

Wei Dan, J. Brendan Murphy, Gong-Jian Tang, Xiu-Zheng Zhang, William M. White, and Qiang Wang, 2022, Cambrian–Ordovician magmatic flare-up in NE Gondwana: A silicic large igneous province?: GSA Bulletin, <https://doi.org/10.1130/B36331.1>.

Supplemental Material

Table S1. Compiled zircon U-Pb crystallization ages for Cambrian-Ordovician igneous rocks in NE Gondwana.

Table S2. Compiled Nd isotopic geochemical data calculated at ~500 Ma.

Table S3. Compiled early Paleozoic Metamorphic dates.

Table S1 Compiled zircon U-Pb crystallization ages for Cambrian-Ordovician igneous rocks in NE Gondwana

Terrane	Locality	Rock type	Age (Ma)	Error (2 σ)	Zircon U-Pb method	References
Himalaya	Kathmandu	Granite	478	17	SHRIMP	Cawood et al., 2007
	Kathmandu	Granite	477	4	SHRIMP	Cawood et al., 2007
	Cuona	Gneissic granite	494	5	LA-ICP-MS	Ding et al., 2017
	Cuona	Gneissic granite	496	17	LA-ICP-MS	Ding et al., 2017
	Cuona	Gneissic granite	491	3	LA-ICP-MS	Ding et al., 2017
	Cuona	Gneissic granite	495	4	LA-ICP-MS	Ding et al., 2017
	Cuona	Gneissic granite	513	5	LA-ICP-MS	Ding et al., 2017
	Cuonadong	Gneissic granite	501	3	LA-ICP-MS	Zhang et al., 2019a
	Cuonadong	Gneissic granite	501	3	LA-ICP-MS	Zhang et al., 2019a
	Cuonadong	Gneissic granite	497	3	LA-ICP-MS	Zhang et al., 2019b
	Cuonadong	Gneissic granite	494	4	LA-ICP-MS	Zhang et al., 2019b
	Cuonadong	Gneissic granite	496	4	LA-ICP-MS	Zhang et al., 2019b
	Cuonadong	Gneissic granite	500	4	LA-ICP-MS	Zhang et al., 2019b
	Cuonadong	Gneissic granite	502	3	LA-ICP-MS	Zhang et al., 2019b
	Dinggye	Gneissic granite	482	9	SHRIMP	Zhang et al., 2020
	Dinggye	Gneissic granite	500	5	SHRIMP	Zhang et al., 2020
	Dinggye	Gneissic granite	490	8	SHRIMP	Zhang et al., 2020
	Dinggye	Gneissic granite	489	5	SHRIMP	Zhang et al., 2020
	Dinggye	Gneissic granite	504	4	SHRIMP	Zhang et al., 2020
	Dinggye	Gneissic granite	498	9	SHRIMP	Zhang et al., 2020
	Everest	Leucosome	489	9	LA-ICP-MS	Yoshida et al., 2019
	Everest	Leucosome	464	11	LA-ICP-MS	Yoshida et al., 2019
	Gyirong	Gneissic granite	499	5	SHRIMP	Wang et al., 2011
	Gyirong	Gneissic granite	485	1	LA-ICP-MS	Wang et al., 2012
	Gyirong	Gneissic granite	475	1	LA-ICP-MS	Wang et al., 2012
	Gyirong	Gneissic granite	486	2	LA-ICP-MS	Wang et al., 2012
	Gyirong	Gneissic granite	474	2	LA-ICP-MS	Wang et al., 2012
	Gyirong	Gneissic granite	487	3	SHRIMP	Gao et al., 2019
	Gyirong	Gneissic granite	448	3	LA-ICP-MS	Gao et al., 2019
	Gyirong	Gneissic granite	467	4	LA-ICP-MS	Gao et al., 2019
	Hakale	Granite	467	3	LA-ICP-MS	Naem et al., 2016
	Hakale	Leucogranite	476	4	LA-ICP-MS	Naem et al., 2016
	Kala, Dadeldhura– Dipayal, Nepal	Gneissic granite	512	5	LA-ICP-MS	Gehrels et al., 2006a
	Kampa	Gneissic granite	506	3	SHRIMP	Quigley et al., 2008
	Kangmar	Gneissic granite	508	1	LA-ICP-MS	Lee et al., 2000
	Kangmar	Gneissic granite	498	8	SHRIMP	Gao et al., 2019
Kangmar	Gneissic granite	500	7	SHRIMP	Gao et al., 2019	
Kangmar	Gneissic granite	495	1	LA-ICP-MS	Wang et al., 2012	

Kangmar	Gneissic granite	499	1	LA-ICP-MS	Wang et al., 2012
Khartar	Garnet Sillimanite Gneiss	493	10	SHRIMP	Liu et al., 2007
Laguirri	Gneissic granite	515	3	LA-ICP-MS	Gu et al., 2013
Lhagoi Kangri	Gneissic granite	477	10	SHRIMP	Gao et al., 2019
Mabja	Sillimanite-bearing biotite plagioclase gneiss	470	8	SIMS	Lee and Whitehouse, 2007
Mabja	Sillimanite-bearing two-mica and two-feldspar gneiss	491	15	SIMS	Lee and Whitehouse, 2007
Mabja	Gneiss	503	18	SIMS	Lee and Whitehouse, 2007
Mabja	Gneissic granite	475	14	SHRIMP	Gao et al., 2019
Mansehra	Granite	480	5	SIMS	Sajid et al., 2018
Mansehra	Granite	490	7	SHRIMP	Naeem et al., 2016
Mansehra	Granite	477	11	LA-ICP-MS	Naeem et al., 2016
Mansehra	Granite	483	2	LA-ICP-MS	Naeem et al., 2016
Mansehra	Granite	473	9	LA-ICP-MS	Naeem et al., 2016
Namche Barwa	Granulite	502	6	SIMS	Su et al., 2012
Namche Barwa	Garnet-biotite gneiss	490	6	SHRIMP	Zhang et al., 2008
Namche Barwa	Garnet-biotite gneiss	499	3	LA-ICP-MS	Zhang et al., 2008
Namche Barwa	Scapolite diopside rock	505	3	LA-ICP-MS	Zhang et al., 2008
Namche Barwa	Gneissic granite	496	1	LA-ICP-MS	Zhang et al., 2012c
Namche Barwa	Gneissic granite	495	5	LA-ICP-MS	Zhang et al., 2012c
Namche Barwa	Gneissic granite	490	11	LA-ICP-MS	Zhang et al., 2012c
Namche Barwa	Gneissic granite	502	9	LA-ICP-MS	Zhang et al., 2012c
Namche Barwa	Gneissic granite	507	10	SHRIMP	Gao et al., 2019
Palung, Kathmandu	Gneissic granite	486	1	LA-ICP-MS	Wang et al., 2016
Palung, Kathmandu	Gneissic granite	455	3	LA-ICP-MS	Wang et al., 2016
Palung, Kathmandu	Gneissic granite	484	5	LA-ICP-MS	Gehrels et al., 2006b
Palung, Kathmandu	granitic dike	476	3	LA-ICP-MS	Gehrels et al., 2006b
Palung, Kathmandu	granitic dike	473	6	LA-ICP-MS	Gehrels et al., 2006b
Ruwa,	granitic dike	474	3	LA-ICP-MS	Gehrels et al.,

