Geophysical Research Abstracts
Vol. 17, EGU2015-9437, 2015
EGU General Assembly 2015

Low resolution optical remote sensing applied to the monitoring of seasonal glacier mass balance.

Vanessa Drolon (1), Philippe Maisongrande (1), Etienne Berthier (1), and Else Swinnen (2)
(1) LEGOS, CNRS,Toulouse, France (vanessa.drolon@gmail.com), (2) TAP,VITO, Mol, Belgium (else.swinnen@vito.be)

Mass balance is a key variable to describe the state of health of glaciers, their contribution to sea level rise and, in a few dry regions, their role in water resource. We explore here a new method to retrieve seasonal glacier mass balances from low resolution optical remote sensing.
We derive winter and summer snow maps for each year during 1998-2014, using the Normalized Difference Snow Index (NDSI) computed from visible and SWIR channels available with SPOT/VEGETATION. The NDSI dynamic is directly linked to the area percentage of snow in the VGT kilometric pixel. The combination of 15 years of 10-daily NDSI maps with the SRTM DEM allows us to calculate the altitude of the transition between bare soil and snow. Then, we compare the interannual dynamic of this altitude with in situ measurements of mass balance available for 60 alpine glaciers (Huss et al., 2010; Zemp et al., 2009, 2013) and find promising relationships for winter mass balance. We also explore the possibility of a real-time monitoring of winter mass balance for a selection of alpine glaciers.
Finally, we discuss the robustness and genericity of these relationships for their future application in regions where in situ glaciers mass balances are scarce or not available.