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3-D displacements in Perito Moreno glacier, Patagonia Icefield, inferred from ALOS/PALSAR data

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Perito Moreno Glacier is one of the most famous carving glaciers in Patagonia icefield, and flows at high velocity of 500m/year. But its continuous and high-resolution observation over wide area hasn't been carried out. Therefore, details of the flow mechanism haven't been clarified.

Synthetic Aperture Radar (SAR) allows us to detect surface deformation at high spatial resolution regardless of sunlight and local weather. In this study, we use radar images acquired by PALSAR onboard ALOS. The purpose of this study is to detect glacier flow of Perito Moreno using pixel offset (feature tracking) technique and to estimate its 3-D flow field.

Several previous studies used SAR data to measure the flow field of Perito Moreno glacier. But these studies needed complementary information other than SAR data (for example, terrain information) to constrain the flow direction. This is because pixel offset provides only two components of range and azimuth direction, which are not able to resolve the 3-D displacements. In this study, we used two data acquired from ascending and descending orbits, and estimated the 3-D displacements without using terrain information.

The inferred flow velocity field showed larger velocity at the central part and upper stream of the glacier. Our result is mostly consistent with previous SAR-based measurement.