	-	-

[#]Description; number indicates different garnets in same sample; p is inferred peak-metamorphism position based on garnet compositional zoning

[1]Interpretation

* n = number of analyses in average

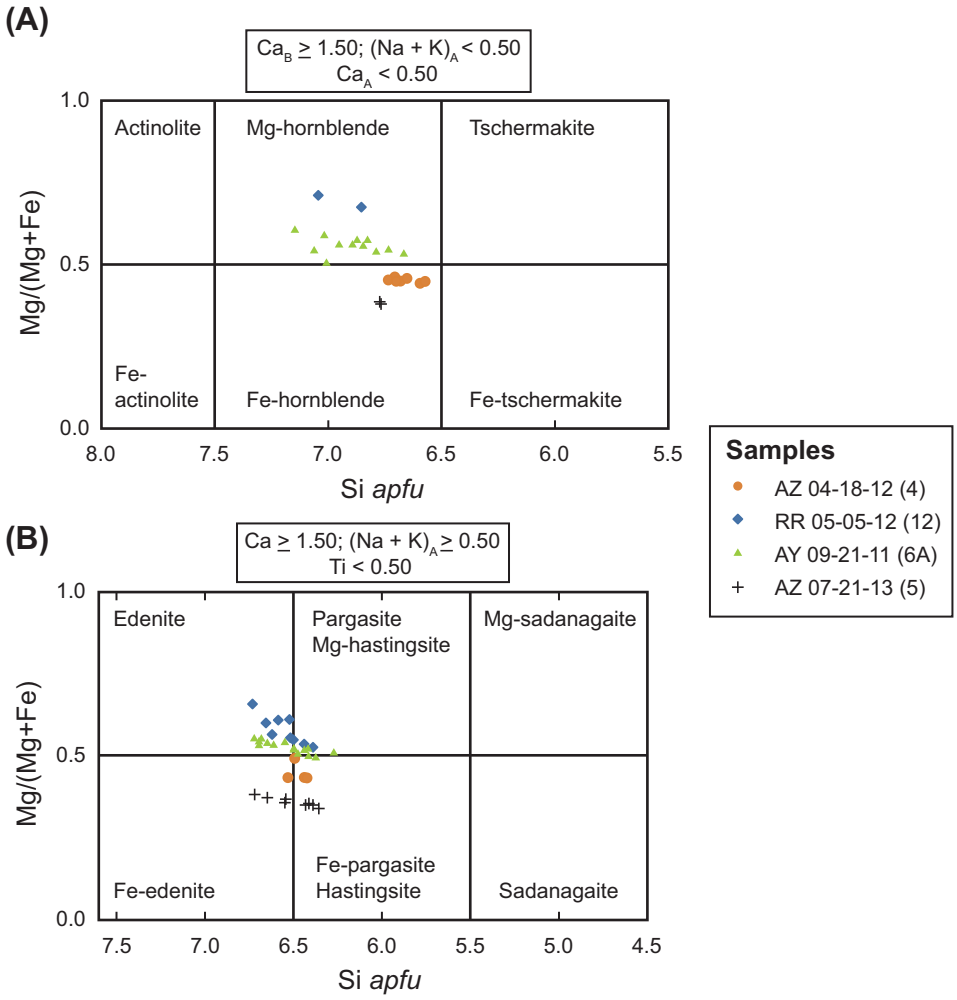

Figure DR7. Amphibole classification diagrams for (A) calcic amphiboles with low A-site occupancy and (B) calcic amphiboltes with high A-site occupancy. Points are all plotted as single electron-microprobe spot analyses.

METAMORPHIC BASEMENT ATTITUDE ROTATION

The attitudes of the pervasive fabrics in the basement units, which are inferred to have formed in the early Paleozoic, have been significantly modified by later deformation. To examine their original orientation, the attitude data was rotated back to a pre-Carboniferous state (Fig. 9B) using the Stereonet 9 software provided by Rick Allmendinger (see http://www.geo.cornell.edu/geology/faculty/RWA/programs/stereonet.html).

Structural data from south of *fault 4* was first rotated to account for the folding that occurred in the east-trending Triassic syncline (Fig. 9). The Triassic rocks are rotated back to horizontal and all of the data from beneath the Triassic strata (e.g., Carboniferous beds and the metamorphic rocks) are rotated accordingly. Next, the Carboniferous strata and underlying metamorphic rocks are rotated together so that the Carboniferous strata are returned to horizontal. The pre-Carboniferous structural data are more parallel than the uncorrected data (Fig. 9). Steep foliations are steep to near vertical and strike to the northwest. Stretching lineations are subhorizontal and trend to the southeast.

A similar procedure was done for the metamorphic structural data to the north of *fault 4*. In this case, all of the data was rotated in order to bring the Carboniferous-Permian strata that outcrop on the northern flank of the Tuo Lai Nan Shan (Fig. 9) back to horizontal. The average foliation attitude and lineation plunge-trend observations from all of the corrected pre-Carboniferous datasets are 126/84 SW and 12/119, respectively (Fig. 9B).

