[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CC Cryospheric Sciences & Cold District Environment

[A-CC28]Glaciology

convener:Takayuki Nuimura(Chiba Institute of Science), Ishikawa Mamoru(Hokkaido University), Kzutaka Tateyama(国立大学法人　北見工業大学, 共同), Hiroto Nagai(Japan Aerospace Exploration Agency)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The cryosphere is a fundamental component of the earth system. It is a region where snow and ice exist in the form of glacier/ice sheet, snow cover and snowfall, frozen ground, sea ice and fresh water ice, and they play a critical role in the global environment under the interactions with atmosphere, ocean, ecosystem and others. In this session, research results on physical and chemical characteristics of snow and ice, variations and dynamics of cryospheric environment, roles of the cryosphere on the earth and other planets will be discussed broadly, regardless of the research method.

[ACC28-P04]Surface elevation change from 2007 to 2017 using Structure from Motion at the Trambau glacier, Nepal

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Alpine glaciers are good indicator of climate change, and recent shrinkage of glaciers contribute to the sea level rise. In addition to that, shrinkage of glaciers is increasing potential exposure to glacier lake outburst floods (GLOFs) in the Himalaya (e.g. Benn et al., 2012). Therefore, monitoring mass balance of Himalayan glaciers is important to assess glacier fluctuation.
Digital elevation model (DEM) based on satellite imageries have been analyzed to estimate fluctuation of glacier mass balance. This method permit getting data covering wide area but it's difficult to obtain high resolution surface elevation changes. Some previous studies suggested that ice cliffs and ponds have significant roles in mass loss of debris-covered glaciers (e.g. Buri et al., 2016). Almost DEMs and orthomosaic based on satellite images are too coarse to extract them. However, Structure from Motion (SfM) technology based on aerial photographs has been developed in the last few years. This method can create 3D model from photographs and it enables generating DEMs and orthomosaic image with high resolution. It allows us to identify the small structures on glaciers. Aerial photograph of glacier surface can be collected relatively easy and they are not expensive comparing to other remote sensing data. Thus, some studies combined aerial photogrammetry and SfM technology have been carried out in the Nepal Himalayan region (e.g. Immerzeel et al., 2014).
In this study, we created high resolution DEMs from 10 years interval aerial photographs by using SfM technology at Trambau glacier in the Nepal Himalaya. These photographs were taken by traditional airborne (plane) in 2007 and taken by handmade fixed-wing UAV in 2017. We also conducted GPS measurement in 2017 post-monsoon season to obtain elevation and coordinate data for georeference and to evaluate the DEMs accuracy. Consequently, we calculated spatial elevation changes from the two DEMs in the Trambau glacier.
We are going to talk about results of the DEMs accuracy and spatial surface elevation changes at this area.

References

Benn et al., 2012: Earth Sci. Rev. 114 (1-2), 156-174.
Buri et al., 2016: Ann. Glaciol. 57 (71), 199-211.
Immerzeel et al., 2014: Remote Sens. Environ. 150, 93-103.