	Dadeldhura– Dipayal, Nepal					2006a
	Ruwa, Dadeldhura– Dipayal, Nepal	Gneissic granite	482	2	LA-ICP-MS	Gehrels et al., 2006a
	Shao La	Metamafic rocks	455	6	SHRIMP	Visonà et al., 2010
	Simchar, Kathmandu	Granite	480	4	LA-ICP-MS	Gehrels et al., 2006b
	Utla	Granite	479	2	SIMS	Sajid et al., 2018
	Utla	Aplite dike	477	4	SIMS	Sajid et al., 2018
	Xiaru	Gneissic granite	486	3	LA-ICP-MS	Gao et al., 2019
	Xiaru	Gneissic granite	459	2	LA-ICP-MS	Gao et al., 2019
	Xiaru	Gneissic granite	472	4	SHRIMP	Gao et al., 2019
	Xiaru	Gneissic granite	466	4	SHRIMP	Gao et al., 2019
	Xiaru	Gneissic granite	479	8	SHRIMP	Gao et al., 2019
	Xiaru	Gneissic granite	455	2	LA-ICP-MS	Gao et al., 2019
	Xiaru	Gneissic granite	447	1	LA-ICP-MS	Gao et al., 2019
	Yadong	Gneissic granite	499	4	LA-ICP-MS	Shi et al., 2010
	Yadong	Gneissic granite	479	4	LA-ICP-MS	Shi et al., 2010
	Yadong	Gneissic granite	509	3	LA-ICP-MS	Gao et al., 2019
	Yadong	Gneissic granite	475	4	LA-ICP-MS	Gou et al., 2015
	Yadong	Gneissic granite	479	4	LA-ICP-MS	Gou et al., 2015
	Yalaxiangbo	Gneissic granite	488	1	LA-ICP-MS	Wang et al., 2012
	Yalaxiangbo	Gneissic granite	496	1	LA-ICP-MS	Wang et al., 2012
	Yalaxiangbo	Gneissic granite	518	8	SHRIMP	Gao et al., 2012
	Zhongba	Gneissic granite	478	2	LA-ICP-MS	Liu et al., 2017
	Zhongba	Gneissic granite	478	2	LA-ICP-MS	Liu et al., 2017
Lhasa	Milin	Gneissic granite	496	9	LA-ICP-MS	Dong et al., 2010
	Milin	Gneissic granite	501	4	LA-ICP-MS	Dong and Zhang, 2015
	Milin	Gneissic granite	498	4	LA-ICP-MS	Dong and Zhang, 2015
	Banglei	Metarhyolite	492	2	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metabasalt	492	4	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metarhyolite	492	4	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metarhyolite	492	3	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metarhyolite	492	3	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metarhyolite	492	1	LA-ICP-MS	Zhu et al., 2012
	Banglei	Metabasalt	512	5	LA-ICP-MS	Liu et al., 2020
	Banglei	Metarhyolite	497	6	LA-ICP-MS	Liu et al., 2020
	Zhaqian	A-type ultrapotassic	511	4	LA-ICP-MS	Hu, P.Y. et al., 2013

		rhyolite				
	Zhaqian	A-type ultrapotassic rhyolite	525	3	LA-ICP-MS	Hu, P.Y. et al., 2013
	Zhaqian	A-type ultrapotassic rhyolite	497	4	LA-ICP-MS	Liu et al., 2020
	Zhakang	A-type ultrapotassic rhyolite	510	3	LA-ICP-MS	Hu, P.Y. et al., 2013
	Zhakang	A-type ultrapotassic rhyolite	501	2	LA-ICP-MS	Ji et al., 2009
	Zhakang	A-type ultrapotassic rhyolite	512	4	LA-ICP-MS	Ding et al., 2015
Amdo	Amdo	Gneissic granite	485	14	SHRIMP	Lu et al., 2014
	Amdo	Gneissic granite	487	6	SHRIMP	Lu et al., 2014
	Amdo	metamafic rock	483	6	LA-ICPMS	Zhang et al., 2012b
	Amdo	metamafic rock	487	6	LA-ICPMS	Zhang et al., 2012b
	Amdo	Gneissic granite	495	5	LA-ICPMS	Zhang et al., 2012b
	Amdo	Gneissic granite	502	5	LA-ICPMS	Zhang et al., 2012b
	Amdo	Gneissic granite	487	12	LA-ICPMS	Zhang et al., 2012b
	Amdo	Granodiorite gneiss	483	13	LA-ICPMS	Guynn et al., 2012
	Amdo	Gneissic granite	498	11	LA-ICPMS	Guynn et al., 2012
	Amdo	Gneissic granite	487	16	LA-ICPMS	Guynn et al., 2012
	Amdo	Gneissic granite	532	7	LA-ICPMS	Guynn et al., 2012
	Amdo	Gneissic granite	510	2	LA-ICPMS	Yun et al., 2019
	Amdo	Gneissic granite	505	2	LA-ICPMS	Yun et al., 2019
	Amdo	Gneissic granite	505	3	LA-ICPMS	Xie et al., 2013
	Amdo	Gneissic granite	505	5	LA-ICPMS	Xie et al., 2013
	Amdo	Gneissic granite	505	4	LA-ICPMS	Xie et al., 2013
	Amdo	Gneissic granite	517	4	LA-ICPMS	Xie et al., 2013
	Amdo	Gneissic granite	488	4	LA-ICPMS	Xie et al., 2010
	Amdo	mafic gneiss	490	8	LA-ICPMS	Liu et al., 2020
	Amdo	Gneissic granite	532	3	LA-ICPMS	Liu et al., 2020

Southern Qiangtang	Bengsong Co	Gneissic granite	497	3	LA-ICP-MS	Peng et al., 2014
	Bengsong Co	Gneissic granite	496	4	LA-ICP-MS	Peng et al., 2014
	Duguer Shan	Gneissic granite	476	5	LA-ICP-MS	Pullen et al., 2011
	Duguer Shan	Gneissic granite	475	5	LA-ICP-MS	Pullen et al., 2011
	Duguer Shan	Gneissic granite	474	5	LA-ICP-MS	Pullen et al., 2011
	Duguer Shan	Gneissic granite	474	5	LA-ICP-MS	Pullen et al., 2011
	Duguer Shan	Gneissic granite	474	4	LA-ICP-MS	Pullen et al., 2011
	Mayiganri	Gneissic granite	467	8	LA-ICP-MS	Pullen et al., 2011
	Bengsong Co	Gneissic granite	481	3	LA-ICP-MS	Hu et al., 2015
	Bengsong Co	Gneissic granite	486	4	LA-ICP-MS	Hu et al., 2015
	Duguer Shan	Gneissic granite	480	3	LA-ICP-MS	Hu et al., 2015
	Duguer Shan	Gneissic granite	485	3	LA-ICP-MS	Hu et al., 2015
	Bengsong Co	Gneissic granite	473	3	LA-ICP-MS	Zhao et al., 2014
	Bengsong Co	Gneissic granite	480	4	SIMS	Dan et al., 2020
	Duguer Shan	Gneissic granite	465	4	SIMS	Dan et al., 2020
	Duguer Shan	Gneissic granite	492	2	LA-ICP-MS	Liu et al., 2016
	Duguer Shan	Gneissic granite	501	2	LA-ICP-MS	Liu et al., 2016
	Duguer Shan	Gneissic granite	502	2	LA-ICP-MS	Liu et al., 2016
	Dawa Shan	Metarhyolite	455	4	LA-ICP-MS	Xie et al., 2017
	Dawa Shan	Metarhyolite	461	3	LA-ICP-MS	Xie et al., 2017
	Dawa Shan	Metarhyolite	470	10	LA-ICP-MS	Xie et al., 2017
	Dawa Shan	Metarhyolite	467	4	LA-ICP-MS	Xie et al., 2017
	Kaqiong Group	Gneissic granite	499	5	LA-ICPMS	Liu et al., 2020
	Kaqiong Group	Gneissic granite	507	10	SHRIMP	Li et al., 2008
Baoshan	Xoamgda area	Massive monogranite	473	6	LA-ICPMS	Wang et al., 2013
	Pinghe batholith	Massive monogranite	473	5	LA-ICPMS	Wang et al., 2013
	Pinghe batholith	Massive monogranite	472	5	LA-ICPMS	Wang et al., 2013
	Pinghe batholith	two-mica granite	475	9	LA-ICPMS	Dong et al., 2013
	Pinghe batholith	two-mica granite	448	6	LA-ICPMS	Dong et al., 2013
	Pinghe batholith	monzogranite	499	5	SHRIMP	Liu et al., 2009
	Pinghe batholith	monzogranite	502	5	SHRIMP	Liu et al., 2009
	Pinghe batholith	monzogranite	500	4	LA-ICPMS	Liu et al., 2009
	Pinghe batholith	monzogranite	486	6	LA-ICPMS	Dong et al., 2012
	Pinghe batholith	monzogranite	486	12	LA-ICPMS	Dong et al., 2012
	Pinghe batholith	granite	480	11	LA-ICPMS	Dong et al., 2012
	Pinghe batholith	granite	480	6	LA-ICPMS	Dong et al., 2012
	Shuangmaidi	two-mica porphyritic	460	6	LA-ICPMS	Li et al., 2016

