

Impact by the mega-earthquake: the 2011 Mw 9.0 Tohoku-Oki Earthquake, on deep-sea ecosystems in Japan Trench

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The tremendous March 2011 Tohoku earthquake (Mw 9.0) ruptured a wide area along the plate interface off the Pacific coast of Tohoku, Japan. The tsunami induced by earthquake was extremely huge. Earthquake, after shocks and tsunami have been variously affected to not only coastal marine ecosystems but also deep-sea ecosystems. Expected impacts to deep-sea ecosystems were following:

- 1) The extinction of deep-sea organisms by turbidity currents,
- 2) The extinction and/or new occurrences of chemosynthesis-based ecosystems by chemicals such as CH₄ and H₂, discharge from seafloor,
- 3) Change of faunal composition and distribution patterns of deep-sea organisms by numerous suspended matters.

To estimate and make clear for above expected impacts by the earthquake, we conducted deep-sea investigations using the HOV Shinkai 6500 and Deep-towing TV Camera systems in the Japan Trench from June to August, 2011. Several fissures on the seafloor, new occurrences of bacterial mats associated with CH₄ and H₂S seepages, other bacterial mats associated with decay of dead benthic organisms aggregations, decreasing of *Calyptogena phaseoliformis* colonies and new occurrences of single species holothurian dense aggregations were observed. These phenomena have never found before the March 2011 Tohoku earthquake. So far, we have investigated using some deep-sea research gears. So, we believe, to describe these impacts by the huge earthquake is our important task.

Keywords: the 2011 Mw 9.0 Tohoku-Oki Earthquake, deep-sea ecosystems, bacterial mat, Japan Trench