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海山型石灰岩の有孔虫群集から見た後期古生代パレオテチス遠洋浅海域の古生物地理的特徴

Paleogeographic characteristics of Late Paleozoic foraminifers elucidated from Paleo-Tethyan mid-oceanic carbonates

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The Changning-Menglian Belt of West Yunnan, SW China and the Inthanon Zone of Northern Thailand are two major closed remnants of the Paleo-Tethys Ocean in the southwestern part of Asia. In these areas, thick carbonate successions, called the Banka Limestone in the Changning-Menglian Belt and the Doi Chiang Dao Limestone in the Inthanon Zone, are distributed as large exotic blocks. They are considered to have an origin of mid-oceanic carbonates formed on tops of volcanic islands within the Paleo-Tethys Ocean, like those of the Panthalassan Akiyoshi Limestone of Southwest Japan. These carbonates are important and unique for providing paleobiogeographic information of Paleo-Tethyan shallow-marine biotas in a pelagic oceanic domain of this onetime large ocean basin.

In the Banka Limestone, carbonates started deposition from probably the Visean (Middle Mississippian) on a basaltic base and continued up to the end of the Permian. It consists mainly of massive and pure shallow-marine carbonates completely free from siliciclastic input. Contemporaneous sediments representing a relatively deep-water carbonate slope facies regime are also associated. These two types of carbonates are interpreted to have formed as a whole a single depositional system on and around a volcanic edifice in a far-continent oceanic domain. The thickness of the shallow-facies carbonates exceeds 1200 m including a basal basaltic unit. Recent studies reported an almost continuous foraminiferal succession consisting of totally 20 age-diagnostic assemblages in this limestone. The Mississippian assemblage is too poor to elucidate any paleobiogeographic affinity, but succeeding Pennsylvanian-Permian ones fundamentally demonstrate Tethyan affinities with a strong paleobiogeographic relationship with the Cathaysian domain in the Late Permian.

The Doi Chiang Dao Limestone essentially has a similar depositional duration and sedimentological characters to those of the Banka Limestone, although one conodont occurrence suggests that its carbonate deposition may have lasted until the earliest Triassic, crossing the P-T boundary. It is probably more than 1000 m thick in a rough estimation and is associated with basalt at its base, which shows a geochemical signature of an oceanic intra-plate affinity. Our recent studies recognized a total of 29, almost continuous foraminiferal assemblage in this limestone. The Mississippian assemblages before the formation of Pangea generally possess a cosmopolitan affinity, reflecting potential faunal interchange through the circum-equatorial seaway between

Laurasia and Gondwanaland. After the Bashkirian (Early Pennsylvanian) up to the latest Permian, foraminiferal faunas are diversified throughout and many Tethyan forms dominated them. Like as the Banka Limestone, the Late Permian foraminiferal assemblages of the Doi Chiang Dao Limestone show strong Cathaysian affinities.

Summarizing the essential features of these Late Paleozoic Paleo-Tethyan mid-oceanic carbonates, their deposition continued throughout almost the entire Carboniferous-Permian, a time-span of approximately 90 m.y., and the foraminiferal fauna has a cosmopolitan affinity in the Mississippian, but later on until the end of the Permian, it essentially shows strong Tethyan affinities in most levels. Particularly in Late Permian time, it exhibits a strong paleobiogeographic relationship with that of the Cathaysian domain. These data demonstrate that the pelagic mid-oceanic domain of the Paleo-Tethys Ocean, which occupied the major part of the ocean and in which these carbonates had been formed, essentially constituted part of the equatoro-tropical Tethyan realm in view of foraminiferal paleobiogeography. In addition to well-studied Pangean shelf areas, these Paleo-Tethyan mid-oceanic isolated carbonate platforms may also have contributed for the dispersion and migration of shallow-marine dwellers within the Tethys by providing "stepping-stone" habitats.

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