


# Utility of Allochthonous Foraminifera Faunas in Submarine Paleoseismology Studies

 Thursday, 12 December 2024

 08:30 - 12:20

 Hall B-C (Poster Hall) (Convention Center)

## Abstract

Submarine paleoseismology hinges on analyzing stratigraphic records to learn about past earthquakes. Marine microfossils, such as foraminifera, can reveal critical details about the water depth of the sediment remobilized during earthquakes. Although allochthonous foraminifera are typically excluded from age control studies, these faunas are useful in providing insight into the water depth from which a sediment transport deposit originated.

As an example, we describe a ~16 m thick Holocene sedimentary deposit first defined by Kioka et al. (2019) and later dated to 1.77 (+0.49/−0.31) ka by Usami et al. (2021) and Schwestermann et al. (2021) based on bulk OC <sup>14</sup>C. Strasser et al. (In Press) identified the event at IODP Expedition 386 Sites M0084, M0086, and M0088, located at hadal depths in the northern Japan Trench. Each site features a basal 1 to 2 m thick, fining-upward medium sand to silt with well-defined planar and ripple lamination. The sequence has been interpreted as a turbidite composed of basal sand grading into silty clay that is overlain by a mass transport deposit. Calcareous foraminifera occur in the deposit despite being well below the CCD. Foraminiferal abundance decreases from the basal sand to the fine silty clay due to gravitational size sorting. Most displaced foraminifera, including thin-shelled taxa, are moderately to well-preserved, likely due rapid burial, high alkalinity, and low internal friction within the flow.

The foraminiferal assemblages are consistent across the three sites. The sandy portion of the deposit is dominated by *Elphidium batialis*, *Uvigerina akitaensis*, *Nonionellina labradorica*, *Chilostomellina fimbriata*, and species of *Bulimina*, indicative of upper to middle bathyal depths (200 to 1000 m). In contrast, the silty clay contains smaller foraminifera like *Bolivina*, *Cassidulina*, *Stainforthia*, and *Epistominella*, suggesting outer neritic to upper bathyal depths (100 to 600 m).

Radiocarbon dating of the foraminifers within the basal sand from each site reveals that M0086 (16750 to 16200 cal BP) and M0088 (16650 to 16050 cal BP) have younger source ages compared to M0084 (19350 to 18800 cal BP).

These findings indicate that the ~1.77 ka sediment transport event entrained much older strata that had originated in upper to middle bathyal depths and outer neritic to upper bathyal depths.

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