

Survey of the runup from the Fukushima tsunami in Tagajo City and Miyato Island, Miyagi (December 14-15, 2016)

Theme : Fukushima tsunami, runup measurements, drone survey.

Location: Tagajo City and Ohama Port, Miyato Island, Higashi Matsushima, Miyagi Prefecture

On December 14th and 15th, IRIDeS staff members Anawat Suppasri, Akihiro Hayashi, Kei Yamashita, and Volker Roeber together with a student of Tohoku University Hiroyuki Ohira visited two sites where significant tsunami evidence was observed. Waves from the Fukushima tsunami entered the Sunaoshi river mouth near Tagajo City, which is one of the major reconstruction sites after the 2011 tsunami. The construction effort is a joint venture of Taisei cooperation, Aomi construction Co., Ltd and Fukamatsugumi construction Co., Ltd.. IRDeS staff members measured the runup traces in a sidearm of Sunaoshi River.

The Sunaoshi river mouth is about 6 m deep. With the waves from the Fukushima tsunami entering Tagajo Port, some of the wave energy entered the river mouth. The elevated sea level discharged upstream and formed an undular bore, which propagated several kilometers inland. An undular bore is a train of short soliton-like waves that can form when the flow speed reaches critical speed (Froude number ~ 1). Video footage from the Fukushima tsunami showed this undular bore and eyewitnesses from the construction corporation reported an increase of the local water level due to the undular bore of around 1.2 m above T.P.

Ohama Port is located near the eastern tip of Miyato Island facing the open ocean. It was one of the sites with actual damage caused by the Fukushima tsunami. People from the Miyagi Prefecture Fisheries Cooperative Association (JF Miyagi) Miyato western branch reported damage to 40 aquacultural installations located about 4 km offshore of Miyato Island. In Ohama fishing port and other small boat harbors around Miyato Island, several small fishing boats were damaged. The damage occurred due to the strong currents induced by the tsunami that caused the boats to collide with each other or with the harbor structures.

The IRIDeS researchers measured the wave runup at Ohama Port with a Promark GPS device and laser range finder. The maximum runup was found to be 4.3 m above T.P.. The runup measurements near Miyato Island are important for model validation. Preliminary computational results indicate that some of the highest runup from the Fukushima tsunami occurred near Ohama Port.

In addition, a drone survey was conducted and a 3D map was computed with software from Dronedeploy. The high resolution DEM is being merged with the surrounding topography data to accurately represent the terrain at the critical runup site.



Prepared by: Anawat Suppasri, Volker Roeber (Hazard and Risk Evaluation Research Division),
Kei Yamashita, Akihiro Hayashi (Endowed Research Division), and Hiroyuki Ohira