ALOS-1/2 SAR データによるカラコルム山脈東部における氷河ダイナミクス
Dynamics of glaciers in the Eastern Karakorum, Pakistan, based on ALOS-1/2 SAR data

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1. Introduction: The regions of high-mountains are frequently called “water towers” for the lowlands and a precise knowledge of the characteristics is required for their proper management. The glaciers provide water by melt down not only to the people living close to the mountains but also contribute runoff to the lowlands and recharge the river fed aquifers and finally effect the global sea level change. After Alaska and Arctic regions, the Karakorum-Himalaya (K-H) area constitutes the second largest glacial cover of the Earth. So far, the seasonal dynamics of the glaciers in the Eastern Karakorum have been poorly understood and in this research we have studied the seasonal velocity changes of these glaciers.

2. Data and Methodology: The air surface temperature data from five observatories located close to the study area has been utilized. ALOS-1/2 data have been processed using GAMMA software and the velocity has been calculated using pixel-offset with a search patch of 128x128 pixels (range x azimuth) with a sampling interval of 12x36 pixels. To examine the temporal changes in velocity, we first set a flow line at each glacier, and then averaged the velocity pixel data over the 500x500 square meter area with its centre at the flow line for the larger glaciers and 200x200 square meters for the smaller glaciers.

3. Results: Hotter years: 2007, 2008 and 2015. Baltoro glaciers shows significant movement in the on the central part in the summers of 2008, also the terminal and onset area are moving faster in 2015. Siachen Glacier shows higher velocity: in the central part in summers of 2010, and in the terminal part in the year 2015. Gasherbrum Glacier shows a probable surge signal by the start of 2007 summer. Kundos Glacier’s eastern limb shows a significant increase in the velocity (summers and winter) of ALOS-2 data (2015) however the western limb seems to have becoming less active. The seasonal dynamics of these glaciers are complex and the response of the glaciers varies individually to the local changes in the temperature.

References:

