



## Short Communications (Research Advances)

## Cassiterite U-Pb age in the Bawapin tin deposit, Tanintharyi Region, southern Myanmar

Song-yang Wu<sup>a</sup>, Shu-sheng Liu<sup>a</sup>, Yong-fei Yang<sup>a</sup>, Bin Zhang<sup>a</sup>, Hui-min Liang<sup>a</sup>, Hong Zhang<sup>a</sup>, Xiang-ting Zeng<sup>a</sup>, Fei Nie<sup>b,\*</sup>

<sup>a</sup> Chengdu Center, China Geological Survey, Chengdu 610081, China

<sup>b</sup> Applied Geological Survey Center, China Geological Survey, Chengdu 610036, China

## 1. Objective

Southeast Asia has a 3500 km tin metallogenic belt in the world, extending from southern Yunnan Province to Bangka, Indonesia. This region is also the world's largest one regarding tin production, which accounts for 85% of historical tin production globally (Lehmann B, 2021). Myanmar is one of the main tin producers within this region (33000 t in 2020) and has become the key supplier after China and Indonesia. Research on tin mineralization in Myanmar mostly focused on ore-related granites, for zircon geochronology, magma evolution, and tectonic settings (Mao W et al., 2020). Myanmar experienced and recorded the history of paleo-neo Tethys (Zaw K et al., 2014), and a wide range of the area was dominated by granites which were thought to have genetic relations with tin mineralization, therefore the age of tin deposits presents a critical role in the understanding of the relationship between magmatism and mineralization, and targeting the possible exploration site in southern Myanmar. However, the fact is that geochronology studies are relatively falling behind when compared with other research. Bawapin tin deposit near Dawei city is the typical primary tin deposit in the Tanintharyi Region, Myanmar with hydrothermal quartz veins, with cassiterite as the main ore mineral (Fig. 1), which are ideal minerals for *in-situ* U-Pb dating due to high U contents and low Pb contents, and high closure temperature of the system. In this research, the authors conducted *in-situ* cassiterite U-Pb dating to precisely constrain the age of the

Bawapin tin deposit.

## 2. Methods

*In-situ* U-Pb analysis of cassiterite was accomplished at the SampleSolution Analytical Technology Company by using the GeolasPro HD laser ablation system. Laser spot size is 32  $\mu\text{m}$  and fluence is 5 J/cm<sup>2</sup> in this study. Twenty seconds of background signal acquisition and fifty seconds of ablation were applied to each spot analysis. External standard zircon 91500 was used to avoid Pb/U fractionation and instrumental mass discrimination, and cassiterite AY-4 is unknown. <sup>206</sup>Pb/<sup>238</sup>U age of AY-4 is 158.9 $\pm$ 5.2 Ma in this research, which is accordant with the age of 158.2 $\pm$ 0.4 Ma.

## 3. Results

Twenty-four cassiterite single grains were analyzed for the Bawapin deposit (Fig. 2a), and the U-Pb dating analysis results are shown in Supplement Table S1. Uranium contents vary from 6.43 $\times 10^{-6}$  to 392 $\times 10^{-6}$ , with an average value of 87.5 $\times 10^{-6}$ . The majority of the <sup>238</sup>U/<sup>206</sup>Pb ratios are over 80 and the highest value is 95.64 (Supplement Table. S1). All results define a good linear correlation and yield the age of 65.6 $\pm$ 1.2 Ma (MSWD=1.05) (Fig. 2b), which indicates that the mineralization of Eocene Bawapin tin deposits has resulted from the subduction of Neo-Tethys slab downward to the Indochina Block.

