

## Long-term Monitoring of Geo-environment on Post-fire alpine slopes of Mount Shirouma-dake, northern Japanese Alps

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This is the continuous study to clarify the geo-environmental changes on the post-fire alpine slopes of Mount Shirouma-dake in the Northern Japanese Alps. The fire occurred at May 9, 2009 on the alpine slopes of Mount Shirouma-dake, and the fire spread to the *Pinus pumila* communities and grasslands. Although the grass had a little damage by the fire, the *P. pumila* received nearly impact of the fire. In the *P. pumila* communities where the leaf burnt, forest floor is exposed and become easy to be affected by atmospheric condition such as rain, wind, snow, and etc.

First, we illustrated a map of micro-landforms, based on geomorphological fieldworks. We observed these micro-landforms repeatedly for fifth years after the fire. As the results of the observation, it is clear that remarkable changes of these micro-landforms have not occurred but some litters on the forest-floor in the *P. pumila* communities are flushed out to surroundings. The litter layer on the forest-floor in the *P. pumila* communities were 3-4 cm thick in August of 2011, but it became 0.5 cm thick in September of 2015. The *P. pumila* communities established on the slopes consists of angular and sub-angular gravel with openwork texture, which are covered by thin soil layer.

Therefore, it is necessary to pay attention to soil erosion following the outflow of the litter. In addition, we observe the ground temperature and soil moisture, under the fired *P. pumila* communities and the no fired *P. pumila* communities after the fire, to find influence of the fire. The ground temperature sensors were installed into at 1 cm, 10 cm, and 40 cm depth. The soil moisture sensors were installed into at 1 cm and 10 cm depth. The 1 cm depth of the soil on the post-fire slopes, diurnal freeze-thaw cycles occurred in October and November of 2011, 2012 and 2014, but it had not occurred in 2009 and 2010. In addition, the period of seasonal frost at 10 cm and 40 cm depth on the post-fire slopes are extended for two weeks. These thermal condition changes are triggered by decrease in the thickness of the litter layer on the fired *P. pumila* communities.

Keywords: Fire, Alpine zone, *Pinus pumila*, Slope erosion, Ground temperature variation, Shirouma-dake