Geological stories from the journey of mollusks fossils in Java

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ABSTRACT

The journey began in the Eocene with the presence of mollusk fossil in the Nanggulan Formation (near Yogyakarta) in Central Java. Many experts believe this was the early part of the Tethys system which might still be connected to the Tethys system in Europe.

The oldest mollusk fossils type locality after Nanggulan is the Early Miocene Jonggrangan Formation in Kulon Progo near the city of Yogyakarta, which is dominated by the gastropod *Haustator* specimen. Molluscan paleontological studies of this type of locality reflect a restricted environment with less influence of the Tethyan system. *Haustator* are considered as the ancestor of the Turritellidae group, which is found mostly on Java Island, during the younger Tertiary to Quaternary Periods.

The story continued to the Middle Miocene where the Tethyan realms indication was clearly observed by the presence of some typical Tethys species such as *Volema* and *Babylonia* from Nyalindung Formation, West Java. The regional sea level rise in this epoch (around 12 Ma) that was indicated by the presence of *Vicarya* as an index fossil, which occurrence was due to land submerging to become mangroves area. The fossil then quickly become extinct when the sea level dropped back.

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Late Miocene to Pliocene was like the transition period from the Tethyan realm to the Pacific realm, where the Tethyan fauna was no longer present. Only evolutionary traces of the Middle Miocene mollusk fossils were observed. This continuous evolution is most clearly seen in *Turritella cramatensis* (late Miocene), *Turritella acuticarinata* (early Pliocene) and *Turritella cikumpaiensis* (late Pliocene) which was interpreted to have originated from *Turritella angulata* as their ancestors.

Earth cooling environment that happened in the late Pliocene/early Pleistocene has led the diversity and evolution of a new group of mollusks, most clearly observed from the abundance of *Turritella bantamensis* in the Bojong Formation, Banten. The new *Turritella* group has a curved whorl that different from its predecessor with an angled whorl shape.

Plio-Pleistocene tectonics event has ended the period of Java marine mollusks domination, then only freshwater mollusk fossils can be found in almost all Quaternary mollusks-bearing deposits.

Keywords: mollusks, fossil, Tertiary, Quaternary, evolution