

Recent Changes of Surface Velocities at Byrd Glacier

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Large glaciers are important outlets by which ice is transported from the interior Antarctica to the ocean, and changes of their surface velocities can have significant impacts on ice sheet mass balance and hence sea level. Byrd Glacier, with the largest catchment basins in Antarctic and flowing into the western part of the Ross Ice Shelf through the Trans-Antarctic Mountains, is one of the largest glaciers in East Antarctica. Here we report some new ice velocity measurements obtained at the main trunk of Byrd Glacier, using the recent acquired Landsat 8 imagery. The velocities were derived from automatic tracking of the surface feature points on sequential images using a cross-correlation algorithm. Images were first precisely co-registered to ensure the high accuracy of surface measurement. Comparison of the new ice velocity maps with earlier measurements of velocities documented by literatures indicates that since 2007, the glacier has overall undergone a deceleration-to-acceleration process. Different velocity change patterns could be viewed for the upstream, midstream and downstream regions, respectively, and the downstream part has the largest flow speed increase in 2013-2014. The cause of the changes in ice dynamics is so far not clear, but requires further study with more knowledge employed.