		granite				
	Shuangmaidi	two-mica porphyritic granite	466	4	LA-ICPMS	Li et al., 2016
	Shuangmaidi	two-mica porphyritic granite	470	4	LA-ICPMS	Li et al., 2016
	Shuangmaidi	two-mica porphyritic granite	466	4	LA-ICPMS	Li et al., 2016
	Shuangmaidi	two-mica porphyritic granite	461	5	LA-ICPMS	Li et al., 2016
	Shuangmaidi	two-mica porphyritic granite	459	5	LA-ICPMS	Li et al., 2016
	Shuangmaidi	peraluminous granites	469	3	LA-ICPMS	Li et al., 2016
	Shuangmaidi	peraluminous granites	465	4	LA-ICPMS	Li et al., 2016
	Shuangmaidi	peraluminous granites	446	5	LA-ICPMS	Li et al., 2016
	Mengmao	two-mica granite	460	4	LA-ICPMS	Li et al., 2016
	Mengmao	two-mica granite	462	5	LA-ICPMS	Li et al., 2016
	Mengmao	monzogranite	455	2	LA-ICPMS	Xiong et al. 2012
	East Gaoligong Mountain	Gneissic granite	474	3	SHRIMP	Liu et al., 2012
	East Gaoligong Mountain	Gneissic granite	462	7	SHRIMP	Liu et al., 2012
	East Baoshan	Gneissic granite	454	4	LA-ICPMS	Kang et al., 2016
	Gongyanghe Group	Amphibolite	499	2	LA-ICPMS	Yang et al., 2012
	Ximeng area	Gneissic granite	463	3	LA-ICPMS	Wang et al., 2013
	Ximeng area	Gneissic granite	460	6	LA-ICPMS	Wang et al., 2013
	Ximeng area	Leucogranite	462	5	LA-ICPMS	Wang et al., 2013
	Ximeng area	Gneissic granite	446	3	LA-ICPMS	Lu et al., 2015
	Menghai area	Granite	459	3	LA-ICPMS	Sun et al., 2018
Tengchong	Gaoligong Mountain	Leucogranite	492	5	LA-ICPMS	Wang et al., 2013
	Gaoligong Mountain	Mylonitic granite	488	6	LA-ICPMS	Wang et al., 2013
	Gaoligong	Gneissoid granite	484	6	LA-ICPMS	Wang et al., 2013

	Mountain					
	Gaoligong Mountain	Gneissoid granite	488	5	LA-ICPMS	Wang et al., 2013
	Gaoligong Mountain	Leucogranite	485	7	LA-ICPMS	Wang et al., 2013
	Gaoligong Mountain	Leucogranite	491	9	LA-ICPMS	Wang et al., 2013
	Gaoligong Mountain	Gneissic granite	498	7	SHRIMP	Li et al., 2012
	Gaoligong Mountain	Gneissic granite	487	11	SHRIMP	Song et al., 2007
	Gaoligong Mountain	Gneissic granite	518	4	LA-ICP-MS	Cai et al., 2013
	Gaoligong Mountain	Gneissic granite	502	3	LA-ICP-MS	Cai et al., 2013
	Gaoligong Mountain	Gneissic granite	505	3	LA-ICP-MS	Cai et al., 2013
	Gaoligong Mountain	Gneissic granite	509	4	LA-ICP-MS	Cai et al., 2013
Sibumasu	Khoo Tao, Thailand	Orthogneiss	496	6	LA-ICP-MS	Lin et al., 2013
	Sedawgyi, Myanmar	Orthogneiss	491	4	LA-ICP-MS	Mitchell et al., 2012
	Upper Peninsula, Thailand	Gneissic granite	501	15	LA-ICP-MS	Dew et al., 2018
	Khao Dat Fa, Thailand	Gneissic granite	477	7	LA-ICP-MS	Kawakami et al., 2014
	Gerik-Dinding, Peninsula of Thailand	Meta-rhyolite	474	3	LA-ICP-MS	Quek et al., 2018
	Gerik-Dinding, Thailand	Meta-rhyolite	460	2	LA-ICP-MS	Quek et al., 2018
	Gerik-Dinding, Thailand	Meta-rhyolite	479	3	LA-ICP-MS	Quek et al., 2018
	Hua Hin, Thailand	Orthogneiss	514	9	LA-ICP-MS	Kanjanapayont et al., 2020
Karakoram	Kafirstan	Granite	492	3	LA-ICP-MS	Faisal et al., 2016
	Kafirstan	Granite	487	5	LA-ICP-MS	Faisal et al., 2016

