

Survey Group Members

Team Leader: Tomoya Shibayama

Associate Team Leader: Takahito Mikami

Group Members: Ryota Nakamura, Syunya Matsuba, Takumu Iwamoto, Martin Mall, Hui Jin, Akihumi Tatekouji and Yusuke Tanokura

Outline

In December 2014 an extra-tropical cyclone induced storm surge developed in the vicinity of Nemuro port, Hokkaido. In order to assess the damage a field survey was conducted by Waseda University's Shibayama Laboratory in December 19, 2014.

** An interview was carried out with the NHK News. Access link [here](#).

Locations

Location of interest was Nemuro city with the focus point being Nemuro Midori-cho around the region of port area (fig. 1 & 2). Field survey from the coast was conducted in order to determine the storm surge height based on traces of storm surge, testimony and photographs of residents. In Midori-cho area the elevation is 0.5 m above sea level, which is lower compared to the surrounding area. The storm surge damage was remarkable in the vicinity of Midori-cho intersection and thus 9 locations (fig 1, A-I) for the survey were determined. Furthermore the trace height of storm surge in Nemuro Port was surveyed in northeast side of the bay (fig 2, K) and in the inner part of the bay (fig 2, J). The figures depicting the location have been retrieved via Google Earth.

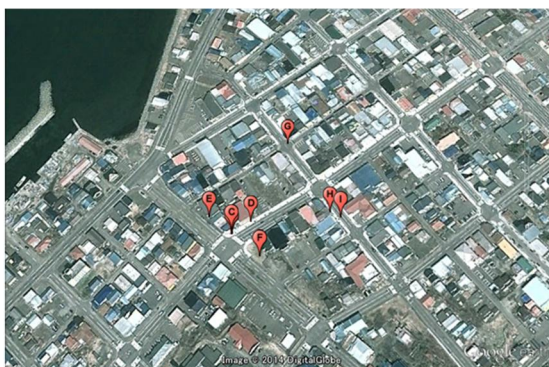


Fig.1 The measured point near the intersection at Midoricho.

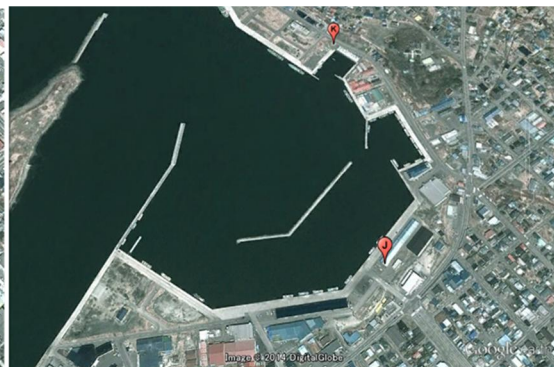


Fig.2 The measured point near the Nemuro.

Survey findings

The survey findings show ample evidence of the existence of a storm surge. Clear traces of the storm surge and photographs of it were taken by the residents. The height of the storm surge was from 1.4 m to 2.2 m around Midori-cho Nemuro-shi according to the survey results. The water level might have been over 2.2 m around the coastal area. At the inner part of the Nemuro Port bay (location J) the trace height was measured to be 2.8 m. At the northeast part of Nemuro Port (location K) the

Field survey report on storm surge that occurred in Nemuro, Hokkaido in December 17, 2014

trace height was measured to be 1.8 m, showing that the inner part of the bay experienced significantly higher inundation. This storm surge intruded into the city from the coast, gradually flooding the area, which was different from the one that occurred in Philippines in 2013.



Num	Name	Latitude	Longitude	S.S.H (m)	Type	Information
A	Clothes Store	43°19.965'	145°34.709'	1.66	S.S.H	Water mark
B	Clothes Store	43°19.965'	145°34.709'	1.59	S.S.H	Water mark
C	Clothes Store	43°19.965'	145°34.709'	1.56	S.S.H	Water mark
D	Street	43°19.971'	145°34.722'	2.2	S.S.H	Resident witness
E	Pachinko Shop	43°19.58.27"	145°34.41.45"	1.39	S.S.H	Water mark
F	Road	43°19.57.06"	145°34.43.58"	1.41	Run Up	Melted snow
G	Toy Store	43°20.00.94"	145°34.45.41"	2.16	S.S.H	Resident witness
H	Shoe Store	43°19.58.30"	145°34.46.95"	1.74	S.S.H	Resident witness
I	Clothes Store	43°19.58.10"	145°34.47.40"	1.55	S.S.H	Resident witness
J	Nemuro Port 1	43°20.362'	145°35.127'	2.82	S.S.H	Resident photo
K	Nemuro Port 2	43°20.636'	145°35.113'	1.8	S.S.H	Resident photo

Tabel.1 Measured storm surge information (tide correction).

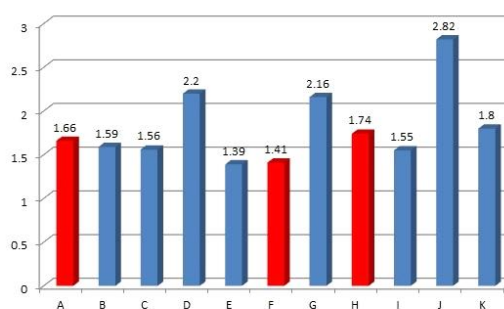


Fig.3 Storm surge height (tide correction).

Summary

The maximum height of the storm surge in Nemuro was 2.8 m. The storm surge was caused by a bomb cyclone moving towards the northeast of Hokkaido. The wind blowing from the east caused the water level to rise around Nemuro Peninsula, and then the wind from the north caused the water to surge to the coast of Nemuro Midori-cho and Nemuro port in half a day. One of the reasons for serious water surge was the location of Nemuro, which is susceptible to the effects of winds generated by a bomb low pressure system. In order to prepare for future storm surge disasters, it is necessary to clarify topographic and weather conditions that result surge in each specific coastal city.