## 4. Conclusions

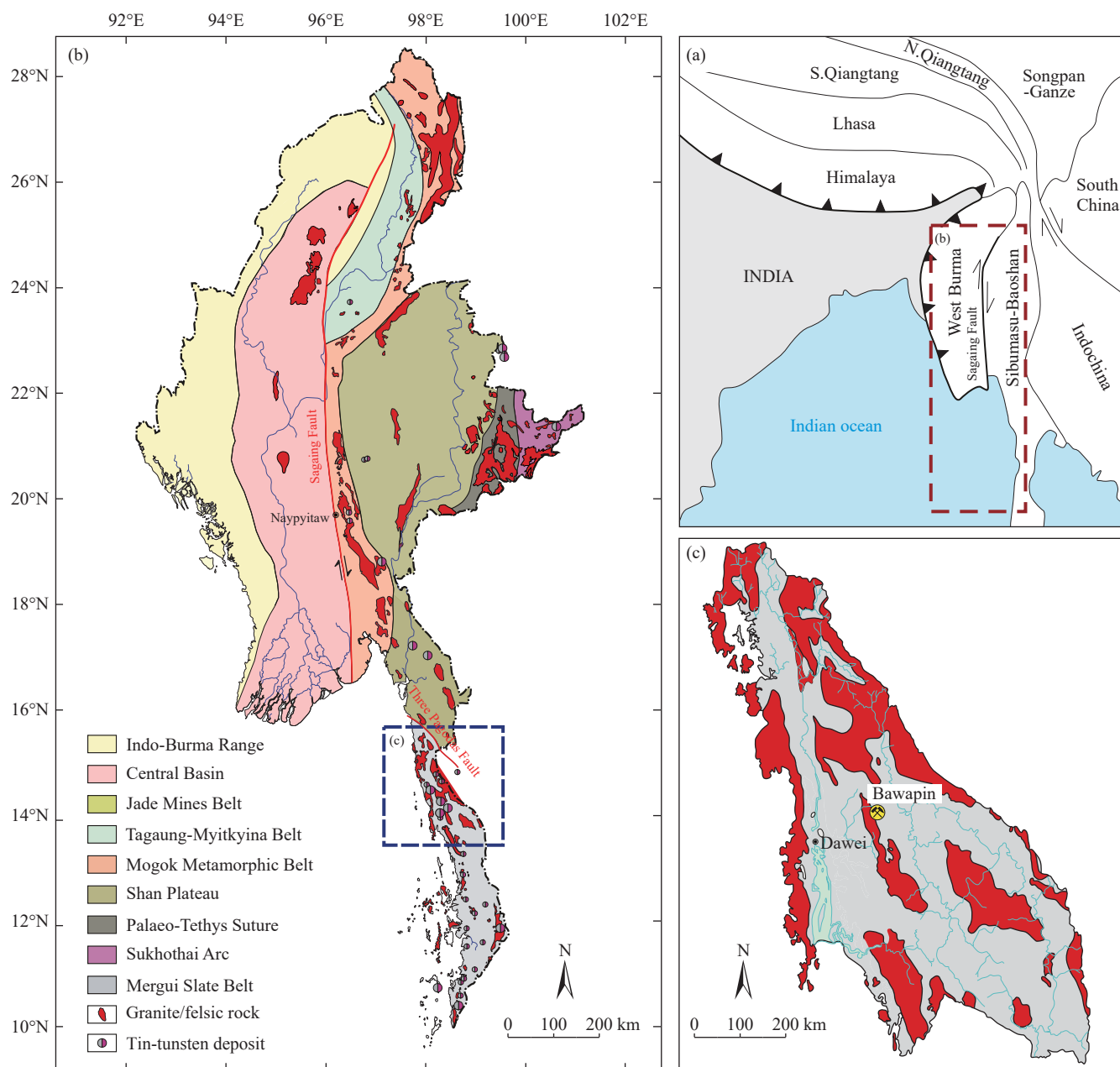
(i) Bawapin tin deposit near Dawei City is the typical primary tin deposit in Myanmar with a hydrothermal quartz vein, and the main ore minerals are cassiterite and wolframite, which provide ideal minerals for U-Pb dating.

