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## Suitable geochemical markers to determine tsunami impact - an approach on coastal areas in Northern Japan

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The 2011 Tohoku-oki tsunami had a destructive effect and impact on the coast of Japan. Coinciding with the inundation of vast coastal areas, the catastrophic event released many pollutants from damaged facilities but also remobilized sediment-bound residues. These environmental and depositional variations left a distinct signature in the sediment, both sedimentologically and geochemically.

A wide variety of organic geochemical substances were detected in the sampled sediment profiles in Northern Japan (Misawa harbor, Futakawame and Oirase). Some compounds reflect the 2011 tsunami's impact and may serve as possible indicators for further investigation of the inundation and backwash, sediment and pollutant distribution, and the preservation. For comparability, the tsunami samples and the respective over- and underlying layers (topsoil & soil) were analyzed.

The selected compound groups differentiated the tsunami layer from the non-affected layers. Natural compounds, relocated by the tsunami, revealed an enrichment of short-chained *n*-alkanes as expressed by the terrigenous/aquatic ratio (TAR) and locally accumulated *n*-aldehydes pointing to an intensive mixing of marine and terrestrial material. Petrogenic pollutants, for instance hopanes, steranes, and polycyclic aromatic hydrocarbons (PAHs), illustrate a higher load in tsunami sediments as the result of damage of harbor facilities. Sewage-related compounds, such as linear alkylbenzene (LABs) and diisopropylnaphthalene (DIPN), were also enriched in the tsunami samples in contrast to the surrounding sites. Another compound group enriched in the tsunami deposits, are chlorinated pollution burdens by the backwash, such as DDX and polychlorinated biphenyls (PCBs), remobilized by erosion dominantly.

The different environmental- and pollution-related compounds illustrate the suitability of geochemical markers as indicators to assess tsunami impact in 2011 Tohoku-oki tsunami affected sediments of Misawa harbor, Futakawame and Oirase in Northern Japan.