OHP Seismic Network

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Abstract. During five years of the OHP, we reconstructed a seismic network in Northwestern Pacific region that was opened by the POSEIDON project. We improved the network in the flowing points: 1) Replacement of the instrument to new one, 2) Reconstruction of seismometer vault, 3) Opening a few new stations. We also carried out temporally installed seismic observation in Northwestern Pacific region. In it, we used broadband OBS as well as broadband seismometers on the land. We introduce our activities in this period.

1 Introduction

In order to reveal seismological structure deep inside of the Earth, Japanese seismologists began to expand seismic observations to foreign countries in late 1980's, under the collaboration with foreign institutes. They started the project called POSEIDON (Pacific Oriented SEISmic Digital Observation Network), the former project of the OHP. The POSEIDON was not substantial organization, but a kind of society for seismologists who managed oversea stations to exchange information and seismic data. The instruments used there were not same and not uniform, because maintenance of each station is left to the individual participant. It caused difficulties of systematically keeping the network in good condition and circulating the data, regardless of great effort by the POSEIDON participants. In 1995, the OHP took over the POSEIDON seismic network, and began to improve it. We classify the seismic network into two. One is a long-term network, and the other is a short-term network. The long-term network consists of the stations that were opened in the period of the POSEIDON. The short-term one is mobile seismic network that is operated in short period (3-5 years), based on scientific purposes. Here, we will explain the both networks.

2 Long-term seismic network

When the OHP project was started, we developed and introduced the OHP standard recording system for seismic network whose specifications were same as those of IRIS system (Fig. 1). And we began to improve the network in the following points. 1) Instruments used by the POSEIDON were replaced to the OHP standard system at all stations. The seismometers were also exchanged for three components of STS-1 (360 sec). The instruments were unified at all stations. 2) The seismometer vaults were re-constructed, if necessary. 3) Some new stations were opened at places where other global networks did not have any stations.

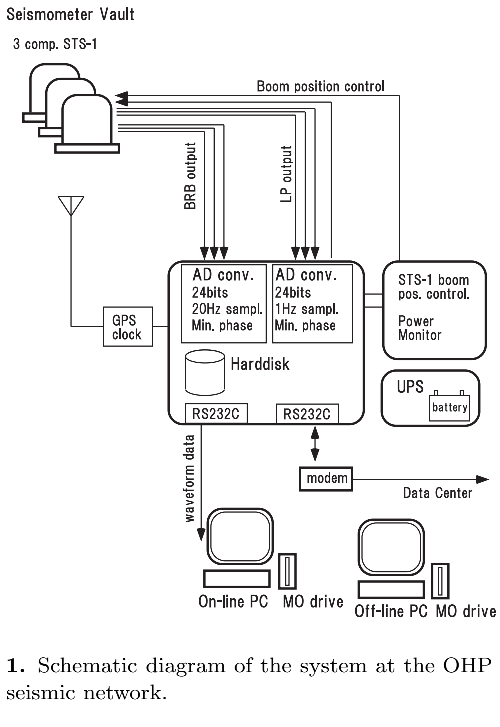

Fig. 1. Schematic diagram of the system at the OHP long-term seismic network.

We are now managing 12 stations in the Northwestern Pacific region, in Japan, Russia, Korea, Philippine, Micronesia, Palau, Vietnam and Indonesia (Solid triangles in Fig. 2). Additionally with them, we also have 5 cooperative stations with IRIS, PRI and MRI (Gray reverse triangle). As mentioned before, we have installed the OHP standard instruments at all stations (excluding the cooperative stations). The recording system has facility for data transmission through telephone line and/or computer network, but half of our stations are located at under-developed area, and the quality of the telephone line there is not enough for data transmission. The condition of the computer network is still worse. Therefore, all data are recorded on Magneto-optical disks by a personal computer at the stations, and are copied to another media and mailed to our data center through post offices.

Still now, we are struggling against troubles in seismic observations. The recording is sometimes stopped because of damages by heavy lightening in tropical region, corrosions of seismometers by high humidity in the under ground vault, and so on. However, the situation of the network becomes more and more stable as amount of our experiences increases. We are making effort to keep our network in good condition as long as possible.

3 Short-term network (Temporally installed seismic observation)

Additionally with the long-term network, we have short-term network in Northeastern Pacific region. In order to get detailed images of the stagnant slab at the depth of 660km beneath the Philippine Sea, we installed broadband seismic array there. In that region, almost area is covered with the ocean, the ocean-bottom observations as well as observations on the land are required for even deployment of seismometers. We installed four broadband seismometers in central-northern part of China, and fifteen broadband ocean-bottom seismometers (BB-OBS) beneath the Philippine Sea since Nov. 1999 (Hexagons and stars in Fig. 2, respectively). The nine BB-OBS systems were retrieved on July 2000, but the seismometers in China are still in operation. The observation in China is carried out under the collaboration with China Seismological Bureau.

The specifications of instruments required for the short-term network are higher mobility, easier operation and higher stability even under bad condition. We developed the recording system for mobile seismic observations on land like PASCAL system. Our system is smaller, lighter, lower power consumption, and easier operation.

The data will soon be available for the OHP participants. In a few years, the data acquired here will be widely opened by our data center. We are expected to make plan to the next mission. Any scientific plans for short-term broadband seismic observation are welcomed.

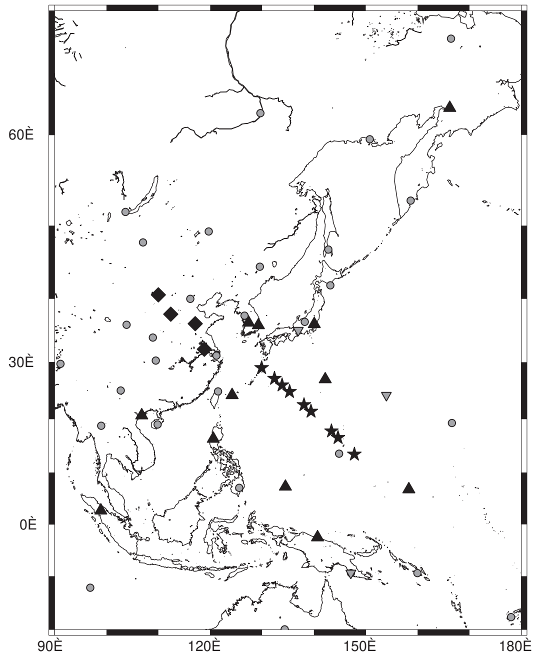

Fig. 2. Location map of the OHP seismic network and IRIS one in Northwestern Pacific Region. Solid triangles: the OHP long-term network, Gray reverse triangles: the cooperative stations of the OHP network, Solid hexagons: short-term stations in China, Solid stars: short-term stations beneath the Philippine Sea, Gray circles : the IRIS stations.

4 Future Plan

During five years of the OHP, we re-constructed the sub-global seismic network (long-term network) and are keeping it in good operation. New technology like satellite communication will help us to keep it easily, in near future. And data center is working well to circulate the seismic data. So, we will focus on the short-term observation, based on the scientific purpose. The joint seismic observation on the land and on the ocean bottom is helpful to reveal the seismological structure in the Northwestern Pacific region. We expect our network becomes one of useful tools for seismologists in Japan, Asian countries

and other countries in the world.

Many persons support the OHP seismic network. Among them, persons listed below much contribute its maintenance:

M. Takeo, T. Iidaka, T. Shibutani, Y. Ishihara