

Paper Number: 4021

Significance of Cretaceous stratal records in Japanese Islands: forearc-trench systems

Ando, H.¹

¹Department of Earth Science, Faculty of Science, Ibaraki University, Bunkyo 2-1-1, Mito 310-8512, Japan;
hisao.ando.sci@vc.ibaraki.ac.jp

As the Japanese Islands are situated in an active convergent margin, their geologic structure is very complicated in general. The Cretaceous strata are distributed reflecting the tectonic setting composed of three arc-trench systems: main Japan, western Ryukyu and eastern Kuril systems. The main Japan Arc, now an island arc is divided into Southwest Japan and Northeast Japan by the Tanakura Tectonic Line (TTL). Furthermore, the WSW-ESE trending Median Tectonic Line (MTL) divides Southwest Japan into the Outer (southern) and Inner (northern) zones. Before the intense modification by early Miocene tectonism such as the opening of the Japan Sea caused by backarc spreading, and the Philippine Sea Plate subduction, it was a NE-SW trending straight continental arc subducted by paleo-Pacific/Izanagi plate during the Cretaceous time. Therefore, the Cretaceous strata had been affected by post-Cretaceous tectonic deformation on a large/mid/micro scale. To establish the paleogeographic and paleoenvironmental reconstruction of the Cretaceous, we must carefully pay attention to such the tectonic modification.

The Cretaceous sedimentary basins of the main paleo-Japan arc are classified into 1) backarc/intra arc, 2) forearc and 3) trench slope (deep sea) basins from paleo-Asian continent to paleo-Japan trench.

The mainly Early Cretaceous sediments of backarc/intra arc basins are sporadically exposed in the northern half of the Inner Zone of Southwest Japan, and exemplified by the Tetori, Sasayama and Kwanmon groups. They are mainly composed of non-marine and continental facies. The Tetori Group is very important in considering the Cretaceous ecosystem due to containing diversified megafossil flora and recently found vertebrate fauna such as dinosaur and turtles, etc. Their equivalent/correlative strata are also distributed in the southern coastal area of Korea.

In Northeast Japan, Cretaceous to Lower Paleocene shallow-marine to non-marine sediments as well as offshore-marine sediments are distributed along central Hokkaido widely and the Pacific coast of north Honshu narrowly and the offshore Pacific area widely. It continues northward toward Sakhalin Island in a north-south direction. This ancient forearc basin is called the Yezo basin.

On the other hand, Southwest Japan had been uplifted by the tectonic movements during Early Miocene. As many of Cretaceous forearc sediments had been eroded away and tectonically deformed, their surface distribution is limited and not easy to study. However, their stratigraphic and faunal successions can be anyhow traced along the southern end of the Inner Zone in contact with MTL southward and the middle part of the Outer Zone, called the Chichibu Belt. Their sediments are dominant in marine facies, but not negligible in fluvial facies. The former strike-slip basin sediments were thickly formed during Coniacian to early Maastrichtian from west to east, reflecting its basin centre migration eastward. This means two parallel NE-SW trending basins were developed in the Late Cretaceous Japan forearc.

The Cretaceous to Paleogene trench slope basin sediments form accretionary complexes mainly composed of turbidite, mélangé and offshore mudstone facies, and associated with some shelf facies. They are wide distributed in the Shimanto Belt, outer half of the Outer Zone of Southwest Japan, and the Ido-nappu and Hidaka belts of Hokkaido in Northeast Japan.

These Cretaceous strata in Japanese Islands record a wide variety of sedimentary facies and biofacies changes from offshore to shallow-marine to continental, reflecting paleoenvironments, climate and ecosystems along the eastern Asian and western Pacific margin.

