The status of damage on the seagrass beds by the 2011 tsunami along the coast of Miyagi Prefecture

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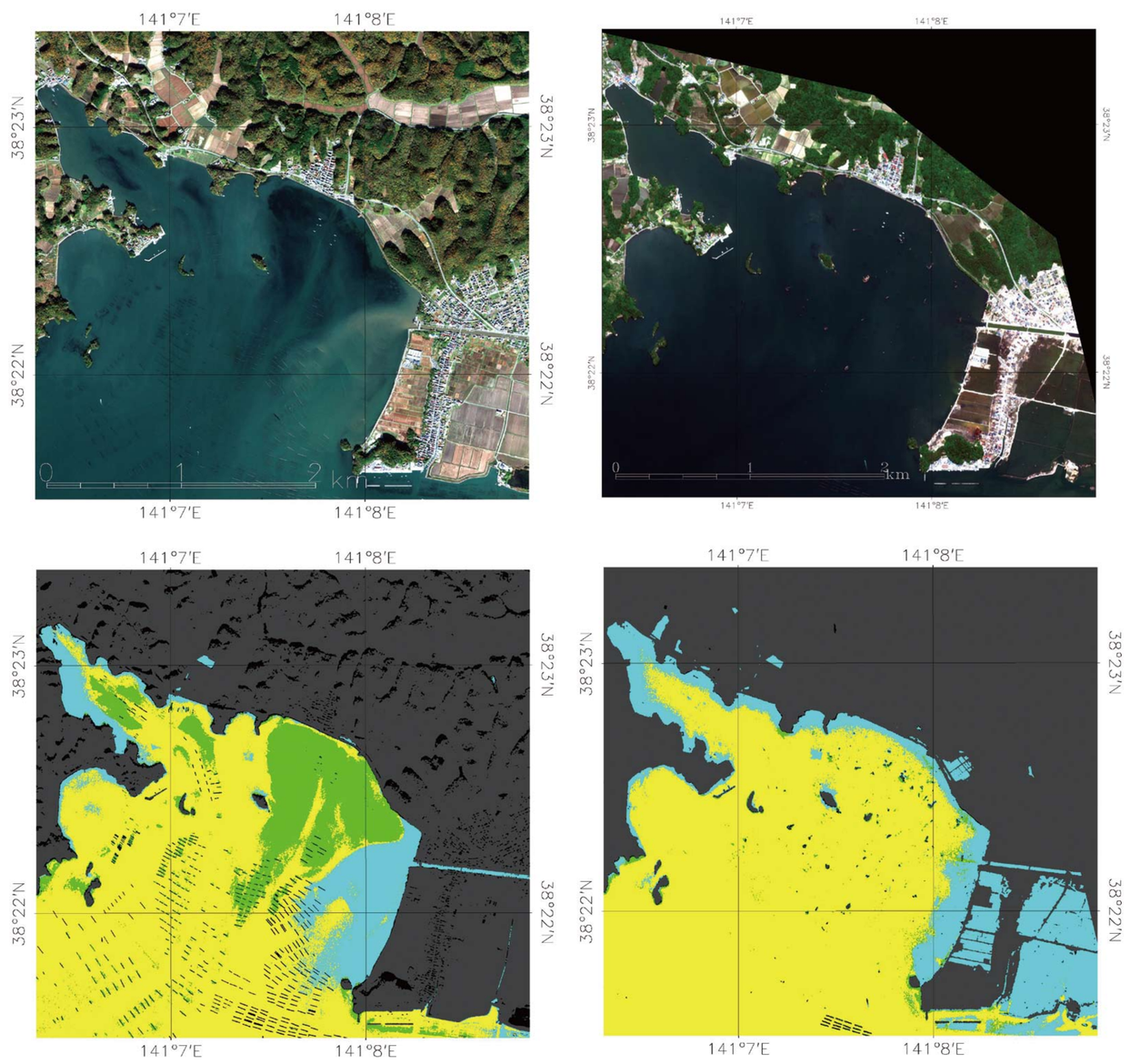
The Tohoku Coast (the northeast side of the main land of Japan) had devastated damage by the tsunami occurred after the Great East Japan Earthquake on 11 March 2011.
More than a year has passed since this disaster; however, the accurate status of the damage on seagrass beds and the process of their recovery are not been assessed.
The Northeast Pacific Region Environmental Cooperation Center (NPEC) and the Atmosphere and Ocean Research Institute, the University of Tokyo have been conducting the research project to assess the damage and process of recovery on the seagrass beds in the four areas in Miyagi Prefecture (Shizugawa Bay, Sendai Bay, Mangokuura Bay, and Matsushima Bay) since 2011. Large-scale changes on the seagrass beds are being revealed by the analysis of the remote sensing images taken before and after the earthquake.

Satellite image analysis in Matsushima Bay

12 November 2009
(before the tsunami)

25 May 2011
(after the tsunami)



The total area of the seagrass beds in Matsushima Bay was 363 hectares* before the tsunami; however, it was reduced to 99 hectares after the tsunami. Thus it is estimated that 264 hectares of the seagrass beds were lost, which is equivalent to the area as big as 56 Tokyo Domes (a baseball stadium in Tokyo). There used be dense distribution of eelgrasses in most of the damaged areas. Aquaculture rafts for oyster and Nori seaweed cultivation were also swept away, reduced from 3,248 to 163. In Higashimatshima City, some land areas were inundated.
These results were provided to the organizations and researchers who conduct recovery programs of seagrass beds.
*1 hectare is 10,000 square meters.

In-situ observation in Shizugawa Bay


Removal of rubbles


Rubbles


Confirming eelgrass community


Confirming *Sargassum* sp.


Side-scan sonar


Investigation by underwater camera


Rubbles detected by sonar

Confirming *Sargassum* sp. by underwater camera

Because of a ria coast, the destructive power of tsunami concentrated to the innermost part of the Shizugawa bay and caused serious damages to eelgrasses. Few eelgrass communities in some sea areas have been observed after the disaster. On the other hand, the extent of the damage on *Sargassum* sp. (*hondarawa*) and *Eisenia bicyclis (arame)* on rocky substrate was relatively small, and their communities remained in the sea after the tsunami. Dense distributuion of *Saccharina* japonica (*makonbu*) and Undaria pinnatifida (*wakame*) have been observed after the disaster.

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