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Distribution properties of foundation disaster caused by the Nagano-Niigata border earthquake in 2011

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Nakano et al. (2012) reported preliminary about the relationship among follows: slope collapse, ground deformation, landform, geology, estimated location of earthquake source fault and region of interference fringes detected by InSAR on the inland earthquake with M=6.7 occurred on 12 March 2011, around Nagano-Niigata prefecture border (hereafter called "Nagano-Niigata prefecture border Earthquake"). In this presentation, we report about the distribution properties of foundation disaster caused by this earthquake after studying of interpretation of satellite imagery and thoroughly investigate in field.

Fig.1 shows overlaying foundation disaster points on geology and geological structure map or InSAR imagery. We identified the properties in addition to the characters reported by Nakano et al. (2012) as follows: 1) A large number of slope collapse occurred in steep slope area consisting of sedimentary rock in Neogene system except landslide area such as Matsunoyama region, 2) A large number of slope collapse and landslide occurred in limb of fold, even if it apart from epicenter (example for the eastside in Mt. Shomenkurayama) in dip slope area, i.e., the occurrence of slope collapse and landslide are tightly related to the geological structure. 3) A lot of ground deformations and cracks, which are almost gravity sliding of road fill, occurred near fold axis and fault line, even if it apart from epicenter.

From the above, we conclude that a foundation disaster caused by a strong inland earthquake in fold zone will occur intensively in the area of hanging wall of the reverse fault with a large amount of crustal deformation, dominated by geology, geological structure such as fold and location of earthquake source fault. This tendency is reported by Koarai et al. (2012) as the example of the Mid Niigata Prefecture Earthquake in 2004, and a fold in this area might develop with the earthquake. (This works was supported by MEXT KAKENHI (22500994))

Reference

Koarai et al (2012): Relationship between slope collapse and growth of active fold. Proceedings of the 22ne Symposium on Geo- Encironments and Geo-Technics, 91-96.

Nakano et al (2012): Characteristic of foundation disaster on the Nagano-Niigata border earthquake. JpGU2012, HDS25-P14.

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