Table S2 Compiled Nd isotopic geochemical data calculated at ~500 Ma

Terrane	Sample	SiO ₂	Sm	Nd	¹⁴³ Nd/ ¹⁴⁴ Nd(m)	±2σ	εNd(t)	T _{2Nd_DM} (Ma)	f _{sm/Nd}	εNd(0)
Himalaya	T0252-1	72.58	8.56	44.1	0.511954	10	-8.28	1901	-0.40	-13.3
	T0252-12-1	59.28	6.42	32.7	0.511988	12	-7.70	1854	-0.40	-12.7
	T0252-12-2	60.08	6.49	30.5	0.511997	11	-8.16	1891	-0.35	-12.5
	T0252-12-3	59.9	5.94	27.9	0.512005	11	-8.01	1879	-0.35	-12.3
	T0252-2	74.14	5.23	24.4	0.511982	10	-8.51	1920	-0.34	-12.8
	T0777-A1	73.49	3.29	14	0.511946	-	-10.02	2040	-0.28	-13.5
	T0777-A2	72.49	3.67	16	0.51199	-	-8.94	1953	-0.30	-12.6
	T0777-A3	72.15	3.47	14.3	0.511996	-	-9.34	1984	-0.25	-12.5
	T0777-A4	72.93	2.82	11.3	0.51193	-	-10.89	2109	-0.23	-13.8
	T0777-A5	72.38	4.68	22	0.511926	10	-9.55	2003	-0.35	-13.9
	T0777-C1	71.79	4.59	20.5	0.511923	14	-10.04	2042	-0.31	-13.9
	T0777-C2	72.08	3.84	14.8	0.511948	8	-10.92	2110	-0.20	-13.5
	T0777-C3	70.61	4.17	19.8	0.511909	9	-9.80	2023	-0.35	-14.2
	T0777-C4	72.28	5.23	24	0.511933	6	-9.61	2008	-0.33	-13.8
	T0777-C5	73.04	3.11	11.3	0.511941	6	-11.67	2168	-0.15	-13.6
	T0812-A-1	70.41	6.6	30.4	0.511941	13	-9.42	1993	-0.33	-13.6
	T0812-A-2	70.49	7.49	33.8	0.511943	9	-9.56	2003	-0.32	-13.6
	T0812-A-3	72.25	7.91	36	0.511956	11	-9.23	1977	-0.33	-13.3
	T0812-A-4	69.92	5.68	25.2	0.51194	6	-9.76	2020	-0.31	-13.6
	T0812-B-1	73.64	5.61	23.8	0.511972	8	-9.54	2001	-0.28	-13.0
	T0812-B-2	73.71	6.46	27.8	0.511968	5	-9.48	1997	-0.29	-13.1
	T0812-B-3	72.99	6.47	30	0.511948	9	-9.23	1977	-0.34	-13.5
	T0814--1	71.73	10.6	47.8	0.511955	15	-9.33	1985	-0.32	-13.3
	T0814--2	71.75	9.48	43.4	0.51195	8	-9.30	1983	-0.33	-13.4
	T0814--5	74.54	5.13	20	0.511991	12	-9.97	2034	-0.21	-12.6
	T0814--6	72.88	2.94	9.93	0.511999	8	-11.34	2137	-0.09	-12.5
	T0832-GN1	73.45	1.95	7.39	0.512023	10	-9.63	2006	-0.19	-12.0
	T0832-GN3	73.65	4.3	17.3	0.512006	6	-9.37	1986	-0.24	-12.3
	T0832-GN4	73.89	1.87	6.75	0.512037	10	-9.86	2023	-0.15	-11.7
	T0832-GN5	75.97	3.97	13	0.512029	9	-11.11	2115	-0.06	-11.9
	T0832-GN7	70.89	1.74	6.38	0.512011	10	-10.20	2051	-0.16	-12.2
	T0834-LG-1	76.26	3.44	10.7	0.512036	8	-11.60	2142	-0.01	-11.7
	T0834-LG-2	76.18	2.59	8.22	0.512032	9	-11.43	2134	-0.03	-11.8
	T0834-LG-3	75.75	3.28	10.6	0.512035	5	-11.15	2116	-0.05	-11.8
	T0834-LG-4	76.2	3.17	10.5	0.512152	12	-8.58	1915	-0.07	-9.5
	T0834-LG-5	75.12	3.36	11.7	0.512041	13	-10.18	2046	-0.12	-11.6
	T0835-LG2	75.42	3.02	11.1	0.512107	12	-8.30	1899	-0.16	-10.4
	T0835-LG3	74.05	4.51	19.1	0.512006	5	-8.89	1949	-0.27	-12.3

	T0835-LG4	75.44	2.28	8.45	0.512094	5	-8.47	1912	-0.17	-10.6
	T0835-LG5	75.21	3	10.9	0.512105	7	-8.47	1911	-0.15	-10.4
	T0839-LG1	75.61	3.02	12.2	0.512053	11	-8.41	1909	-0.24	-11.4
	T0839-LG2	76.3	3.17	12.4	0.512055	11	-8.68	1931	-0.21	-11.4
	T0839-LG3	76.19	2.61	10.5	0.512062	6	-8.27	1898	-0.24	-11.2
	TYC-25	71.31	5.62	29.2	0.51198	3	-7.71	1855	-0.41	-12.8
	TYC-26	74.03	6.8	31.8	0.512019	3	-7.77	1859	-0.34	-12.1
	TYC-32	74.59	5.21	26.9	0.512067	8	-6.06	1721	-0.41	-11.1
	TYC-85	72.95	8.22	38.5	0.511924	2	-9.61	2009	-0.34	-13.9
	TYC-86	70.93	8.01	36.7	0.511922	2	-9.84	2026	-0.33	-14.0
	TYC-87	71.97	7.78	33.6	0.511926	2	-10.27	2061	-0.29	-13.9
	TYC-107	74.56	7.34	33.7	0.512009	2	-8.12	1888	-0.33	-12.3
	KAW883	74.28	3.6	14.5	0.511949	7	-10.47	2075	-0.24	-13.4
	HF67/91	75.45	3.7	14.9	0.511954	9	-10.37	2068	-0.24	-13.3
	HF63/91	71.45	10.7	53.6	0.511927	11	-9.02	1961	-0.39	-13.9
	HF66b/91	50.81	5.2	21.7	0.512327	8	-2.75	1452	-0.26	-6.1
	HF59/91	48.77	4.6	17.4	0.512569	12	1.02	1146	-0.19	-1.3
	HF61/91	51.11	2.6	9.9	0.512531	12	0.34	1201	-0.19	-2.1
Lhasa	KC0901-1	75.88	6.75	35	0.512008	3	-7.18	1812	-0.41	-12.3
	KC0901-2	48.05	7.79	31.1	0.512252	4	-4.64	1604	-0.23	-7.5
	KC0901-4	75.76	6.26	31.8	0.512001	3	-7.47	1835	-0.40	-12.4
	KC0901-5	51.4	4.87	18.3	0.512328	2	-3.76	1533	-0.18	-6.0
	KC0901-6	75.67	4.16	20.8	0.511966	3	-8.27	1900	-0.39	-13.1
	KC0902-1	48.96	2.86	8.74	0.512657	3	0.31	1200	0.01	0.4
	KC0902-2	72.54	4.97	24.8	0.51199	4	-7.82	1864	-0.38	-12.6
	KC0902-3	76.29	4.74	24.4	0.511997	2	-7.44	1834	-0.40	-12.5
	KC0903-1	51.12	6.55	26.6	0.512304	4	-3.46	1509	-0.24	-6.5
	KC0903-2	74.22	5.96	30.6	0.511992	4	-7.56	1843	-0.40	-12.6
	KC0904-1	48.06	3.11	12.8	0.512289	5	-3.62	1523	-0.25	-6.8
	KC0904-2	78.62	5.16	27	0.512004	4	-7.19	1813	-0.41	-12.4
	KC0905-1	66.23	8.39	43.1	0.512	2	-7.40	1830	-0.40	-12.4
	KC0906-1	74.1	3.81	19.8	0.512008	5	-7.16	1811	-0.41	-12.3
Southern Qiangtang	15ZB130-1	72.01	6.06	26.4	0.512062	15	-7.69	1836	-0.30	-11.2
	15ZB135-1	75.05	5.57	23.1	0.512052	11	-8.31	1886	-0.26	-11.4
	15ZB139-1	71.06	0.87	3.95	0.512108	12	-6.40	1732	-0.33	-10.3
	BS0715	73.59	6.12	26.2	0.512068	9	-7.72	1838	-0.28	-11.1
	BS08031	73.40	5.29	23.4	0.512044	7	-7.91	1854	-0.31	-11.6
	BS1001	76.82	4.62	20.8	0.512049	5	-7.67	1834	-0.32	-11.5
	BS1002	74.20	5.84	26.1	0.512057	10	-7.57	1826	-0.31	-11.3
	BS1003	72.72	5.81	26.0	0.512056	8	-7.58	1827	-0.31	-11.4
	BS1004	75.19	6.36	31.2	0.512038	9	-7.20	1797	-0.37	-11.7
	BS1005	74.40	5.62	25.5	0.51205	7	-7.58	1828	-0.32	-11.5
	15ZB96-1	72.65	7.26	31.0	0.512067	10	-7.77	1842	-0.28	-11.1

