[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-GI General Geosciences, Information Geosciences & Simulations

[M-GI25]Environmental changes in mountainous area

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Mountainous areas provide water resources to the populated downstream areas, protecting the diversity of ecosystem and providing tourism attraction. To access the mountain environment changes and mitigate the impacts of global warming influences, a cross-cutting session is proposed to share the scientific knowledge among various fields; such as climatology, hydrology, geography, glaciology, water/carbon/material cycle, eco-diversity, etc.

[MGI25-P14]Study of the snowmelt process analysis using a snow ablation model in the Norikura highland

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Snow cover is one of the important factors that construct the atmospheric environment and ecological systems in the alpine region. In the discussion of snowmelt process, a snow ablation model is widely used. This model enables to calculate amount of snowmelt and glacier ablation and needs some parameters as input data which is effective to the snowmelt like air temperature or incoming shortwave radiation. The result of its modelling can be generally applied to the discussion of spatial snowmelt distribution because it needs a few of parameter. In this study, the snow ablation model is applied and modeling the snowmelt process at the meteorological observation site which is 1590 m a.s.l. in the Norikura highland. In this study, the meteorological observation was conducted. The following meteorological data was obtained: air temperature (℃), related humidity (%), wind direction (degree), wind speed (m $s^{\−1}$), atmospheric pressure (hPa), shortwave and longwave radiation (W $m^{\−2}$) and snow depth (m), and those data recorded every 10 minutes. In this study, an energy balance analysis for snow surface and a snow ablation model using parameter(s) with air temperature and air temperature and incoming shortwave radiation were conducted. The snow ablation models were applied in an ablation period, which is defined by the energy balance analysis. The model coefficients were adjusted by the regression analysis in the ablation period from 2011/12 to 2016/17. When the calculated snowmelt rate became negative, a snowmelt was assumed to not being occurred and the calculated data was eliminated. The result of energy balance analysis showed that the snowmelt energy of net shortwave radiation in the ablation period was much larger than that in the accumulated period, and it was appeared to be what a fluctuation of shortwave radiation controlled the snowmelt process at this study site. The result of snow ablation model showed that a standard error using a model with parameters as air temperature and incoming shortwave radiation was smaller than that using a model with a parameter as air temperature only. This meant that the former snow ablation model showed the better accuracy. The snow ablation models underestimated the snowmelt rate using the energy balance analysis. The meteorological observation data showed some atmospheric properties, which are low air temperature, low vapor pressure and weak wind speed. The atmospheric condition caused the turbulent energy flux decreased and, therefore, large snowmelt energy flux was supplied by the net shortwave radiation. Thus, the

snowmelt process was controlled by the net shortwave radiation at this study site. The snow ablation model with parameter as air temperature and incoming shortwave radiation showed better accuracy. This result supports claims of previous reports and, it is also reasonable, considering the result of energy balance analysis at this study site.