Data Repository Item 2004072

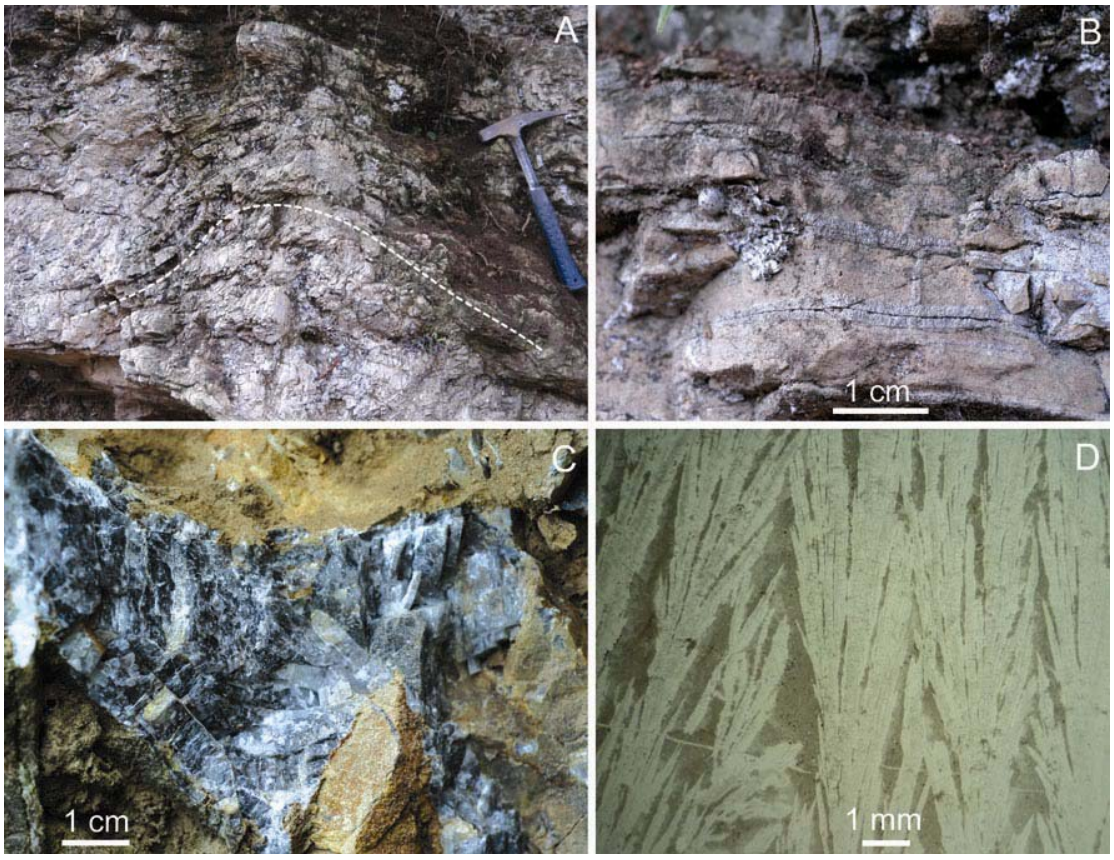

Fig. DR1. (A) Tepee-like structure near the base of Doushantuo cap dolomite, Songlin, central Guizhou Province. Dashed line traces a bedding plane. Sheet cracks are also present in tepee-like structures, but are not readily visible at this magnification. (B) A magnified view of horizontal (and rarely vertical) sheet cracks filed with quartz crystals. (C) Barite precipitates about 2 meters above the base of Doushantuo cap dolomite at Wuhe, eastern Guizhou Province. (D) Barite crystal fans about 1.2 meters from the base of Doushantuo cap dolomite, Baokang, northern Hubei Province.

Table DR1. Stratigraphic height (SH, in meters), $\delta^{13}C$ (‰, VPDB), and $\delta^{18}O$ (‰, VPDB) of measured Doushantuo cap carbonate samples. CO_2 was extracted using standard offline technique, after reaction with concentrated H_3PO_4 at 25°C for 12 hours. $\delta^{13}C$ and $\delta^{18}O$ were measured on a Finnigan MAT 251 mass spectrometer. Analytical precision is better than 0.1‰ for $\delta^{13}C$ and 0.3‰ for $\delta^{18}O$.

