

Nutrient Status of Otsuchi Bay and the major rivers flowing into it on the Sanriku Coast of Japan: 6 Years after the Great East Japan Earthquake

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The massive tsunami on 11 March 2011 severely damaged coastal fauna and the infrastructure of many coastal communities, including sewage treatment systems and fishery facilities. It also delivered massive amounts of debris and soil from landside into bays and heavily disturbed seaweed and seagrass beds. The disturbance has raised concerns about alterations in the nutrient status (the concentration and stoichiometry of major nutrients) of the affected bays. We will report time-series data on the nutrient status of Otsuchi Bay, an embayment located within the severely damaged region from March 2011 to March 2017. We compared data collected after the tsunami with those collected before the tsunami to evaluate possible tsunami-related impacts on nutrient status of the bay and the major rivers flowing into it. Anomalous features were noted in the first years after the tsunami: 1) remarkable accumulation of nitrite and silicic acid in summer of 2011; 2) remarkable accumulation of phosphate during the mixing period between November 2011 and January 2012 when the total inorganic nitrogen to phosphate (TIN/P) ratio was substantially reduced (ca. 6) relative to the typical ratio observed during the pre-tsunami period (ca. 10). This low TIN/P ratio was due to the high concentration of phosphate that was inferred to have originated from land-derived debris and sediment. In contrast, during the mixing period of the subsequent 2 years (2012–13 and 2013–14), the TIN/P ratio increased to reach a value of 12–13, which is greater than the typical value before the tsunami. Although the TIN/P ratio reduced slightly during the mixing period of the following 2 years (2014–15 and 2015–16), the average ratio was still higher than that before the tsunami. In this presentation we will report results obtained in the 6th year.

Keywords: the 2011 off the Pacific coast of Tohoku Earthquake, tsunami, Sanriku Coast, Nutrient status