

Measurement of precise grain size and morphological characteristics of tsunami sand particles

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Morphological characteristics such as circularity, convexity, aspect ratio, intensity, particle size of the 2011 Tohoku-oki tsunami deposits are measured by a grain image analyzer (Morphologi G3S, Malvern). The tsunami deposits, beach sand, coastal dune sand, and basal layer (aeolian sand) beneath the tsunami deposit were collected from Misawa coast, northern Tohoku just after the tsunami inundation. We could analyze the particle size with 1/32-phi-precision by using the machine and it shows that the tsunami deposit is slightly but significantly finer than the coastal dune sand. It was also confirmed that the basal layers contain a significant amount of silt and clay fractions, whereas the tsunami deposit is poor in mud contents (<1%). Circularity and aspect ratio of the tsunami sand particles are similar to those of the coastal dune sand, but dissimilar to those of basal layers. Precise measurement of particle characteristics of sandy and muddy tsunami sediments will be useful not only to identify the possible source of tsunami sediment but also to identify thin sandy layers or sandy patches of paleo-tsunami origin in soil.

Keywords: Tsunami deposit, Precise grain size analysis, Morphological characteristics, Morphologi G3S, 2011 Tohoku-oki tsunami deposits