Songlin section, central Guizhou				**Jinguadun section, Yangtze Gorges**				**Lantian section, S. Anhui**			
Sample #	SH	$\delta^{13}C$	$\delta^{18}O$	Sample #	SH	$\delta^{13}C$	$\delta^{18}O$	Sample #	SH	$\delta^{13}C$	$\delta^{18}O$
01ZS-41	0.0	–3.0	–7.5	1-a	0.0	–2.4	–5.9	LTD-02	0.00	–3.6	–8.8
01ZS-42	0.2	–3.2	–8.5	1-b	0.1	–2.5	–6.1	LTD-03	0.07	–4.2	–7.7
01ZS-43	0.5	–3.2	–7.4	1-c	0.3	–2.4	–6.2	LTD-04	0.14	–4.2	–8.6
01ZS-44	0.7	–3.0	–7.7	2-a	0.4	–2.3	–6	LTD-05	0.21	–4.7	–8.3
01ZS-45	1.0	–2.8	–7.1	2-b	0.6	–2.5	–6.1	LTD-06	0.28	–3.9	–10.2
01ZS-46	1.2	–3.7	–8.4	2-c	0.7	–2.6	–6.6	LTD-07	0.35	–4.4	–8.6
01ZS-47	1.4	–2.6	–7.1	3-a	0.8	–2.5	–6.2	LTD-08	0.42	–4.3	–10.2
01ZS-48	1.7	–3.4	–8.0	3-b	1.0	–2.92	–6.2	LTD-09	0.49	–4.5	–8.3
01ZS-49	1.9	–3.7	–8.6	4-a	1.1	–2.9	–7.1	LTD-10	0.56	–5	–8.8
01ZS-50	2.2	–3.3	–8.5	4-b	1.3	–2.9	–7.2	LTD-11	0.63	–5	–8.9
01ZS-51	2.4	–3.1	–8.1	5-a	1.4	–3.1	–6.8	LTD-12	0.70	–5.2	–8
01ZS-52	2.6	–3.1	–7.2	5-b	1.5	–3.1	–6.9	LTD-13	0.77	–5	–8.3
01ZS-53	2.9	–3.0	–7.4	6-a	1.7	–2.9	–6.5	LTD-14	0.84	–4.9	–8.4
01ZS-54	3.1	–3.3	–7.3	6-b	1.8	–2.6	–6.8	LTD-15	0.91	–5	–8.4
01ZS-55	3.4	–3.2	–7.5	7	2.0	–3.2	–6.7	LTD-16	0.98	–5.1	–7.9
01ZS-56	3.6	–4.1	–8.0	8-a	2.1	–0.7	–4.2	LTD-17	1.05	–5.1	–8.1
01ZS-57	3.8	–3.8	–7.7	8-b	2.2	–1	–6.8	LTD-18	1.12	–5.2	–7.6
01ZS-58	4.1	–4.5	–9.7	9-a	2.4	–1.2	–4.4	LTD-19A	1.19	–4.9	–7.9
01ZS-59	4.3	–4.3	–10.0	9-b	2.5	–3.4	–13.3	LTD-19B	1.26	–5	–6.8
01ZS-60	4.6	–4.5	–9.5	12	2.7	–2.8	–15.6	LTD-20A	1.33	–4.8	–9.5
01ZS-61	4.8	–3.9	–7.8	13-a	2.8	–1.1	–4.6	LTD-20B	1.40	–5.1	–7.3
01ZS-62	5.0	–4.6	–9.2	14-a	2.9	–3.9	–13.1	LTD-21	1.47	–5.4	–8.8
01ZS-63	5.3	–4.0	–8.4	14-b	3.1	–3.7	–10.1	LTD-22	1.54	–4.7	–11
01ZS-64	5.5	–4.3	–8.8	15-a	3.2	–2.6	–10.8	LTD-23	1.61	–5	–8.3
01ZS-65	5.8	–4.0	–7.6	15b-a	3.4	–2.6	–11.6	LTD-24	1.68	–5	–9.9
01ZS-67	6.0	–4.3	–8.1	15b-b	3.5	–3.6	–8.2				
01ZS-69	6.2	–4.3	–8.1	16	3.6	–2.4	–10.9				
01ZS-71	6.5	–4.4	–7.9	17-a	3.8	–3.2	–6.7				
01ZS-72	6.7	–4.4	–8.2	17-b	3.9	–3	–7.6				
01ZS-73	7.0	–5.7	–8.6	17-c	4.1	–3.1	–6.8				
01ZS-74	7.2	–4.4	–8.0	18	4.2	–4.3	–9.8				
01ZS-75	7.4	–4.4	–7.4	19	4.3	–5.8	–7.2				
01ZS-76	7.7	–4.6	–8.9								
01ZS-77	7.9	–5.1	–9.0								
01ZS-77+	8.2	–5.3	–10.9	**Baokang section, northern Hubei**							
01ZS-78	8.4	–4.8	–9.4	Sample #	SH	$\delta^{13}C$	$\delta^{18}O$				
01ZS-79	8.6	–5.0	–8.6	OB-1	0.15	–0.9	–3.8				
01ZS-80	8.9	–4.6	–7.5	OB--2	0.55	–1.9	–5.4				
01ZS-81	9.1	–4.1	–7.7	OB--3	0.75	–2.0	–5.6				
01ZS-82	9.4	–4.1	–7.6	OB--4	1.1	–2.4	–6.7				
01ZS-83	9.6	–5.5	–8.4	OB--5	1.25	–2.1	–5.0				
01ZS-84	9.8	–5.0	–8.6	OB--6	1.5	–0.6	–2.6				

Table DR2. U-Pb Isotope Dilution Analyses, Datangpo Volcanic Ash.

