

### **Prolonged Mineralization for the Formation of the Southeast Asian Tin Province**

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The Southeast Asian tin province is a 3,500-km-long belt that accounts for 40-45 % of the world historic tin production. It extends from western Yunnan of China through Myanmar and Thailand to Peninsular Malaysia and the Indonesian Tin Islands. This tin province formed through multiple tectonic events linked to Tethyan ocean subduction and closure. In situ U-Pb dating of cassiterite and wolframite from tin-tungsten deposits in the Southeast Asian Tin province have been conducted to unravel its prolonged mineralization history. Compilation of all available geochronological data identified five distinct episodes of tin-tungsten mineralization: (1) The 285–265 Ma mineralization in eastern Malaysia during Paleo-Tethys subduction; (2) The 239–210 Ma mineralization in Indonesia, western Malaysia, and Thailand after Paleo-Tethys closure; (3) The 124–107 Ma mineralization in the Tengchong block of China during Meso-Tethyan subduction; (4) The 90–42 Ma mineralization in western Yunnan, Myanmar, and Thailand during Neo-Tethyan subduction-linked deposits; and (5) The 31 and 20 Ma mineralization in the Baoshan block in western Yunnan during lithospheric delamination. The repeated episodes of mineralization achieved a cumulated duration >110 Ma, notably longer than in the other major tin provinces (e.g., Cornwall: ~17 Ma; Central Andes: ~47 Ma; South China: ~50 Ma), correlating with Southeast Asia's exceptional endowment. This work highlights the role of recurrent tectonic processes in sustaining metallogenic fertility over geologic timescales, positioning Southeast Asia as the world's largest tin province. Future exploration should focus on structural intersections and zones with repeated magmatism.