Non-destructive analyzes of sediments to discern tsunami-related mud cap and overlying muds to improve age determination of tsunami deposits

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Age of tsunami deposit is usually determined from dating results of sediments above and below the tsunami derived layers. However, determining the upper boundary of tsunami deposit is often difficult, because the top of tsunami deposit is sometimes comprised of mud-dominated sediment (mud cap) which can be indistinguishable from overlying muddy sediment deposited under normal sedimentary condition. This ambiguity may cause serious problem determining true tsunami ages.

Here we present an examples of non-destructive and destructive analyses of core sample taken from Okirai, Iwate prefecture. Our results indicated that X-CT (X-ray Computed Tomography), XRF (X-ray Fluorescence), and grain size analyses were useful to identify tsunami-related mud cap from overlying muds deposited after tsunami events. Since X-CT and XRF analyses are non-destructive analyses, it is highly recommended to conduct these analyses before subsampling of the sediments for further analyses including radiocarbon dating. Such careful sampling for dating will contribute to improve age estimation of tsunami deposits.

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