

## Earthquake Distribution and Velocity structure in Nagaoka Region

\*Shutaro Sekine<sup>1</sup>, Yoshihiro Sawada<sup>1</sup>, Keiji Kasahara<sup>1</sup>, Shunji Sasaki<sup>1</sup>, yoshihiro tazawa<sup>1</sup>, Shintaro Abe<sup>2</sup>, Masayuki Yoshimi<sup>2</sup>

1. Association for the Development of Earthquake Prediction (ADEP), 2. National Institute of Advanced Science and Technology (AIST)

The Nagaoka region is located on the high strain rate zone at eastern margin of Japan Sea, and it is also the area where the Chuetsu Earthquake and the Chuetsu-oki Earthquake have occurred. Between the two large faults, another faults are confirmed on the western margin of the fault zone of the Nagaoka plain. To investigate the activity of faults, the Association for the Development of Earthquake Prediction (ADEP) determined to newly construct a high-density seismic observation network (AN-net) in the region from 2010. We add the data of the AIST Kashiwazaki seismic observation network where is deployed just to the south of AN-net. In this study, we estimate the distribution of the earthquakes, and velocity structures in this region.

The seismic station of the AIST consists of the 15 stations. Each stations has velocity seismograph, which data is acquired offline. We merge the AN-net and AIST data manually. 101 earthquakes is used in the tomography.

In this study, we calculate P- and S- velocity structure by Double Difference tomography. After 2010 when the AN-net was constructed, arrival times of each earthquakes is picked manually in the AN-net region. Before 2010 and region of the Surrounding AN-net, we get the arrival data from JMA unified earthquake catalog. The number of absolute P- and S-wave arrival times used in the tomography is 369,852 and 328,375, respectively, with the relative arrival times for the manually picked P- and S- waves reaching 1,364,619 and 1,151,624, respectively, from 15,010 earthquakes which occurred from October 1997 to 2017. By adding the observation point located in the southern part of AN - net, the southern part of the Nagaoka plain is estimated better.

### Acknowledgement

In this study, we use the JMA unified earthquake catalog. The earthquake catalog used in this study is produced by the JMA, in cooperation with MEXT. The catalog is based on seismic data provided by NIED, JMA, Tohoku Univ., and the Univ. of Tokyo.

Keywords: tomography, velocity structure