Geophysical Research Abstracts
Vol. 15, EGU2013-6521, 2013
EGU General Assembly 2013

Hadal disturbance and radionuclide profiles at the deepest Japan Trench, northeastern Japan

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Four months after the 2011 Tohoku–Oki earthquake, we carried out a video survey and collected sediment core collection from the hadal region (∼7,600 m water depth) of the Japan Trench using an autonomous instrument. Fine material remained suspended at ∼50 m above the seabed presumably induced by turbidities released during the central earthquake and the following aftershocks. Elevated levels of Cs-137 (T1/2=30 y) and excess Pb-210 (T1/2=22.3 y) concentrations suggested that 30 cm thick sediment layer had accumulated at the trench base (7,553 m) after the mainshock. However, no Cs-134 (T1/2=2 y) fallout from the Fukushima Dai–ichi nuclear disaster was detected. In contract, inspection of a nearby sediment site (7,261 m) 4.9 km away from the central trench site revealed fewer disturbances as reflected by a recent deposition of only 4 cm sediment, but here we encountered recent Cs-134 fallouts from the top 0-1 cm depth. We propose that the apparent lack of Cs-134 in the central trench is coursed by settlement of turbidites containing Cs-137 from past atmospheric fallout and higher excess Pb-210. The fast transport of the Cs-134 to the hadal slope sediment is presumably induced by enhanced scavenging and the vertical transport associated to an intensified diatom blooming occurring just at the time of the Fukushima disaster.