	15ZB97-1	73.68	6.66	29.5	0.512049	9	-7.78	1843	-0.31	-11.5
	GE08191	73.85	5.9	25.7	0.512051	7	-7.90	1853	-0.29	-11.5
	GE08192	78.22	5.87	25.3	0.512045	10	-8.11	1870	-0.29	-11.6
	GE08193	77.17	6.09	26.8	0.512039	10	-8.05	1865	-0.30	-11.7
	DG0701	73.12	6.3	28.6	0.512074	10	-7.11	1789	-0.32	-11.0
Baoshan	10DX-85	73.7	5.52	27.24	0.512017	4	-7.38	1828	-0.38	-12.1
	10DX-90	71.67	3.32	16.35	0.51199	4	-7.92	1872	-0.38	-12.6
	11ML-77	76.62	11.24	53.6	0.512156	6	-4.94	1630	-0.36	-9.4
	11ML-73 A	76.58	3.5	13.1	0.512154	9	-7.20	1810	-0.18	-9.4
	11ML-74a	76.36	2.68	8.96	0.512198	9	-7.57	1835	-0.08	-8.6
	PH5-7	71.13	3.12	14.1	0.51194	9	-9.60	2007	-0.32	-13.6
	PH5-4	65.92	5.32	21	0.511998	13	-9.71	2013	-0.22	-12.5
	PH4-7	71.93	4.78	20.4	0.511968	8	-9.56	2003	-0.28	-13.1
	PH4-6	71.81	5.12	21.8	0.511975	8	-9.44	1994	-0.28	-12.9
	PH3-7	68.52	6.13	34.6	0.511862	8	-9.42	1994	-0.46	-15.1
	PH3-1	66.16	5.18	26.4	0.511902	9	-9.38	1990	-0.40	-14.4
	XD-6	68.46	3.57	15.9	0.511957	10	-9.40	1990	-0.31	-13.3
	XD-1	72.98	3.47	16.2	0.511926	8	-9.60	2008	-0.34	-13.9
	PDX-16	63.86	6.01	31	0.511883	11	-9.66	2013	-0.40	-14.7
	PDX-4	65.83	4.4	20.8	0.511932	9	-9.38	1990	-0.35	-13.8
	03BS06	71.79	6.143	29.99	0.511947	10	-8.83	1945	-0.37	-13.5
	03BS08	72.06	4.871	23.24	0.511956	14	-8.84	1946	-0.36	-13.3
03BS09	73.41	3.427	12.58	0.511952	12	-11.34	2142	-0.16	-13.4	
Tengchong	10DX-44	76.95	6.64	34.01	0.51204	5	-6.64	1769	-0.40	-11.7
	10DX-45A	74.51	5.76	30.2	0.512018	5	-6.90	1789	-0.41	-12.1
	10DX-45D	74.59	1.8	8.05	0.512082	4	-6.92	1790	-0.31	-10.8

Table S3 Compiled early Paleozoic Metamorphic dates

Locality	Locality	Sample	Rock type	Age (Ma)	Error 2 σ	Note	Dating method	References
Himalaya	Bhimphedi, Nepal	Kalitar	Schist	490	22	Three 208Pb/232Th spots, MSWD=0.07	LA-ICPMS, monazite inclusion in garnet	Gehrels et al., 2006b
	Langtangi, Nepal	13	Gneiss	451	6	1 Th-Pb spot	SIMS, monazite inclusion in garnet	Kohn et al., 2004
	Langtangi, Nepal	13	Gneiss	309	7	1 Th-Pb spot, same grain	SIMS, monazite inclusion in garnet	Kohn et al., 2004
	Garhwal, India	2LP	Leucogneiss	534	24	Garnet-whole rock isochron	Sm-Nd Garnet	Argles et al., 1999
	Langtang, Nepal	MA27	Schist	458	17	1 Th-Pb spot	SIMS, allanite inclusion in garnet	Catlos et al., 2000
	Langtang, Nepal	MA27	Schist	432	15	1 Th-Pb spot	SIMS, allanite inclusion in garnet	Catlos et al., 2000
	Eastern Nepal	ET19	Orthogneiss	436	8	1 Th-Pb spot	SIMS, monazite inclusion in garnet	Catlos et al., 2002
	Eastern Nepal	ET26	Orthogneiss	548	17	1 Th-Pb spot	SIMS, monazite inclusion in garnet	Catlos et al., 2002
	Formation 111, Nepal	L96-221 b	Kyanite leucosome	467	5	Upper intercept	TIMS, monazite in kyanite leucosome	Godin et al., 2001
	Tanawal Formation	756	Pelitic schist	482	8	17 U-Pb spots, MSWD=4.4	LA-ICPMS, monazite in matrix	Palin et al., 2018
	Tanawal Formation	RB169	Pelitic schist	465	4	26 U-Pb spots, MSWD=0.2	LA-ICPMS, monazite in matrix	Palin et al., 2018
Tanawal Formation	756	Pelitic schist	482	8	17 U-Pb spots, MSWD=4.4	LA-ICPMS, monazite in matrix	Foster, 2000	
Lhasa	Bage	15-5	HP mafic granulite	485	13	N=8, MSWD=4.7	LA-ICPMS, zircon	Zhang et al., 2012a
	Bage	15-11	HP mafic granulite	483	9	N=9, MSWD=2.9	LA-ICPMS, zircon	Zhang et al., 2012a

References

- Argles, T. W., Prince, C. I., Foster, G. L., and Vance, D., 1999, New garnets for old? Cautionary tales from young mountain belts: *Earth and Planetary Science Letters*, v. 172, no. 3-4, p. 301-309.
- Cai, Z. H., Xu, Z. Q., Duan, X. D., Li, H. Q., Cao, H., and Huang, X. M., 2013, Early stage of Early Paleozoic orogenic event in western Yunnan Province, southeastern margin of Tibet Plateau.: *Acta Petrologica Sinica*, v. 29, no. 6, p. 2123-2140.
- Catlos, E. J., Harrison, T. M., Manning, C. E., Grove, M., Rai, S. M., Hubbard, M. S., and Upreti, B. N., 2002, Records of the evolution of the Himalayan orogen from in situ Th-Pb ion microprobe dating of monazite: Eastern Nepal and western Garhwal: *Journal of Asian Earth Sciences*, v. 20, no. 5, p. 459-479.
- Catlos, E. J., Sorensen, S. S., and Harrison, T. M., 2000, Th-Pb ion-microprobe dating of allanite: *American Mineralogist*, v. 85, no. 5-6, p. 633-648.
- Cawood, P. A., Johnson, M. R. W., and Nemchin, A. A., 2007, Early Palaeozoic orogenesis along the Indian margin of Gondwana: Tectonic response to Gondwana assembly: *Earth and Planetary Science Letters*, v. 255, no. 1-2, p. 70-84.
- Chen, F. K., Li, X. H., Wang, X. L., Li, Q. L., and Siebel, W. G., 2007, Zircon age and Nd-Hf isotopic composition of the Yunnan Tethyan belt, southwestern China: *International Journal of Earth Sciences*, v. 96, no. 6, p. 1179-1194.
- Dan, W., Wang, Q., Zhang, X. Z., and Tang, G. J., 2020, Early Paleozoic S-type granites as the basement of Southern Qiantang Terrane, Tibet: *Lithos*, v. 356, p. 105395.
- Dew, R. E. C., Collins, A. S., Glorie, S., Morley, C. K., Blades, M. L., Nachtergaele, S., King, R., Foden, J., De Grave, J., Kanjanapayont, P., Evans, N. J., Alessio, B. L., and Charusiri, P., 2018, Probing into Thailand's basement: New insights from U-Pb geochronology, Sr, Sm-Nd, Pb and Lu-Hf isotopic systems from granitoids: *Lithos*, v. 320-321, p. 332-354.
- Ding, H., Zhang, Z., Dong, X., Yan, R., Lin, Y., and Jiang, H., 2015, Cambrian ultrapotassic rhyolites from the Lhasa terrane, south Tibet: Evidence for Andean-type magmatism along the northern active margin of Gondwana: *Gondwana Research*, v. 27, no. 4, p. 1616-1629.
- Ding, H. X., Zhang, Z. M., Li, M. M., Niu, Z. X., and Zhang, N., 2017, Metamorphism and tectonic significance of the Greater Himalayan Crystalline Sequence in Cona region: *Acta Petrologica Sinica*, v. 33, no. 8, p. 2357-2376.
- Dong, M. L., Dong, G. C., Mo, X. X., Santosh, M., Zhu, D. C., Yu, J. C., Nie, F., and Hu, Z. C., 2013, Geochemistry, zircon U-Pb geochronology and Hf isotopes of granites in the Baoshan Block, Western Yunnan: Implications for Early Paleozoic evolution along the Gondwana margin: *Lithos*, v. 179, p. 36-47.
- Dong, M. L., Dong, G. C., Mo, X. X., Zhu, D. C., Nie, F., Xie, X. F., Wang, X., and Hu, Z. C., 2012, Geochronology and geochemistry of the Early Palaeozoic granitoids in Baoshan block, western Yunnan and their implications: *Acta Petrologica Sinica*, v. 28, no. 5, p. 1453-1464.
- Dong, X., Zhang, Z. M., and Santosh, M., 2010, Zircon U-Pb Chronology of the Nyingtri Group, Southern Lhasa Terrane, Tibetan Plateau: Implications for Grenvillian and Pan-African Provenance and Mesozoic-Cenozoic Metamorphism: *Journal of Geology*, v. 118, no. 6, p. 677-690.
- Dung, X., and Zhang, Z. M., 2015, Cambrian granitoids from the southeastern Tibetan Plateau: Research on petrology and zircon Hf isotope: *Acta Petrologica Sinica*, v. 31, no. 5, p.

