

Bulk versus density fractionations: Comparison of Radiocarbon Dating Techniques on Tsunami Deposits located at Kadonohama, Iwate Prefecture

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Tsunami deposits are geological layers within the sedimentary record, that indicate evidence of paleo-tsunamis. These deposits are formed by high-energy tsunami wave series. Identifying and dating these deposits is essential in better understanding the potential effects of future tsunamis and developing reliable hazard maps. It can be difficult to date tsunami deposits, as they form through the erosion and deposition of reworked and transported sediment, leaving deposits themselves undatable. This study will compare two radiocarbon dating techniques at two sites from Kadonohama, Iwate Prefecture. At Site 1, two tsunami deposits were identified, whereas at Site 2, only one tsunami deposit was present. Samples collected from both sites have undergone bulk sediment radiocarbon dating, which will be compared with density fractionation radiocarbon dating. Bulk sediment dates can be influenced by new carbon intrusion through plant roots and old carbon intrusion via sediment reworking. Bulk sediment radiocarbon dates have large error ranges throughout the core, with the radiocarbon dates being older than those of density fractionation. Density fractionation physically separates soil organic matter based on particle density. The denser material mostly consists of older carbon. Hence, through separation, it can reduce the influence of old carbon on the radiocarbon results. Comparing these results using density fractionation will help develop a stronger understanding of paleotsunamis within the region.

Keywords: Tsunami Deposit, Radiocarbon Dating, Bulk Sediment, Density Fractionation, Sedimentary Environment