

Paper 54

Sedimentological and mineralogical analysis of the turbidite sandstone beds at the eastern margin of the Niigata Neogene backarc oil basin, Northwest Japan; with special reference to the coexistence of shallow-marine and deep-marine turbidite sandstone beds

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The study area, a part of the eastern margin of the Niigata Neogene backarc oil basin, is a very interesting area to clarify the sedimentological relationship between shallow-marine and deep-marine sediments, as the Neogene sediments are widely distributed under the control of north-south trending folds with many useful thin tuff marker-beds. Recent detailed stratigraphic works have disclosed the lateral change from deep-water

formations in the west to shallow-water formations in the east.

In the early Pliocene age, two kinds of turbidite sandstones, submarine-fan turbidite in the west and shelf turbidite sandstone in the east, were formed at the same time and resulted in coexistence of two kinds of sandstone-mudstone alternations in the study area.

These two kinds of turbidite sandstones were both

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transported westward but from different sources, as heavy mineral components of them are fundamentally different from each other. The western submarine-fan turbidite was transported through the submarine canyon, whose head was located near the mouth of the main river which supplied sediments mainly from the upper area of the provenance area (mostly of Mesozoic sedimentary rocks and Cretaceous granitic rocks). The eastern shelf turbidite, on the other hand, was transported, probably during the time of storms, through many small channels from

the coastal area, where small rivers supplied the sediments mainly from the lower portion of the provenance area (mostly of Neogene volcanic rocks).

As shown in this study, heavy mineral analysis of sandstones is very useful for analysis not only of provenance but also of sedimentological process, especially in case of sandstones deposited in the Neogene active margin basins, as many volcanic origin minerals are added to the basement-origin minerals.