1183-1199.

- Faisal, S., Larson, K. P., King, J., and Cottle, J. M., 2016, Rifting, subduction and collisional records from pluton petrogenesis and geochronology in the Hindu Kush, NW Pakistan: *Gondwana Research*, v. 35, p. 286-304.
- Foster, G. L., 2000, The pre-Neogene thermal history of the Nanga Parbat Haramosh Massif and the NW Himalaya [PhD dissertation: The Open University, United Kingdom, 345 p.
- Gao, L.-E., Zeng, L., Hu, G., Wang, Y., Wang, Q., Guo, C., and Hou, K., 2019, Early Paleozoic magmatism along the northern margin of East Gondwana: *Lithos*, v. 334-335, p. 25-41.
- Gao, L. E., Zeng, L. S., and Xie, K. J., 2012, Eocene high grade metamorphism and crustal anatexis in the North Himalaya Gneiss Domes, Southern Tibet: *Chinese Science Bulletin*, v. 57, no. 6, p. 639-650.
- Gehrels, G. E., DeCelles, P. G., Ojha, T. P., and Upreti, B. N., 2006a, Geologic and U-Pb geochronologic evidence for early Paleozoic tectonism in the Dadelhdura thrust sheet, far-west Nepal Himalaya: *Journal of Asian Earth Sciences*, v. 28, no. 4-6, p. 385-408.
- , 2006b, Geologic and U-Th-Pb geochronologic evidence for early Paleozoic tectonism in the Kathmandu thrust sheet, central Nepal Himalaya: *Geological Society of America Bulletin*, v. 118, no. 1-2, p. 185-198.
- Godin, L., Parrish, R. R., Brown, R. L., and Hodges, K. V., 2001, Crustal thickening leading to exhumation of the Himalayan Metamorphic core of central Nepal: Insight from U-Pb Geochronology and Ar-40/Ar-39 Thermochronology: *Tectonics*, v. 20, no. 5, p. 729-747.
- Gou, Z. B., Zhang, Z. M., Dong, X., Ding, H. X., Xiang, H., Lei, H. C., Li, W. C., and Tang, L., 2015, Petrogenesis and tectonic significance of the Early Paleozoic granitic gneisses from the Yadong area, southern Tibet: *Acta Petrologica Sinica*, v. 31, no. 12, p. 3674-3686.
- Gu, P. Y., He, S. P., Li, R. S., Shi, C., Dong, Z. C., Zha, X. F., Wu, J. L., and Wang, Y., 2013, Geochemical features and tectonic significance of granitic gneiss of Laguigangri metamorphic core complexes in southern Tibet: *Acta Petrologica Sinica*, v. 29, no. 3, p. 756-768.
- Guynn, J., Kapp, P., Gehrels, G. E., and Ding, L., 2012, U-Pb geochronology of basement rocks in central Tibet and paleogeographic implications: *Journal of Asian Earth Sciences*, v. 43, no. 1, p. 23-50.
- Hu, P. Y., Li, C., Wang, M., Xie, C. M., and Wu, Y. W., 2013, Cambrian volcanism in the Lhasa terrane, southern Tibet: Record of an early Paleozoic Andean-type magmatic arc along the Gondwana proto-Tethyan margin: *Journal of Asian Earth Sciences*, v. 77, p. 91-107.
- Hu, P. Y., Zhai, Q. G., Jahn, B. M., Wang, J., Li, C., Lee, H. Y., and Tang, S. H., 2015, Early Ordovician granites from the South Qiangtang terrane, northern Tibet: Implications for the early Paleozoic tectonic evolution along the Gondwanan proto-Tethyan margin: *Lithos*, v. 220, p. 318-338.
- Ji, W. H., Chen, S. J., Zhao, Z. M., Li, R. S., He, S. P., and Wang, C., 2009, Discovery of the Cambrian volcanic rocks in the Xainza area, Gangdese orogenic belt, Tibet, China and its significance: *Geological Bulletin of China*, v. 28, no. 9, p. 1350-1354 (in Chinese with English abstract).
- Kang, H., Li, D. P., Chen, Y. L., and Lu, Z., 2016, Origin and Tectonic Implications of the Early Paleozoic High-Si Granite in the Eastern Baoshan Block, Yunnan: *Geoscience*, v. 30, no. 5, p. 1026-1037 (in Chinese with English abstract).

