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

[M-GI25]Environmental changes in mountainous area

convener:Keisuke Suzuki(Department of Environmental Sciences, Faculty of Science, Shinshu University), Yoshihiko Kariya(Department of Environmental Geography, Senshu University), Chiyuki Narama(新潟大学理学部理学科, 共同), Akihiko SASAKI(Department of Geography and Environmental Studies, Kokushikan University)
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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-P18]Heat Balance Analysis during Snow Covered period in the Mt. Nishihodaka

*Hikari Matsumoto[1], Motoshi NISHIMURA[2], Akihiko SASAKI[1], Keisuke Suzuki[1] (1.Faculty of Science, Shinshu University, 2.Interdisciplinary Graduate School of Science and Technology, Shinshu University)
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Melting of snow in the alpine region affects vegetation and supplies water resources, therefore, it is important to understand the snowmelt process in the alpine region. There are various atmospheric and topography condition in the alpine region, then, the meteorological observation in a variety of area is required. In this study, the meteorological observation and a heat balance analysis were conducted in order to reveal the regional characteristic of snowmelt process in the alpine region.The meteorological observation station was located in the Mt. Nishihodaka at 2355 m a.s.l. and the heat balance analysis was carried out during the snow covered period from 2013/14 to 2016/17. The following meteorological observation data were obtained: air temperature (℃), rerated humidity (%), wind direction (degree), wind speed (m s^{-1}), atmospheric pressure (hPa), upward and downward shortwave radiation (W m^{-2}), incoming and outgoing longwave radiation (W m^{-2}), precipitation (mm) and the snow depth (m). These data were recorded and obtained every 10 minutes, but the snow depth data was every 60 minutes. The snow surface temperature was calculated by the Stefan-Boltzmann law and observed outgoing longwave radiation.The meteorological observation date showed some properties of atmospheric condition at this study area.The daily mean temperature has been negative and the daily mean vapor pressure has been under 6 hPa during November to March and increased since April. The daily mean wind speed fluctuated 1 to 10 m $s^{−1}$ and did not an obvious inter seasonal variation. These results showed that low air temperature and wind speed in snow covered period are meteorological characteristics in this study area.The result of the heat balance analysis showed that net radiation controlled the snowmelt process in this study area, which is accounted for 80 to 95%, because low air temperature and low vapor pressure restrained a turbulent energy flux in the snow covered period. The sensible heat flux and latent heat flux in the accumulation period have been negative, in contrast, these has been positive in the ablation period. Therefore, air temperature is very low during the accumulation period and there were many days when air temperature was lower than snow surface temperature. The air temperature and vapor pressure increased during ablation period, and the turbulent energy flux also increased. Therefore, the ratio of net radiation against the snowmelt energy became 70 to 76 %. The air temperature and vapor pressure increased in the rainy day, which made the sensible het flux and latent heat flux increased.