

## CHAPTER 6

### CONCLUSIONS

The tectonic evolution of the Sa Kaeo-Chanthaburi Accretionary Complex can be proposed on the basis of detailed field investigation and detrital chromian spinel studies. The above-mentioned results and discussions are summarized as follows.

1. Considering the rock assemblages and tectonic structures of *mélange* such as block-in-matrix in the Sa Kaeo-Chanthaburi, eastern Thailand, the name “Sa Kaeo-Chanthaburi Accretionary Complex” (SKCB-AC) are proposed. The SKCB-AC consists of two kinds of rock assemblages, the *mélange* of Permian oceanic plate materials and the covering Triassic turbidite sequences of the Pong Nam Ron Formation.
2. Based on the field investigation and laboratory studies, the SKCB-AC can be tectono-stratigraphically subdivided into 5 units, namely Khao Prik unit, Khao Hleam unit, Ban Nong Bon unit, Soi Dao unit and Pong Nam Ron Formation. The Khao Prik unit is characterized by *mélanges* of limestone, basaltic rocks, cherts, clastic rocks and serpentinite. In this unit, the limestone blocks are very dominant and widely distributed. The Khao Hleam unit is *mélange* of reddish brown chert, basaltic pillow lava, volcanoclastic

rocks with subordinate hyaloclastite, limestone, and serpentinite. The Ban Nong Bon unit comprises mainly mélange of sandstone, conglomerate and shale. Chert and limestone also occur as small tectonic blocks in shale matrix, ranging from a few centimeters to a few meters in diameter. The Soi Dao unit is mélange of oceanic plate materials similar with those of the Khao Hleam unit. Basalt, chert and limestone are the dominant rock types in this mélange unit. Sandstone also occurs as tectonic blocks in shale matrix. The Pong Nam Ron Formation forms as the covering sediments of the other rock units. This unit comprises a succession of the sandstone and shale alternations, which exhibit almost characteristics of turbidite deposits.

3. Regarding the tectono-stratigraphy and paleontological data, the age of mélange are younger than those of fossils (Permian) from tectonic blocks, but still be older than age of the Soi Dao Granite (Upper Triassic) that intruded in the SKCB-AC. The formation age of mélanges is assigned as Uppermost Permian to Lower Triassic, while the age of covering sediments of the Pong Nam Ron Formation is Middle Triassic.
4. The Middle Triassic covering sediments, sandstones of the Pong Nam Ron Formation are classified as “Feldspathic Greywacke” and “Lithic Greywacke”, and most of them correspond to the “Dissected Arc” of the Dickinson (1985)’s QtFL and QmFLt diagrams. Reasonably the Pong Nam Ron Formation was a turbidite deposited during the subduction of the oceanic plates to the western margin of the Indochina forming the magmatic arc.

5. Numerous detrital chromian spinels are discovered as rather small grains in both of turbidite sandstone strata of the Pong Nam Ron Formation, and terrigenous/volcaniclastic blocks in mélange units. Their grains vary between 20  $\mu\text{m}$  and 500  $\mu\text{m}$  in size. Generally they display reddish brown to dark brown and black (or opaque) under the microscope. Both of them are mostly sub-angular to angular. Several grains exhibit sub-hedral to euhedral habits suggesting the preservation of original crystal shape, and many grains contain inclusions.
6. Characteristically the detrital chromian spinels from the Pong Nam Ron Formation have high Cr content (with the average of Cr#s about 0.62) and relatively vary in  $\text{TiO}_2$  content (nil to 2.67 wt%). The Cr#s are ranging from 0.44 to 0.80. As the Mg#s range from virtual nil to 0.69 and average about 0.48. The atomic ratios  $\text{Fe}^{3+}/(\text{Cr}+\text{Al}+\text{Fe}^{3+})$  are ranging from 0.02 to 0.18 with the average about 0.10.
7. The detrital chromian spinels from the sandstone and conglomerate blocks in mélange of the SKCB-AC have the atomic ratio Cr#s range widely from 0.25 up to 0.95 and average about 0.67. The atomic ratio Mg#s are 0.03 to 0.70, with the average about 0.45. The atomic ratios of  $\text{Fe}^{3+}/(\text{Cr}+\text{Al}+\text{Fe}^{3+})$  are also widely ranging from 0.02 to 0.17, with the average about 0.09.
8. The geochemistry of detrital chromian spinels from the Pong Nam Ron Formation and the sandstone and conglomerate blocks in mélanges suggests that they were derived from the island arc basalts.

9. The characteristics of detrital chromian spinels from the Pong Nam Ron Formation are similar with those of the Nam Duk Formation in the Phetchabun area, north-central Thailand.
10. Probably the detrital chromian spinels from the Pong Nam Ron Formation and the sandstone and conglomerate blocks in mélanges are derived from the basalt-serpentinite magmatic arc complex during their sedimentations.
11. The geochemistry of detrital chromian spinels from the volcanoclastic rocks indicates probably two kinds of the tectonic setting, "Intraplate Basalt" and "Island Arc Basalt" as a provenance rock. The mixture between the detrital chromian spinel of "Intraplate Basalt" and "Island Arc Basalt" probably suggests the subduction and accretion of oceanic plate bearing the oceanic volcanoes beneath the island arc on the continental margin during the volcanoclastic sediments were deposited at the trench site.
12. The western margin of the Indochina varied from the passive margin in the Saraburi area to the active margins in the Phetchabun and Sa Kaeo-Chanthaburi areas during the Permian to Triassic before the Indochina was collided with the Sibumasu and complete closure of the Paleo-Tethys in the Late Triassic.