

# **Contribution to the geology of Thailand and implications for the geodynamic evolution of Southeast Asia**

**FERRARI Olivier** ; may, 29, 2007

*Supervisor: Prof. Gérard Stampfli, Institut de Géologie et Paléontologie*

The purpose of this study is to unravel the geodynamic evolution of Thailand and, from that, to extend the interpretation to the rest of Southeast Asia .

The methodology was based in a first time on fieldwork in Northern Thailand and Southernmost Myanmar, using a multidisciplinary approach, and then on the compilation and re-interpretation, in a plate tectonics point of view, of existing data about the whole Southeast Asia.

The main results concern the Nan-Uttaradit suture, the Chiang Mai Volcanic Belt and the proposition of a new location for the Palaeotethys suture. This led to the establishment of a new plate tectonic model for the geodynamic evolution of Southeast Asia, implying the existence new terranes (Orang Laut and the redefinition of Shan-Thai) and the role of the Palaeopacific Ocean in the tectonic development of the area.

The model proposed here considers the Palaeotethys suture as located along the Tertiary Mae Yuam Fault , which represents the divide between the Cimmerian Sibumasu terrane and the Indochina-derived Shan-Thai block .

The term Shan-Thai, previously used to define the Cimmerian area (when the Palaeotethys suture was thought to be represented by the Nan-Uttaradit suture ), was redefined here by keeping its geographical location within the Shan States of Myanmar and Central-Northern Thailand, but attributing it an East Asian Origin. Its detachment from Indochina was the result of the Early Permian opening of the Nan basin.

The Nan basin closed during the Middle Triassic, before the deposition of Carnian-Norian molasse. The modalities of the closure of the basin imply a first phase of Middle Permian obduction, followed by final eastwards subduction.

The Chiang Mai Volcanic Belt consists of scattered basaltic rocks erupted at least during the Viséan in an extensional continental intraplate setting , on the Shan-Thai part of the Indochina block. The Viséan age was established by the dating of limestone stratigraphically overlying the basalts. In several localities of the East Asian Continent, coeval extensional features occur, possibly implying one or more Early Carboniferous extensional events at a regional scale. These events occurred either due to the presence of a mantle plume or to the roll-back of the Palaeopacific Ocean , subducting beneath Indochina and South China .

The Palaeopacific Ocean is responsible, during the Early Permian, for the opening of the Song Ma and Poko back-arcs ( Vietnam ) with the consequent detachment of the Orang Laut Terranes (Eastern Vietnam, West Sumatra, Kalimantan, Palawan , Taiwan ).

The Late Triassic/Early Jurassic closure of the Eastern Palaeotethys is considered as having taken place by subduction beneath its southern margin (Gondwana), due to the absence of Late Palaeozoic arc magmatism on its northern (Indochinese) margin and the presence of volcanism on the Cimmerian blocks (Mergui, Lhasa).