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U-Pb dating of detrital zircon from the Yuli belt of the Tananao metamorphic complex of Taiwan

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The Taiwan orogenic belt is composed of metamorphic and sedimentary rocks in the Central Range (Hsuehshan and Backbone Ranges) and Western Foothills from east to west. The metamorphic terrace of the Central Range can be subdivided into the Hsuehshan Range of a Cenozoic argillite-slate unit and Backbone Range of a Mesozoic schist unit. The Backbone Range can also be divided into the Tailukao and Yuli belts. The Yuli belt is made up by mainly of slate-phyllite and subordinately including discontinuous bodies of glaucophane-schist, serpentinite, and gabbro that was considered to be a Mesozoic subduction zone between the Eurasian and paleo-Pacific Plates.

The study is selected for U/Pb zircon geochronology in order to assess their magmatic crystallization age of glaucophane-schist. And the youngest U/Pb ages of detrital zircon grains are commonly used to constrain the maximum depositional ages of stratigraphic successions. The study also focuses here on using U/Pb zircon geochronology to constrain the depositional age of host rocks of the Yuli belt. The geochronological study for the metamorphic complex is therefore important to the understanding of its complex geological evolution.

Three glaucophane-schist samples yielded euhedral zircons that formed a concordant population with a concordia age of 15.4±0.4 Ma, 15.5±0.6 Ma, and 16.0±0.2 Ma. These ages are interpreted as inherited zircon ages representing the crystallization age of glaucophane-schist during ocean floor magmatic activity. Tens samples collecting from the host rocks of metasandstone yielded anhedral detrital zircons analyses with the age spectum of the main peaks of 8-45 Ma, 70-200 Ma, 0.2-0.25 Ga, 0.7-0.85 Ga, 1.7-1.9 Ga, and 2.4-2.6 Ga. The younger cluster of Tertiary period within each sample gives about 1-5%.

A few grains appear much younger than 45 Ma and are of particular interest because it represents the younger component added to the sediment during its deposition. It indicates that the Yuli belt has been deposited in the Tertiary of a Cenozoic melange.