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Dynamics of the brittle star population in the continental slope off Sanriku, Northeast Japan

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Ophiuroidea are the dominant species at the sea bottom of the upper bathyal zone from 200 m to 600 m off the Sanriku region. The region has been estimated to have 373 individuals, with 124 g per m^2 (Fujita and Ohta, 1989). Brittle stars potentially play an important role in submarine matter flow and in the food chain in this region. Because of their importance in ecosystem functions, brittle stars have gained attention, particularly for large-scale conservation planning and sustainable fishery (Yamakita et al., 2015 a). To reveal the temporal dynamics of brittle stars in the Sanriku region, the number of brittle stars and their size composition were observed. We used an interval video system for long-term sea-bottom observation platforms (lander systems) at 300- and 1000-m-deep sites off Otsuchi Bay. Furthermore, we collected literature, pictures, and videos using a remotely operated vehicle (ROV) and conducted a geological survey to evaluate the spatial distribution of brittle stars before and after the earthquake.

Three ophiuroid species (*Ophiura sarsii* Lutken, 1855; *Ophiura leptoctenia* Clark, 1911; and *Ophiophthalmus normani* Lyman, 1879) were observed, and the dominant species differed with site. *O. sarsii* was the dominant species at the 300-m site, and *O. normani* dominated at the 1000-m site with apparently lower density.

At the 300-m study site, a trend of decreasing population number and increasing body size was observed. At the 1000-m study site, a sporadic change in the body size and population number was observed despite the stable environmental conditions.

The growth rate of the shallow brittle star community in our study corresponded to that reported previously. Increase in turbidity and burial of organisms were the probable causes of the decrease in population number at the deeper site. Some of the turbidity was related to another medium-sized earthquake. Higher-resolution images were needed for the detection of the recruitment process and hidden environmental changes at the deeper site. Although there were no obvious changes in the distribution of species before and after the earthquake except for an increase in marine debris in the deep-sea valley (Yamakita et al. 2005 b), the preliminary result showed a difference in the size histogram. Further analysis and collection of additional samples are needed to examine these changes.

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