

Analysis of land deformation in Niigata Chuetsu province using PSInSAR technique and analogue model experiments

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In order to prevent ground-failure disasters such as earthquakes and landslides and to manage its risk, it is necessary to precisely measure the land deformations before and behind past disasters and to construct models of subsurface structures. PSInSAR (Permanent Scatterers Interferometry SAR) analysis that is one of the processing techniques of SAR (Synthetic Aperture Radar) satellite image is thought to be able to acquire a long-term, large area, highly accurate, high density land deformation data and to catch the crustal movement of large area. In this study we considered whether the PSInSAR catch the crustal movement through comparing land deformation caught by PSInSAR technique with the result of analog model experiments.

Model experiment is a technique for reproducing the formation process of the geologic structure physically in the laboratory. The deformation of the surface of the formed structure was calculated by the PIV image analysis. The distribution pattern of the surface deformation and the formed fault at the model experiments was compared with the land deformation analyzed by PSInSAR in the Niigata Chietsu province. As a result, there was a similarity between PSInSAR analysis and model experiment results about the distribution pattern of vertical displacement around discontinuous area of faults.

That is, our study revealed that the land deformation analyzed by PSInSAR technique catch the deformation by the crustal movement of the large area.