

A midterm report on trajectory prediction of tsunami debris generated by the Great East Japan Earthquake

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Ministry of the Environment, Government of Japan

Issues on marine debris generated by the Great East Japan Earthquake are addressed through cooperation among relevant ministries under the coordination of the Secretariat of Headquarters for Ocean Policy.

MOEJ has been conducting drift predictions since 2011 to ascertain the status of the debris. The intermediate result for this year is provided below.

1. Prediction method

- Simulations are conducted by using drifting speed obtained by adding the speed of the ocean current and the speed of the wind(leeway).
- Because the impacts of ocean current and leeway vary depending on the size and shape of the debris, we have made four categories for the simulations based on the debris volume ratio above and beneath sea surface.
 - 1) Subsurface type (above : beneath sea surface=0 : 1)
 - 2) Lumber(standard) type (above : beneath sea surface=1 : 1)
 - 3) Float type ① (above : beneath sea surface=2 : 1)
 - 4) Float type ② (above : beneath sea surface=4 : 1)
- The initial conditions were established by analyzing images obtained by JAXA's Advanced Land Observing Satellite(ALOS), "Daichi."
- Simulations are conducted based on the assumption that all debris washed out has never sunk or never been collected.

(Major change from the last simulation)

- More realistic movement of the oceanic fields are realized by reanalyzing actual data obtained until June 2012.
- More realistic movement of the atmospheric fields are realized by replacing wind data interval from 10 days average used previously to a shorter one.

*Please see attached 1 for details of the prediction method.

2. Summary

The prediction until June 2013 is provided below, by four categories based on size and shape.

(1) Subsurface type (above : beneath sea surface=0 : 1)

This type is predicted to drift the Pacific Ocean toward the east passing by the north of the Hawaiian Islands and start to reach the west coast of the U.S. around June 2013.

(2) Lumber(standard) type (above : beneath sea surface=1 : 1)

This type is predicted to start to reach the west coast of the U.S. around December 2012, after remaining between the Hawaiian Islands and the North American Continent from August to October 2012.

(3) Float type ① (above : beneath sea surface=2 : 1)

Most of this type is expected to have already reached the west coast of the North American Continent as of August 2012. The remaining is predicted to travel toward the west of the Pacific Ocean and start to reach the Philippine sea by February 2013

(4) Float type ② (above : beneath sea surface=4 : 1)

Most of this type is expected to have already reached the coasts between Canada and Alaska as of August 2012. The remaining is predicted to travel toward the west of the Pacific Ocean then gradually disperse.

*Please see attached 2 for details of the prediction result.

3. Future response

We will continue to improve the accuracy of the prediction model and keep updating its term as we accumulate more data, based on the simulation results obtained this time.

Furthermore, we will consider necessary measures to take as the government of Japan by sharing information and having discussions with relevant governments and institutes under the coordination of the Secretariat of Headquarters for Ocean Policy, and taking into account the result obtained this time and future result.