

S-net project: Deployment and its seismic and tsunami observation system

*Kenji Uehira¹, Masashi Mochizuki¹, Toshihiko Kanazawa¹, Takashi Shimbo¹, Katsuhiko Shiomi¹, Takashi Kunugi¹, Shin Aoi¹, Takumi Matsumoto¹, Shoji Sekiguchi¹, Narumi Takahashi¹, Naotaka YAMAMOTO¹, Masanao Shinohara², Tomoaki Yamada²

1. National Research Institute for Earth Science and Disaster Resilience, 2. Earthquake Research Institute, University of Tokyo

Seafloor Observation Network for Earthquakes and Tsunamis along the Japan Trench (S-net) has 150 real-time monitoring observatories that cover the area about 1000km x 300 km from off-Hokkaido to off-Kanto. It is expected that early tsunami and earthquake warnings and earthquake researches will be enhanced. S-net consists of six segment networks of about 25 observatories and 800 km fiber optic cable (1,500 km fiber optic cable for the Japan Trench outer rise segment network). Each observatory has four sets of three-component seismometers for earthquake observation and two sets of pressure gauge for tsunami observation. Fiber-optic cable connects to landing station, and the data is transmitted from landing station to the data center via IP-VPN network.

S-net project has started in 2011. We have already finished deployment of all of the observatories and fiber-optic cables in 2016. Observatories and cables are installed by cable ship which conducts laying and installation of submarine fiber optic communication cables. We carried out installation by C/S Subaru (9,557 ton), C/S KDDI Pacific Link (7,960 ton), and C/S SEGERO (8,323 ton). In order to avoid influence of with fishery activity (for example, the trawling with using otter board), we buried the cables and observatories one meter or deeper below the seabed in the sea area where water depth is shallower than 1,500 meters using the plough and/or ROV (Remotely Operated Vehicle).

We have also constructed five landing stations; Minamiboso station in Minamiboso City, Chiba Pref., Kashima station in Kashima City, Ibaraki Pref., Watari station in Watari Town, Miyagi Pref., Miyako station in Miyako City, Iwate Pref., and Hachinohe station in Hachinohe City, Aomori Pref.. The Watari station is located on the third floor of reinforced concrete building, and other stations are container-type data centers. The S-net (except outer-rise segment) started to operate in May 2016, and the pressure gauge and accelerometer data have been transmit to Japan Metrological Agency (JMA) for monitoring purpose. The S-net detected many earthquakes. S-net also observed tsunamis like with the earthquake of the November 22, 2016 off Fukushima (M7.4).

Keywords: S-net