

# Origin and transport process of tsunami deposits based on the image analysis of gravel particles

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Characteristics of tsunami deposits (e.g., particle size, grain composition, thickness, and sedimentary structure) are the most fundamental information to describe tsunami deposits. These parameters reflect conditions of tsunamis (tsunami height and flow velocity) and might allow us to reconstruct the paleo-tsunami behavior. In this study, based on image analysis, we extracted parameters of gravel particles of tsunami deposits, and estimated origins of tsunami deposits. Moreover, we discuss transport process of tsunami deposits based on variety of roundness.

We applied image analysis to calculate long/short axis lengths, perimeters, areas, aspect ratio, circularity, and roundness. For image analysis, we used gravel particles of tsunami deposits obtained in a trench wall (Ishimura and Miyauchi, 2015), hand-Geoslicer samples (Ishimura et al., 2015) and modern fluvial and beach sediments.

As a result, roundness is the more sensitive parameter than other parameters to characterize fluvial and beach sediments. Based on comparison of roundness values between tsunami deposits and modern fluvial and beach sediments, we quantitatively revealed that gravel particles of tsunami deposits composed of the both of beach and fluvial sediments. Moreover, roundness changes of tsunami deposits from seaside to inland indicate tsunami inundation area and transport process.

Keywords: Tsunami deposits, Image analysis, Roundness, 2011 Tohoku-oki tsunami