

U-Pb ages of sandstone-hosted detrital zircons from the Paleo-Tethyan subduction zone, northern Thailand

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We investigated the U-Pb ages of detrital zircons hosted by lithic and basaltic sandstones within a melange in the Inthanon Zone of northern Thailand, in order to reconstruct the timing of accretion and arc activity related to Permo-Triassic Paleo-Tethys subduction. The majority of detrital zircons within the melange have grouped U-Pb ages around 2.5 Ga, 700-1000 Ma, 400-600 Ma, and 250-300 Ma, similar to other circum-Paleo-Tethys subduction zone sediments. We classified these sandstones into two types (Types 1 and 2) based on the youngest detrital zircon peak age. Type 1 sandstones have the youngest Late Carboniferous detrital zircon age peaks, older than Middle-Late Permian chert blocks within the melange. Assuming that the youngest peak age corresponds to the maximum depositional age, there are two explanations of why the oceanic plate stratigraphy cannot be applied to a melange containing both Type 1 sandstones and chert: 1) Type 1 sandstones within the melange were allochthonous, or 2) detrital zircons that formed during Permo-Triassic magmatism are missing from Type 1 sandstones. In contrast, Type 2 sandstones have early Middle Triassic youngest peaks, younger than the radiolarian-dated Late Permian chert, suggesting an early Middle Triassic maximum depositional age. In addition, detrital zircons with youngest peak ages in the Type 1 sandstone may be derived from an as-yet unidentified Late Carboniferous arc. In comparison, younger detrital zircons within Type 2 sandstones were sourced from an intensively active Early and Middle Triassic island arc within the Sukhothai Zone, with the majority of zircons formed between the Early and Middle Triassic.

Keywords: detrital zircon, U-Pb age, Inthanon Zone, Paleo-Tethys, Thailand