- Kanjanapayont, P., Klötzli, U., and Frank, N., 2020, Dating multiple generation of zircons from granites and gneiss from Thailand: Implication for the crustal evolution of the Sibumasu terrane: *Journal of Asian Earth Sciences*, v. 190, p. 104148.
- Kawakami, T., Nakano, N., Higashino, F., Hokada, T., Osanai, Y., Yuhara, M., Charusiri, P., Kamikubo, H., Yonemura, K., and Hirata, T., 2014, U-Pb zircon and CHIME monazite dating of granitoids and high-grade metamorphic rocks from the Eastern and Peninsular Thailand - A new report of Early Paleozoic granite: *Lithos*, v. 200, p. 64-79.
- Kohn, M. J., Wieland, M. S., Parkinson, C. D., and Upreti, B. N., 2004, Miocene faulting at plate tectonic velocity in the Himalaya of central Nepal: *Earth and Planetary Science Letters*, v. 228, no. 3-4, p. 299-310.
- Lee, J., Hacker, B. R., Dinklage, W. S., Wang, Y., Gans, P., Calvert, A., Wan, J. L., Chen, W. J., Blythe, A. E., and McClelland, W., 2000, Evolution of the Kangmar Dome, southern Tibet: Structural, petrologic, and thermochronologic constraints: *Tectonics*, v. 19, no. 5, p. 872-895.
- Lee, J., and Whitehouse, M. J., 2007, Onset of mid-crustal extensional flow in southern Tibet: Evidence from U/Pb zircon ages: *Geology*, v. 35, no. 1, p. 45-48.
- Li, C., Xie, Y. W., Sha, S. L., and Dong, Y. S., 2008, SHRIMP U-Pb zircon dating of the Pan-African granite in Baxoi country, eastern Tibet, China: *Geological Bulletin of China*, v. 27, no. 1, p. 64-68 (in Chinese with English abstract).
- Li, G.-J., Wang, Q.-F., Huang, Y.-H., Gao, L., and Yu, L., 2016, Petrogenesis of middle Ordovician peraluminous granites in the Baoshan block: Implications for the early Paleozoic tectonic evolution along East Gondwana: *Lithos*, v. 245, p. 76-92.
- Li, Z. H., Lin, S. L., Cong, F., Xie, T., and Zou, G. F., 2012, U-Pb ages of zircon from metamorphic rocks of the Gaoligongshan Group in western Yunnan and its tectonic significance: *Acta Petrologica Sinica*, v. 28, no. 5, p. 1529-1541.
- Lin, Y.-L., Yeh, M.-W., Lee, T.-Y., Chung, S.-L., Iizuka, Y., and Charusiri, P., 2013, First evidence of the Cambrian basement in Upper Peninsula of Thailand and its implication for crustal and tectonic evolution of the Sibumasu terrane: *Gondwana Research*, v. 24, no. 3-4, p. 1031-1037.
- Liu, Q., Deng, Y. B., Xiang, S. Y., and Li, H. L., 2017, Early Ordovician tectono-thermal event in Zhongba Terrane and its geological significance: *Earth Science*, v. 42, no. 6, p. 881-810 (in Chinese with English abstract).
- Liu, Q. S., Ye, P. S., and Wu, Z. H., 2012, SHRIMP zircon U-Pb dating and petrogeochemistry of Ordovician granite bodies in the southern segment of Gaoligong Mountain, western Yunnan Province: *Geological Bulletin of China*, v. 31, no. 2-3, p. 250-257 (in Chinese with English abstract).
- Liu, S., Hu, R., Gao, S., Feng, C., Huang, Z., Lai, S., Yuan, H., Liu, X., Coulson, I. M., Feng, G., Wang, T., and Qi, Y., 2009, U-Pb zircon, geochemical and Sr-Nd-Hf isotopic constraints on the age and origin of Early Palaeozoic I-type granite from the Tengchong-Baoshan Block, Western Yunnan Province, SW China: *Journal of Asian Earth Sciences*, v. 36, no. 2-3, p. 168-182.
- Liu, Y., Li, S., Santosh, M., Cao, H., Yu, S., Wang, Y., Guo, R., Xu, L., Zhou, J., and Zhou, Z., 2020, The passive margin of northern Gondwana during Early Paleozoic: Evidence from the central Tibet Plateau: *Gondwana Research*, v. 78, p. 126-140.
- Liu, Y. M., Li, C., Xie, C. M., Fan, J. J., Wu, H., Jiang, Q. Y., and Li, X., 2016, Cambrian granitic

- gneiss within the central Qiangtang terrane, Tibetan Plateau: implications for the early Palaeozoic tectonic evolution of the Gondwanan margin: *International Geology Review*, v. 58, no. 9, p. 1043-1063.
- Lu, H. N., Sun, Z. B., Zhang, H., Zhou, K., Yan, X., Zeng, W. T., Yu, S. Y., and Wang, X. F., 2015, Zircon U-Pb Ages and Its Geological Implications of Manheng Granite from Ximeng City, Yunnan Province, China: *Acta Mineralogica Sinica*, v. 35, no. 4, p. 515-521 (in Chinese with English abstract).
- Lu, L., Wu, Z. H., Zhao, Z., Hu, D. G., and Ye, P. S., 2014, Zircon SHRIMP U-Pb dating, geochemical characteristics and tectonic significance of granitic gneisses in Amdo, Tibet: *Journal of Earth Science*, v. 25, no. 3, p. 473-485.
- Mitchell, A., Chung, S.-L., Oo, T., Lin, T.-H., and Hung, C.-H., 2012, Zircon U-Pb ages in Myanmar: Magmatic–metamorphic events and the closure of a neo-Tethys ocean?: *Journal of Asian Earth Sciences*, v. 56, p. 1-23.
- Naem, M., Burg, J. P., Ahmad, N., Chaudhry, M. N., and Khalid, P., 2016, U-Pb zircon systematics of the Mansehra Granitic Complex: implications on the early Paleozoic orogenesis in NW Himalaya of Pakistan: *Geosciences Journal*, v. 20, no. 4, p. 427-447.
- Palin, R. M., Treloar, P. J., Searle, M. P., Wald, T., White, R. W., and Mertz-Kraus, R., 2018, U-Pb monazite ages from the Pakistan Himalaya record pre-Himalayan Ordovician orogeny and Permian continental breakup: *GSA Bulletin*.
- Peng, Z. M., Geng, Q. R., Wang, L. Q., Zhang, Z., Guan, J. L., Cong, F., and Liu, S. S., 2014, Zircon U-Pb ages and Hf isotopic characteristics of granitic gneiss from Bunsumco, central Qiangtang, Qinghai-Tibet Plateau: *Chinese Science Bulletin*, v. 59, no. 26, p. 2621-2629 (in Chinese).
- Pullen, A., Kapp, P., Gehrels, G. E., Ding, L., and Zhang, Q., 2011, Metamorphic rocks in central Tibet: Lateral variations and implications for crustal structure: *Geological Society of America Bulletin*, v. 123, no. 3-4, p. 585-600.
- Quek, L. X., Ghani, A. A., Lai, Y. M., Lee, H. Y., Saidin, M., Roselee, M. H., Badrudin, M. H., Hassan, M. H. A., Aziz, J. H. A., Ng, T. F., Ali, M. A. M., and Zulkifley, M. T. M., 2018, Absolute age evidence of Early to Middle Ordovician volcanism in Peninsular Malaysia: *Current Science*, v. 115, no. 12, p. 2291-2296.
- Quigley, M. C., Liangjun, Y., Gregory, C., Corvino, A., Sandiford, M., Wilson, C. J. L., and Xiaohan, L., 2008, U-PbSHRIMP zircon geochronology and T-t-d history of the Kampa Dome, Southern Tibet: *Tectonophysics*, v. 446, no. 1-4, p. 97-113.
- Sajid, M., Andersen, J., Rocholl, A., and Wiedenbeck, M., 2018, U-Pb geochronology and petrogenesis of peraluminous granitoids from northern Indian plate in NW Pakistan: Andean type orogenic signatures from the early Paleozoic along the northern Gondwana: *Lithos*, v. 318, p. 340-356.
- Shi, C., Li, R. S., He, S. P., Wang, C., Pan, S. J., Liu, Y., and Gu, P. Y., 2010, LA-ICP-MS zircon U-Pb dating for gneissic garnet-bearing biotite granodiorite in the Yadong area, southern Tibet, China and its geological significance: *Geological Bulletin of China*, v. 29, no. 12, p. 1745-1753 (in Chinese with English abstract).
- Song, S. G., Ji, J. Q., Wei, C. J., Su, L., Zheng, Y. D., Song, B., and Zhang, L. F., 2007, Early Paleozoic granite in Nujiang River of northwest Yunnan in southwestern China and its tectonic implications: *Chinese Science Bulletin*, v. 52, no. 17, p. 2402-2406.

