

Evidence of important basal sliding under an East Antarctic outlet glacier

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We present results of an Airborne Radar profiling of 2 majors outlet glaciers of East Dronning Maud Land (Antarctica), revealing the presence of a very deep subglacial valley beneath one of the glaciers. We also detected an important contrast of roughness between upstream and downstream region. Furthermore, surface velocity of these glaciers was inferred from interferometry, from which basal conditions were retrieved using a higher-order ice sheet model. By combining radio echo sounding, interferometry and ice sheet modelling, we are able to demonstrate that high surface velocity of one of the glacier is due to ice deformation in midstream region (>70 km from the grounding line) and due to dominant basal sliding downstream of this area. We associated this basal sliding with the very low roughness area in the downstream part of the glacier. This result shows that marine sediments also play a dominant role in the dynamics of outlet glaciers in East Antarctica.