

Assessing the environmental impact of T?hoku tsunami off Hachinohe (NE Japan): a multidisciplinary approach

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On March 11th 2011 the Japanese East coast was hit by a tsunami, which killed more than 18.000 people, caused major devastation in the coastal zone and the meltdown of 3 nuclear reactors. A magnitude 9 on the Richter scale earthquake offshore Sendai resulted in Tsunami waves reaching heights of up to 40.5 meters, which travelled 10 kilometers inland. Whereas the devastation on land is clearly visible, underwater impact is more difficult to assess. Here we present an overview of the multidisciplinary approach used to describe the benthic ecosystems off Hachinohe (NE Japan), 5 months after the T?hoku earthquake. Middle height (~4m) of Tsunami also came to the coastal area of Shimokita Peninsula. An oceanographic cruise (cruise KT11-20? aboard R/V TANSEI MARU, AORI/JAMSTEC) took place in August 2011. An international group of Japanese, French and Dutch oceanographers, all specialists in marine ecology and marine biogeochemistry, joined this scientific mission in order to describe benthic ecosystems and fossilizing foraminiferal faunas. 4 scientific tasks were defined. The sedimentological investigation has consisted in the identification of all sedimentary evidences (physical structures and radionuclides) that illustrate hydrosedimentary processes at the seafloor (erosion, sediment gravity flow deposition). The geochemical investigation has consisted in the optimal characterization of geochemical conditions prevailing in the benthic ecosystems. A special attention has been addressed to the dissolved species (oxygen, nitrate and more) in the bottom and pore water, the organics buried in the sediment and the nature of solid phases. The faunal investigation has consisted in the ecological study of benthic foraminifera (living and dead faunas). This study has given reliable information about the response of benthic life to environmental constraints related to tsunami. The future investigation will consist in the geochemical study of trace elements in the foraminiferal shells (i.e. tests). Those overall observations should enlighten scientific community on the effect of the T?hoku tsunami on marine ecosystems off Hachinohe, and on the potential resilience of benthic communities.

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