SEISMICITY IN NORTHERN TIBET AND BRITTLE-DUCTILE TRANSITION

The Tibetan Plateau has an average elevation of ~5 km (Fielding et al., 1994), although the northeastern margin of the plateau has a lower average elevation of ~4.5 km, which drops off rapidly to <1.5 km to the north in the Hexi Corridor foreland basin (Fig. 1). Geophysical studies show that the average crustal thickness of northern Tibet is 55-65 km (Zhao et al., 2001; Yue et al., 2012; Gao et al., 2013; Ye et al., 2015) (Fig. DR8). For comparison, the adjacent Ordos Basin to the northeast of the plateau's northern margin (Fig. 1) has a crustal thickness of 40-43 km (Chen et al., 2005; Liu et al., 2006; Pan and Niu, 2011). The mechanical strength of the Qilian Shan region, with an effective elastic thickness (T_e) of < 10 km to 20 km, is much weaker than Qaidam Basin to the south, where T_e equals 60-70 km (Braitenberg et al., 2003). The brittle crust in northern Tibet extends to a depth of approximately 17 km (~14 km below sea level) based on depth of crustal seismicity (Chu et al., 2009; Sloan et al., 2011) (Fig. DR8). Brittle structures across the Qilian Shan-Nan Shan thrust belt may sole into a main detachment surface at this depth (Lease et al., 2012), although geophysical studies show that multiple horizontal detachment surfaces exist in the crust (Gao et al., 1999; 2013; Ye et al., 2015).

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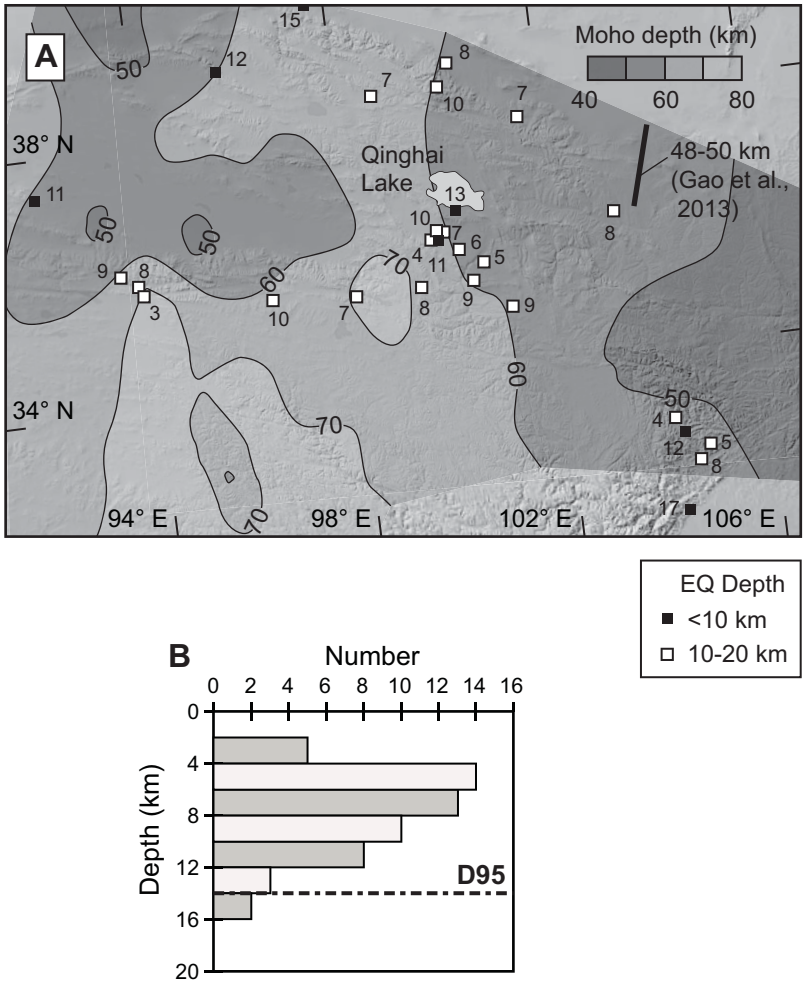

Figure DR8. (A) Contoured crustal thickness estimates derived from receiver functions analysis of Yue et al. (2012) and Moho depth imaged by seismic reflection analysis of Gao et al. (2013). Also plotted are the relocated earthquake depths compiled from Chu et al. (2009) and Sloan et al. (2011). Figure modified from Zuza et al. (2016). The underlying basemap is from GeoMapApp software, available online at www.geomapapp.org (Ryan et al., 2009). (B) Histogram plot of well-constrained earthquake depths from Chu et al. (2009) and Sloan et al. (2011) across northern Tibet. The D95 is a cutoff line above which 95% of the total catalogued seismic events are included; this may be approximate the depth of the base of the seismogenic zone. Note that this plot contains data from a slightly larger area than displayed in Figure DR8A.