Accretionary complex of remnant-arc origin: Greenstone-conglomerate-chert succession in the Oku-Niikappu area of the Idonnappu Zone, Hokkaido, Japan

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Received April 30, 2003.

Accepted August 9, 2003.

The mid-Cretaceous Oku-Niikappu Dam Complex (ONDC: Fig. 1) occurs in the Niikappu River area of the Idonnappu Zone (Ueda and Miyashita, 2002, 2003). The ONDC contains a tectonic block with a stratigraphic succession from basal volcanic rocks through alternating conglomerate and chert (middle unit) to an upper chert unit (Figs. 2-4). The conglomerate clasts consist dominantly of basaltic to rhyolitic volcanic rocks, with subordinate of ultramafic to felsic plutonic clasts (Figs. 3 and 5). The basal volcanics and the volcanic clasts in the conglomerate have chemical characteristics of island arc origin. This succession represents an island arc in which activity ceased, followed by dissection in a pelagic environment, and is suggestive of an intraoceanic remnant arc isolated by back-arc spreading. Similar strata and clastic compositions have been reported from the remnant arcs of the Daito and Kyusyu-Palau Ridges in the Philippine Sea Plate. The occurrence of accreted remnant arcs is significant for considering subduction zone tectonics, because they indicate subduction of oceanic crust associated with island arcs and back-arc basins similar to those of the present-day Western Pacific.

Fig.1. Geologic map of the Oku-Niikappu Dam area. The greenstone-conglomerate-chert succession occurs within a fault-bounded block, and displays synclinal structure.

Fig.2. Alternating volcanic conglomerate and chert in the middle horizon exposed along the Niikappu River. Granule conglomerate (g) grades into chert (c on the right) via volcanic sandstone (s). Brown radiolarite is also observed to the left of this photograph.

Fig.3. Massive unsorted conglomerate (A) consisting of subangular to subrounded volcanic clasts, in the middle horizon. Bed thickness occasionally exceeds 10m. Minor clinopyroxenite (B) and microgabbro (C) clasts are found in places.

Fig.4. Red bedded chert (c) containing thin intercalated volcanic sandstone beds (s), upper horizon. The chert between the two sandstone beds shows pinch-and-swell structure caused by soft-sediment deformation.

Fig.5. Photomicrographs of clasts in the conglomerate. Scale bars indicate 1mm. (A) Dacite clast with quartz microphenocrysts, among basalt and andesite clasts. (B) Amphibolitized gabbro clast. (C) Hornblende tonalite. (D) Serpentinite. (A-C): Cross-polarized light, (D): plane-polarized light

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