Geophysical Research Abstracts
Vol. 14, EGU2012-12450, 2012
EGU General Assembly 2012

Constraining basal hydrology with model inversions of basal friction using new InSAR surface velocities.

E Larour (1), E Rignot (2,1), H. Seroussi (1), M. Morlighem (2,1)

(1) Jet Propulsion Laboratory, Mechanical Division, Thermal and Cryogenics Enginerring Section, Pasadena, United States, (2) University of Calfornia at Irvine, Earth System Science Department, Irvine, CA, United States

Constraining ice flow models for continental ice sheets such as Antarctica or Greenland can be difficult, especially regarding the specification of basal friction at the ice/bed interface. Historically, two approches have been taken: 1) model the basal hydrology of the ice sheet, and relate the resulting basal water pressure to the basal drag coefficient and 2) invert for the basal drag coefficient using InSAR surface velocities, and infer the resulting basal hydrology. Here, we use both approaches within the Ice Sheet System Model (ISSM), the JPL/UCI developed ice flow model, for which we have developed a new hydrological model based on LeBrocq et al, 2009.
We compare this model against a large scale inversion of Antarctica's basal drag coefficient using new InSAR surface velocities from Rignot et al 2011. We discuss the potential for this model to improve constraints on basal friction evolution, and implications for projections of ice flow dynamics in a changing climate. We also discuss relevance for calibrating thermal models of Antarctica.

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 Cryosphere Science Program.