

## **Sensitivity of flow in Greenland outlet glaciers to errors in surface mass balance forcing using the Ice Sheet System Model**

Principal Investigator: Nicole-Jeanne Schlegel <sup>1</sup>

Eric Larour <sup>1</sup>, Helene Seroussi <sup>1</sup>, Mathieu Morlighem <sup>2</sup>, Daria Halkides<sup>4</sup>  
Jason Box<sup>3</sup>

A clear understanding of exactly how the Greenland ice sheet responds to climate change requires a high-degree of spatial resolution and the modeling of longitudinal stresses, especially within the ice sheet's large drainage basins, as they contain outlets capable of high-velocity flow. The Ice Sheet System Model (ISSM) is a finite-element model capable of simulating transient ice flow on an anisotropic mesh that can be refined to higher resolutions and considers longitudinal stresses in the areas of enhanced ice flow. These features offer a distinct advantage over previous models of the Greenland Ice Sheet, specifically in terms of modeling fast-flowing outlet glaciers. With use of established ISSM capabilities, we examine the sensitivity of ice flow within the basins of major Greenland outlet glaciers to uncertainties in a historic reconstruction of yearly surface mass balance forcing. This work was performed at the California Institute of Technology's Jet Propulsion Laboratory under a contract with the National Aeronautics and Space Administration's Modeling, Analysis and Prediction (MAP) Program.

1- Jet Propulsion Laboratory - California Institute of Technology, Pasadena, CA, USA

2- University of California, Irvine, Department of Earth System Science, Irvine, CA, USA

3- Byrd Polar Research Center, The Ohio State University, Columbus, OH, USA

4- University of California, Los Angeles, Los Angeles, CA, USA