- Su, W., Zhang, M., Liu, X. H., Lin, J. F., Ye, K., and Liu, X., 2012, Exact timing of granulite metamorphism in the Namche-Barwa, eastern Himalayan syntaxis: new constrains from SIMS U-Pb zircon age: *International Journal of Earth Sciences*, v. 101, no. 1, p. 239-252.
- Sun, Z. B., Hu, S. B., Zhou, K., Wang, Y. X., Liu, G. C., Wu, J. L., and Zhao, J. T., 2018, Zircon U-Pb age, Hf isotopic composition of the Bulangshan Ordovician granite in the Menghai area, southwestern Yunnan Province, and its tectonic significance: *Geological Bulletin of China*, v. 37, no. 11, p. 2044-2054 (in Chinese with English abstract).
- Visona, D., Rubatto, D., and Villa, I. M., 2010, The mafic rocks of Shao La (Khartu, S. Tibet): Ordovician basaltic magmatism in the greater himalayan crystallines of central-eastern Himalaya: *Journal of Asian Earth Sciences*, v. 38, no. 1-2, p. 14-25.
- Wang, X. X., Zhang, J. J., Santosh, M., Liu, J., Yan, S. Y., and Guo, L., 2012, Andean-type orogeny in the Himalayas of south Tibet: Implications for early Paleozoic tectonics along the Indian margin of Gondwana: *Lithos*, v. 154, p. 248-262.
- Wang, X. X., Zhang, J. J., and Wang, M., 2016, Early Paleozoic orogeny in the Himalayas: evidences from the zircon U-Pb chronology and Hf isotope compositions of the Palung granitic gneiss in Nepal: *Earth Science Frontiers*, v. 23, no. 2, p. 190-205 (in Chinese with English abstract).
- Wang, X. X., Zhang, J. J., Yang, X. Y., and Zhang, B., 2011, Zircon SHRIMP U-Pb ages, Hf isotopic features and their geological significance of the Greater Himalayan Crystalline Complex augen gneiss in Gyirong area, south Tibet: *Earth Science Frontiers*, v. 18, no. 2, p. 127-139 (in Chinese with English abstract).
- Wang, Y., Xing, X., Cawood, P. A., Lai, S., Xia, X., Fan, W., Liu, H., and Zhang, F., 2013, Petrogenesis of early Paleozoic peraluminous granite in the Sibumasu Block of SW Yunnan and diachronous accretionary orogenesis along the northern margin of Gondwana: *Lithos*, v. 182-183, p. 67-85.
- Xie, C.-m., Li, C., Fan, J.-j., and Su, L., 2017, Ordovician sedimentation and bimodal volcanism in the Southern Qiangtang terrane of northern Tibet: Implications for the evolution of the northern Gondwana margin: *International Geology Review*, v. 59, no. 16, p. 2078-2105.
- Xie, C. M., Li, C., Su, L., Wu, Y. W., and Xie, Y. W., 2013, Pan-African and early Paleozoic tectonothermal events in the Nyainrong microcontinent: Constraints from geochronology and geochemistry: *Science China-Earth Sciences*, v. 56, no. 12, p. 2066-2079.
- Xiong, C., L., Jia, X. C., Yang, X. J., Luo, G., Bai, X. Z., and Huang, B. X., 2012, LA-ICP-MS zircon U-Pb dating of Ordovician Mengmao monzogranite in Longling area of western Yunnan Province and its tectonic setting: *Geological Bulletin of China*, v. 31, no. 2-3, p. 277-286 (in Chinese with English abstract).
- Yang, X. J., Jia, X. C., Xiong, C., L., Bai, X. Z., Huang, B. X., Luo, G., and Yang, C. B., 2012, LA-ICP-MS zircon U-Pb age of metamorphic basic volcanic rock in Gongyanghe Group of southern Gaoligong Mountain, western Yunnan Province, and its geological significance: *Geological Bulletin of China*, v. 31, no. 2-3, p. 264-276 (in Chinese with English abstract).
- Yoshida, M., Gehrels, G., Upreti, B. N., and Rai, S. M., 2019, Early Paleozoic zircon ages of the Higher Himalayan Gneisses of the Everestregion and their Pan-African/Proto-Himalayan orogenic signature: *Journal of Nepal Geological Society*, v. 59, p. 107-124.
- Yun, X. R., Cai, Z. H., He, B. Z., Zheng, M. L., Jiao, C. L., Peng, Y., and Liu, R. H., 2019, Early Paleozoic and Mesozoic orogenic records in Amdo region, Tibet : Zircon U-Pb

- geochronology and Hf isotopic compositions from the Amdo micro-continent and South Qiangtang terrane: *Acta Petrologica Sinica*, v. 35, no. 6, p. 1673-1692.
- Zhang, F., Wang, Y. B., and Yang, D. T., 2020, Zircon U-Pb, O isotope, and geochemistry study of the early Palaeozoic granitic gneiss in the Dinggye district, central Himalaya: Implications for the early Palaeozoic orogenic event along the northern margin of Gondwana: *Geological Journal*, v. 55, no. 1, p. 439-456.
- Zhang, L. K., Li, G. M., Gao, H. W., Zhang, Z., Fu, J. G., Xia, X. B., Dong, S. L., Wei, L. A., and Yong, H. A., 2019a, Zircon geochronology and Hf isotope compositions of the granitic gneiss from Cuonadong in South Tibet and its insights for the evolution of the Proto-Tethys: *Geology in China*, v. 46, no. 6, p. 1312-1335 (in Chinese with English abstract).
- Zhang, L. K., Li, G. M., Santosh, M., Cao, H. W., Dong, S. L., Zhang, Z., Fu, J. G., Xia, X. B., Huang, Y., Liang, W., and Zhang, S. T., 2019b, Cambrian magmatism in the Tethys Himalaya and implications for the evolution of the Proto-Tethys along the northern Gondwana margin: A case study and overview: *Geological Journal*, v. 54, no. 4, p. 2545-2565.
- Zhang, Z., Dong, X., Liu, F., Lin, Y., Yan, R., He, Z., and Santosh, M., 2012a, The making of Gondwana: Discovery of 650Ma HP granulites from the North Lhasa, Tibet: *Precambrian Research*, v. 212-213, p. 107-116.
- Zhang, Z. M., Dong, X., Liu, F., Lin, Y. H., Yan, R., and Santosh, M., 2012b, Tectonic Evolution of the Amdo Terrane, Central Tibet: Petrochemistry and Zircon U-Pb Geochronology: *Journal of Geology*, v. 120, no. 4, p. 431-451.
- Zhang, Z. M., Dong, X., Santosh, M., Liu, F., Wang, W., Yiu, F., He, Z. Y., and Shen, K., 2012c, Petrology and geochronology of the Namche Barwa Complex in the eastern Himalayan syntaxis, Tibet: Constraints on the origin and evolution of the north-eastern margin of the Indian Craton: *Gondwana Research*, v. 21, no. 1, p. 123-137.
- Zhang, Z. M., Wang, J. L., Shen, K., and Shi, C., 2008, Paleozoic circum-Gondwana orogens: Petrology and geochronology of the Namche Barwa Complex in the eastern Himalayan syntaxis, Tibet: *Acta Petrologica Sinica*, v. 24, no. 7, p. 1627-1637.
- Zhao, Z., Bons, P. D., Wang, G., Liu, Y., and Zheng, Y., 2014, Origin and pre-Cenozoic evolution of the south Qiangtang basement, Central Tibet: *Tectonophysics*, v. 623, p. 52-66.
- Zhu, D.-C., Zhao, Z.-D., Niu, Y., Dilek, Y., Wang, Q., Ji, W.-H., Dong, G.-C., Sui, Q.-L., Liu, Y.-S., Yuan, H.-L., and Mo, X.-X., 2012, Cambrian bimodal volcanism in the Lhasa Terrane, southern Tibet: Record of an early Paleozoic Andean-type magmatic arc in the Australian proto-Tethyan margin: *Chemical Geology*, v. 328, p. 290-308.