

Influence of an anomalous layer about physical properties on geologic structures in the Niigata Chuetsu region

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In Niigata Chuetsu region, faults originated from deep section make folds at the vicinity of the ground. There is an anomalous layer in physical properties, and it makes pattern of deformation of the surface of the ground complex. So now it is difficult to estimate the geologic structures of the deep section correctly from the surface deformation.

On this research, we did scaled analogue model experiments assuming glass beads as a lower friction layer (i.e. an anomalous layer). They are excellent technique to examine underground geometry of geologic structures and its development processes. For experimental materials, we used Toyoura sands and glass beads. They are so proper materials to approximate brittle fracture. The experiment process is as follows. First we prepared a base which generates faults and set it bottom of the device. Next we made sedimentary layer with the materials on the base and compressed the entire device horizontally. Thus we could observe process of generating reverse faults. Through all experiments, we took regularly image data at minute intervals for analysis.

And we analyzed results of the experiments with PIV analysis. This technique helped us to see behavior of the experimental materials, thus we could get the data of these displacement and shearing strain distribution. The results of the experiments and the analysis suggested that incline of the faults of the surface became smaller than the one of the deep section by influence of the lower friction layer. We are sure that we can make more correct information about the geologic structure in Niigata Chuetsu region with doing more analogue experiments and developing consideration.