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

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At global scale, the mass loss of glaciers (outside of the Greenland and Antarctic ice sheets) strongly impacts the total sea level rise and, in a few dry regions, the water resource. Low resolution optical remote sensing is an alternative tool to estimate empirically the regional glacier mass balance and could complement in situ measurements (limited to a few easy-to-access glaciers) and High Resolution Imagery (inappropriate in term of temporal resolution for DEM differencing and geographic coverage for the snow-line method).

Spectral signature of snow makes possible the calculation of a Normalized Difference Snow Index computed from visible and SWIR channels available with SPOT/VEGETATION. The dynamic of this Index is directly linked to the area percentage of snow in the kilometric pixel. On the basis of the 14 years SPOT/VGT archive (1998-2012), the year to year dynamic of the NDSI is shown to be correlated with the inter-annual variability of glaciers mass balance.