

Cosmogenic nuclide burial dating lacustrine deposits in Luding, China

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About 400 m thick lacustrine sediments are found in Haiziping, Luding, 500–900 m higher than the current water level of the Dadu River. These lacustrine sediments are described as Xigeda layer in the Chinese literature, and their formation is regarded as sedimentation from a united lake covering the Dadu, the Anning and the middle Yangtze rivers during Pliocene [1]. In this study we date the lacustrine sediments using the cosmogenic nuclide $^{26}\text{Al}/^{10}\text{Be}$ burial method. Three lacustrine sediments are taken from different elevations, YN09 at 2060 m, YN10 at 1890 m and YN11 at 1810 m. The burial ages of the three lacustrine samples coincide within 1σ errors; the two samples having smaller errors, YN09 and YN10, show identical ages, 1.2 ± 0.3 Ma and 1.2 ± 0.7 Ma, respectively. Taken a weighted mean, the lake resulting in the lacustrine sediments in Luding formed 1.2 ± 0.3 Ma ago.

Although the burial age of the lacustrine sediments in Luding coincides with the age of the lacustrine sediments in Panzhihua, 1.2 ± 0.3 Ma vs $1.34\text{--}1.58$ Ma [2], we propose that these lacustrine sediments located in different regions were deposited from separate lakes. The reasons are: (1) the lacustrine sediments lie at different elevations: those in Luding lie at 1800–2200 m, whereas the lacustrine sediments in Panzhihua lie at 1100–1600 m; (2) the redox state of the lacustrine sediments differs: the whole section of the lacustrine sediments in Luding is khaki-colored, whereas the lower section of the lacustrine sediments in Panzhihua is grey-colored, which suggests reduced conditions; (3) the lacustrine sediments in Xichang, lying between Luding and Panzhihua, were deposited much later than those in Luding and Panzhihua [Kong, P., unpublished data], suggesting formation of these lacustrine sediments in individual lakes.

[1] Yao *et al* (2007) *Adv. Earth Sci.* **22**, 504–514 [2] Kong *et al* (2009) *Earth Planet. Sci. Lett.* **278**, 131–141