



## **Permian limestone blocks inside the Nan-Uttaradit Suture Zone (Northern Thailand): faunal affinities and palaeogeographic implications**

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Thailand is interpreted as consisting, from west to east, of three distinct paleogeographic domains: the Sibumasu-Mergui terrane, detached from Gondwana during the Carboniferous opening of the Neotethys Ocean, the Shan-Thai terrane and the Indochina terrane.

The Nan ophiolite belt is exposed in the eastern part of Northern Thailand and separates Shan-Thai from Indochina.

It has long been questioned whether this ophiolite belt was representing the Paleotethys suture (i.e. the suture between the Cimmerian domain and Indochina) or the closure of a smaller basin located at the Northern Margin of Palaeotethys. Consequently, some authors consider Shan Thai as Cimmerian, while others, including us, consider it as Indochina derived

The oldest rocks in the Nan belt are those of the Pha Som Metamorphic Complex, ranging in age from Carboniferous to Late Permian. This Group is a melange composed of blocks which vary in composition from volcanic rocks to meta-greywacke, limestone, piemontite-quartz schists, radiolarite and serpentinite.

Fieldwork has been undertaken in the Nan area, as well as in the adjacent areas, in order to understand, in a paleogeographic point of view, what terrane corresponds to what domain.

Three different kinds of limestone blocks have been found inside and above the Pha Som Group and studied under cathodoluminescence, to know their fracturation history. In addition, the micropaleontological analysis, based on benthic foraminifers allowed us to give them ages.

The three kinds of limestone (Middle Permian Grey limestone overlying the ophiolite, Upper Permian Bluish limestone as blocks inside the schists and Siliceous limestone as part of the matrix) gave results implying that they underwent different deposition and tectonic evolutions.

Data concerning adjacent areas as well as the ophiolite itself allowed us to present a model for the closure of the Nan basin and to assume that the Shan-Thai terrane is not Gondwana derived but detached from Indochina, probably during Carboniferous times.

The closure of this basin must have taken place in two phases: the first one (obduction), during Early-Middle Permian induced greenschists metamorphism at  $269 \pm 12$  Ma (Barr et al. 1985) and allowed the preservation of the ophiolite, while the second phase (subduction) occurred between the deposition of the Upper Permian radiolarites (Sukhwatananan and Asawapaatchara, 1987) and the deposition of the Carnian-Norian Molasse that overlies the ophiolite (Luddecke et al. 1991).

Foraminifera found in the limestone blocks of the Pha Som Group, the Carboniferous flora, Carboniferous fauna and diamond occurrences in westernmost Thailand and in Burma, are of importance in the interpretation of Shan-Thai as Indochina derived. Especially the easternmost occurrence of Carboniferous glaciomarine deposits versus the westernmost occurrences of Carboniferous equatorial flora (Myo Min et al. 2001), as well as the localisation of Gondwana-derived diamonds (Griffin et al. 2001) prove that the true Palaeotethys suture is located in the region of Mae Hong Son.

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