First author: E-mail address: songywu@163.com (Song-yang Wu).

\* Corresponding author: E-mail address: niefei\_cdcgs@qq.com (Fei Nie).

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**Fig. 1.** a–Regional tectonic setting of Myanmar; b–simplified map of Myanmar's major structural belts; c–geological map of the Dawei area, Tanintharyi Region, Myanmar, showing the location of Bawapin tin deposit.

(ii) The *in-situ* cassiterite U-Pb age of the Bawapin tin deposit was  $65.6 \pm 1.2$  Ma ( $n=24$ , MSWD=1.05), which indicated W-Sn mineralization event in Tanintharyi Region, Myanmar occurred during Eocene due to the subduction of Neo-Tethys slab downward to the Indochina Block.

#### CRediT authorship contribution statement

Song-yang Wu, Fei Nie and Shu-sheng Liu conceived the presented idea and prepared the manuscript and figures. Yong-fei Yang, Bin Zhang, Hui-min Liang, Hong Zhang, and Xiang-ting Zeng conducted the field work and collected the samples. All authors discussed the results and contributed to the final manuscript.

#### Declaration of competing interest

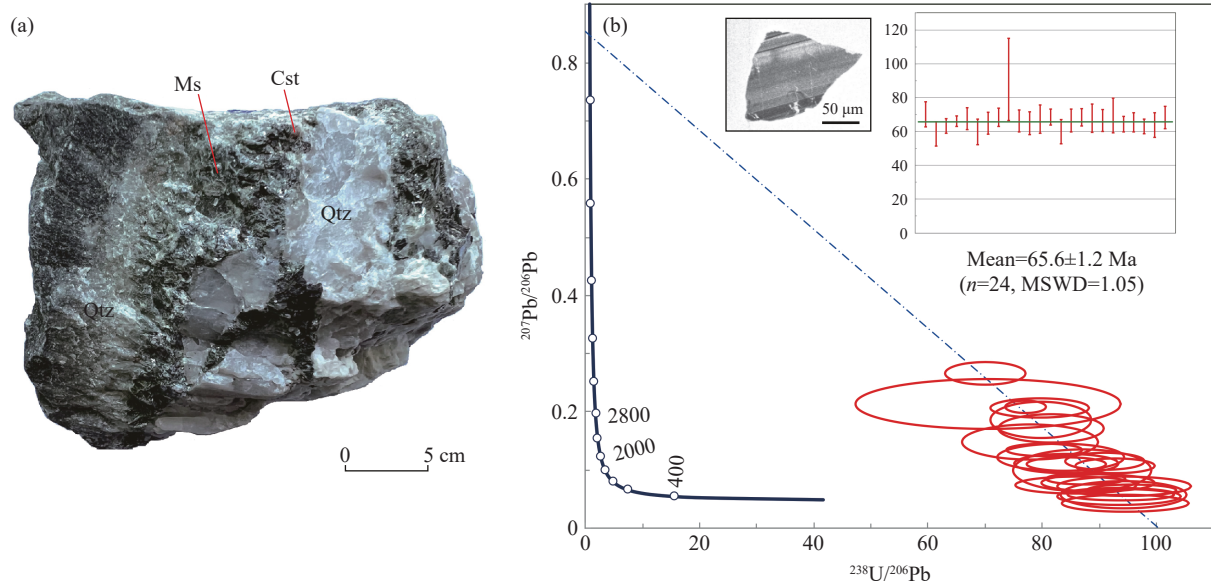
The authors declare no conflict of interest.

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#### Supplementary appendix table

Table. S1 to this article can be found online at doi: 10.31035/cg2022066.



**Fig. 2.** a–Typical ore sample in Bawapin tin deposit; b–U–Pb concordia diagram for cassiterites from the Bawapin tin deposit. Cst–cassiterite, Ms–muscovite, Qtz–quartz, MSWD–mean square of weighted deviates.

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