

# Metamorphic rocks of the Kuching Zone Sarawak: Comment on Najiatun Najla Mohamad *et al.* (2020) The geology and stratigraphic framework of the Kuching Zone Sarawak: Current understanding and unresolved issues

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**Abstract:** Metamorphic rocks of Sarawak have been dated and are not Upper Carboniferous or older rocks nor are they correlatives of the Pinoh Metamorphics of Kalimantan. Two newly-dated rocks are Triassic and are named the West Sarawak Metamorphics and a third sample is Cretaceous.

**Keywords:** Kuching Zone, metamorphic rocks, dating, Sarawak

It is good to see the recent geological note concerning the Kuching Zone by Najiatun Najla Mohamad *et al.* (2020) in *Warta Geologi* identifying unresolved issues and new work needed to better understand the Kuching Zone of Sarawak. No one interested in the geology of Borneo could disagree with their conclusion that “The geology of Kuching Zone is very complex, and the interpretations concerning the geological history are still arguable and not fully resolved”. However, the note overlooked or misunderstood some recent work concerning the age of metamorphic rocks despite citing a recent paper by Breitfeld *et al.* (2017) which recorded the new age data.

The note comments that “undated Pre-Upper Carboniferous Kerait Schist and Tuang Formation were considered to be the oldest rocks in this zone due to similarities with the Pinoh Metamorphic in Kalimantan (Tan, 1986)”. Several other authors have made the same correlation despite the fact that metamorphic rocks in Sarawak are separated from the Pinoh Metamorphic rocks in Kalimantan by a wide zone including melanges considered to mark sutures. It is true to say that until recently the metamorphic rocks known as the Kerait Schist and Tuang Formation were undated, although the claim that the rocks are “Pre-Upper Carboniferous” should be identified as an assumption. As Table 1 records, the Kerait Schist was considered to be older than the Terbat Formation merely because it is a metamorphic rock and is more strongly deformed; there is no other evidence. No contacts have been observed between metamorphic rocks

and other rocks and the supposed Pre-Upper Carboniferous age was based on the assumption that the metamorphic rocks represent an older basement to the unmetamorphosed Terbat Formation and other sedimentary rocks.

Table 1 also records that “There is no proper age dating conducted to this metamorphic basement (Tan, 1986; Tate, 1991). The Pinoh Metamorphic is also undated and assumed to be Paleozoic (Breitfeld *et al.*, 2017)”. None of these assertions is correct although they may have been considered reasonable before the publication of Breitfeld *et al.* (2017) and recent dating studies cited by them. Breitfeld *et al.* (2017) did not assume the Pinoh Metamorphics to be Paleozoic although they did point out in their introduction that “until recently, the metamorphic rocks in SW Borneo and the Kuching Zone of Sarawak were undated but were considered to be Paleozoic basement”. However, they then went on to cite work by Davies (2013) and Davies *et al.* (2014) that had dated the Pinoh Metamorphics as Cretaceous. A detailed account of the dating of the Pinoh Metamorphics and other rocks of the Schwaner Mountains can be found in Breitfeld *et al.* (2020) and there can be no doubt of their Cretaceous age.

In the same paper Breitfeld *et al.* (2017) pointed out that their new results, from previously undated metamorphic rocks in Sarawak, required revision of the assumption that they were Permian/Carboniferous or older basement. Ar-Ar dating of micas from two samples of the Kerait Schist and Tuang Formation yielded Triassic ages and since the different formation names were based

only on their occurrence in different areas Breitfeld *et al.* (2017) proposed that they should be grouped together and named the West Sarawak Metamorphics. One sample of a chlorite-quartz-mica schist previously assigned to the Tuang Formation yielded a Cretaceous age. It is therefore clear that metamorphic rocks previously assigned to the Kerait Schist and Tuang Formation are not pre-Upper Carboniferous basement, nor are they equivalents of the Pinoh Metamorphics of Kalimantan.

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