

Siliceous microfossil biostratigraphy of the Miocene strata in the vicinity of the whale fossil locality, Hae River, Hidaka district, Hokkaido

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A calcareous concretion with the size over one meter in diameter containing whale bones was discovered as a float during the riparian works on the Hae River, Hidaka Town in 2005. Radiolarian and diatom assemblages recovered from the concretion indicate the *Lipmanella redondoensis* Zone and the *Rouxia californica* Zone, respectively, suggesting an age of 7.7 to 7.4 Ma. This age is concordant with the age range of the Nina Formation which is distributed near the locality of the concretion and was previously dated as ca. 10.1 to 3.5 Ma based on the diatom stratigraphy in the surrounding area. However, because of very few biostratigraphic data for the sedimentary rocks exposing along the Hae River, the location of the original home of the concretion is still unknown. In order to determine the home locality, we surveyed geology along the river and analyzed diatom and radiolarian biostratigraphy for the sedimentary sequence. The Nina Formation exposing at and around the whale fossil locality mainly consists of diatomaceous mudstone, sandy mudstone and sandstone. Many of the studied samples yielded common to abundant fossil diatoms that include various index species, *Denticulopsis praedimorpha*, *Denticulopsis dimorpha*, *Denticulopsis katayamae*, *Thalassionema schraderi*, *Rouxia californica* and *Neodenticula kamschatica*. The occurrences of these species indicate that the Nina Formation encompasses the Middle Miocene through the Pliocene. The river floor outcrops near the whale fossil locality belong to the *Denticulopsis dimorpha* Zone and the outcrop that has been correlated to the *Rouxia californica* Zone is located about 1.5 kilometers downstream from the whale fossil locality. Spontaneous upstream dislocation of a large rock over a long distance is most unlikely, and, thus, the home locality of the whale fossil went unsolved.

Keywords: diatom, Radiolaria, whale fossil, calcareous concretion