Fractions			Concentrations				Atomic ratios							Age [Ma]	
No.	Properties	Wt. [µg]	Pb rad [ppm]	U [ppm]	Pb com [pg]	Th / U	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{206}Pb$	±	$^{207}Pb/^{235}U$	±	$^{206}Pb/^{238}U$	±	$^{207}Pb/^{206}Pb$	±
	(1)	(2)	(2)	(2)	(3)	(4)	(5)	(6)		(6)		(6)		(6)	
	ZLG–5														
1	5, Z, cl, c,n,A	12	16.6	124	2.2	1.26	4,569	0.06160	11	0.9001	21	0.10597	17	660.4	3.8
2	4, Z, cl,c,n, A	15	12.9	92.5	2.2	1.45	4,289	0.06164	20	0.8997	33	0.10585	16	661.8	7.0
3	5, Z,cl,c,n, A	14	21.8	163	3.3	1.37	4,575	0.06180	7	0.9046	16	0.10616	16	667.3	2.5
4	4, Z, cl,c,n, A	11	10.3	94.6	3.7	1.21	1,571	0.06153	17	0.7361	22	0.08677	11	657.9	5.8
5	5, Z,cl,c,n, A	16	11.2	79.6	3.3	1.43	2,617	0.06153	12	0.9075	21	0.10697	15	657.9	4.0
6	2, Z, cl,c,n, A	5	11.8	89.8	2.4	1.37	1,269	0.06151	31	0.8605	47	0.10146	16	657.2	10.9

Notes:

(1) Z = zircon. Cardinal number indicates the number of mineral grains analyzed (e.g. 2 grains); all mineral grains were selected from non-paramagnetic separates at 0^{o} tilt at full magnetic field in Frantz magnetic Separator; < 75 µm); c = colorless; cl = clear; n = needles; A = air-abraded following Krogh (1973, 1982).

(2) Concentrations are known to ± 30% for sample weights of about 30 µg and ± 50% for samples < 3 µg.

(3) Corrected for 0.0125 mole fraction common–Pb in the ^{205}Pb – ^{235}U spike.

(4) Calculated Th/U ratio assuming that all ^{208}Pb in excess of blank, common–Pb, and spike is radiogenic ($\lambda\ ^{232}Th = 4.9475 \times 10^{-11}\ y^{-1}$).

(5) Measured, uncorrected ratio.

(6) Ratio corrected for fractionation, spike, blank, and initial common–Pb (at the determined age from Stacey and Kramers, 1975). Pb fractionation correction = 0.094% / amu (± 0.025%, 1σ); U fractionation correction = 0.111% / amu (± 0.02% 1σ). U blank = 0.2 pg; Pb blank ≤ 10 pg. Absolute uncertainties (1σ) in the Pb/U and $^{207}Pb/^{206}Pb$ ratios calculated following Ludwig (1980). U and Pb half-lives and isotopic abundance ratios from Jaffey et al. (1971).

Laboratory procedures:

The separation of Pb and U and the analytical techniques employing a ^{205}Pb-^{235}U tracer solution are those described in Krogh (1973, 1982) with modification outlined in Tucker et al. (1990). Isotope ratio measurements of U and Pb were performed at Washington University, St. Louis, in a Sector 54 thermal ionization mass spectrometer, equipped with a Daly type pulse counting ion detector by the method of peak hopping. Calibration of instrument performance and mass fractionation were done periodically with reference to NIST (National Institute of Standards and Technology) and CBNM (Central Bureau for Nuclear Measurement) standard materials. The isotopic concentration of the laboratory background (typically between 2-4 pg for Pb and U) was measured routinely and used in calculating the U-Pb age of the unknown samples. A measure of background contamination is reflected in the low sample weights, 5-16 micrograms, high uncorrected $^{206}Pb/^{204}Pb$ ratios, and low common Pb contents. Isotopic ages were calculated using the half-lives and isotope abundance ratios given by Jaffey et al. (1971) and common-Pb isotope ratios (at 663 Ma) given by Stacey and Kramers (1975).

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