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Detection of glacial lake using spaceborne SAR data

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The retreat of mountain glaciers and expansion of glacial lakes are the common issue related to global warming and it sometimes causes a sudden flood, which is called as Glacial Lake Outburst Flood (GLOF). GLOF event occurs frequently in 1960s at Himalayan glaciers.

Satellite data is a sophisticated tool for this research because it is difficult to operate frequent field survey due to severe weather condition and hard accessibility. However, the optical sensor equipped on satellite has one serious problem, which is weather condition of target area. It is very difficult to acquire cloud-free data at Himalayan region on a regular schedule. Therefore, it is necessary to find another way to avoid this problem.

Synthetic Aperture Radar (SAR) is one possible way because SAR can observe under all weather condition, while it has geometric and radiometric distortion due to its observation mechanism and topographic feature. Therefore, orthorectification and radiometric terrain correction were applied at first, then we attempt to use SAR data for detection of glacial lake.

For detection of glacial lake, we set threshold of backscatter coefficient between glacial lake and other landcover because water surface usually has lower backscatter coefficients than other landcover due to smooth surface feature of water.

We also have a plan to validate these results with manual interpretation results of glacial lakes using optical sensor which compiled under SATREPS (Science and Technology Research Partnership for Sustainable Development) project by JICA and JST.

Keywords: Glacial Lake, SAR, Terrain Correction, GLOF