

Monitoring of the 2011 Tohoku tsunami deposits by geochemical and rock magnetic analyses in Sendai bay sediments.

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Near-shore marine sediments deposited along island arcs preserve evidence of past disaster events such as tsunamis. A tsunami occurred on 11 March 2011 off the Pacific coast of Tohoku, Japan, associated with the 2011 off the Pacific coast of Tohoku Earthquake. The event is likely preserved in marine sediments. This study aims to constrain the distribution of tsunami deposits and its preservation states in Sendai Bay, located west of the earthquake, by geochemical and rock magnetic analyses. Surface sediments on the seafloor were collected at four stations, the entrance (S-2) and outer sites (S-3, S-4, and S-5) in the Bay, between 2011 and 2014. Stations S-4 and S-5 are located under the axis of the storm wave base, which erode modern sediments (e.g., Saito, 1989). Results of low-temperature magnetometry indicate that transported magnetite by the tsunami is oxidized within a year at stations S-4 and S-5. Magnetic grain size parameters, Mr/Ms and Hcr/Hc, show that coarse grains are supplied at stations S-4 and S-5 in 2013-2014. Magnetic extracts observation with a scanning electron microscopy (SEM) and element identification by energy dispersive X-ray spectrometry (EDX) indicates that Ti-poor magnetite particles with less lamellae increase in the samples that collected after the 2011 Tohoku tsunami. Fe₂O₃ and Cr contents are high in the samples. While Cr content decreases from 2013 at all stations. Fe₂O₃ content also declines at station S-5 in 2014. It is implied that the 2011 Tohoku tsunami deposits are not preserved after 2013 at least.

Keywords: Tsunami deposit, Rock magnetism, Sendai Bay