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## Zircon LA-ICP-MS U-Pb Dating of Listwanite from Baer Ophiolite, Yarlung-Zangbo Suture Zone, Implications for the Indus-Eurasia Collision

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### 1 Introduction

Listwanite is a suite of silica-carbonate alteration products formed when CO<sub>2</sub>-bearing hydrothermal fluids meet and react with serpentinized mafic and ultramafic rocks (Robinson et al., 2005). This alteration product is of great economic significance. Gold, mercury, magnesite and base metal deposits are often associated with listwanite. In China, the petrogenesis of listwanite and related mineralization has received insufficient attention to date. This paper reports the study of listwanite outcropping along the northeast edge of the Baer ophiolite, in the western part of the Yarlung Zangbo suture (YZSZ).

The Baer ophiolite lies in Ngari Prefecture, southwest Tibet (Li et al., 2011). The Baer listwanite crops out along the northeast boundary of the ophiolite with a width of c. 20 meters, and stretches a few kilometers in a NWW orientation. Based on the study of spinel under the optical microscope, two stages of listwanite were identified: stage one listwanite contains spinel relicts whereas stage two listwanite almost contains no spinel relicts. This means that stage two listwanite experienced a greater intensity of alteration.

Baer listwanite is mainly composed of SiO<sub>2</sub>, MgO and CO<sub>2</sub>. 8 samples (containing 3 stage one samples and 5 stage two samples) show variation in the major oxides in which the MgO/SiO<sub>2</sub> ratios are not consistent, implying that the listwanization was not an iso-chemical process. The Baer peridotite and the two stages of listwanites have similar trace element distribution patterns in which the listwanites show little enrichment in the LREE compared with the protolith.

### 2 U-Pb Dating Results and Its Implications

35 zircon grains were separated from 5 kg listwanite samples and analyzed by the LA-ICP-MS method and figure 1 lists all the reliable ages (27 spots) and their CL images (ages less than 1 Ga use the <sup>206</sup>Pb/<sup>238</sup>U age and more than 1 Ga use the <sup>207</sup>Pb/<sup>206</sup>Pb age). Note that the age range is large (from 58 Ma to 2532 Ma) and that the CL images show that some grains are metamorphic in origin and some of them are magmatic.

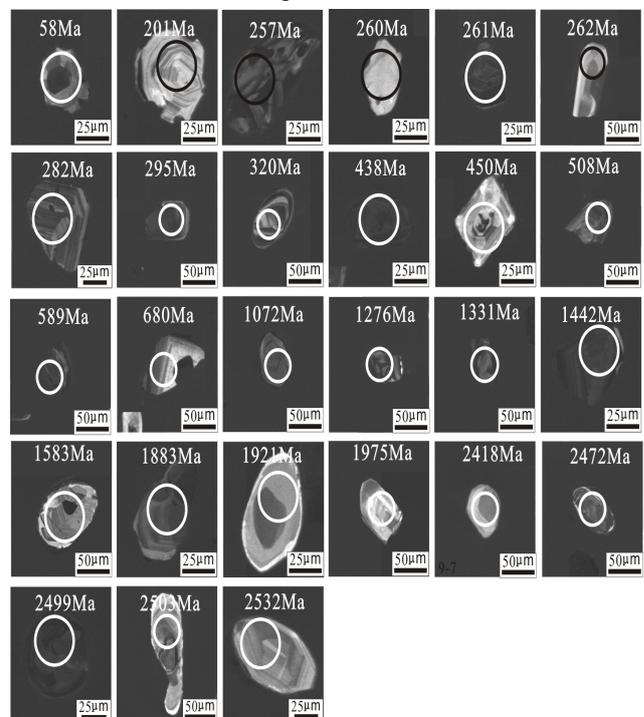


Fig. 1. Zircon CL images and LA-ICP-MS dating results of the Baer listwanite.

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The geological occurrence strongly suggests that the fault-bounded listwanite formed after the emplacement of the ophiolite. The youngest analyzed zircon spot (58 Ma) defines the oldest formation age of the listwanite, which may in turn be used to limit the Indus-Eurasia collision age. Based on the geology and geochronology data of Baer listwanite, we propose that the collision happened after 58 Ma in the Baer area.

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