

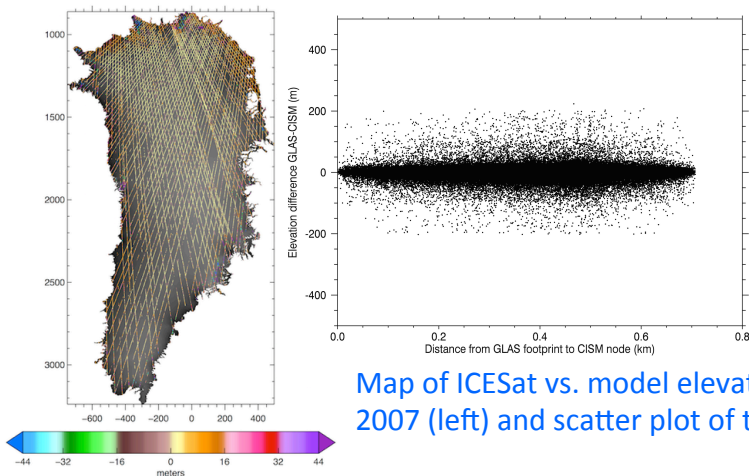
A New Ice Sheet Model Validation Framework for Greenland

Objective

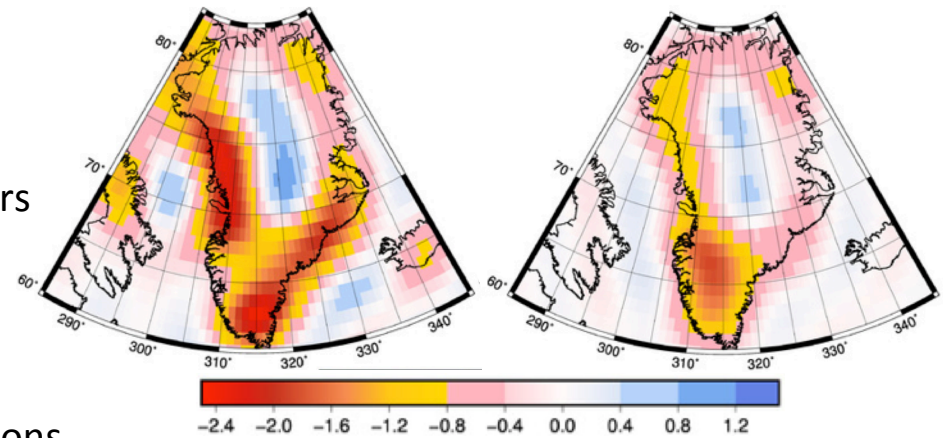
Satellite-based observations of polar ice sheet change are available but are *not* routinely used for model validation due to expertise gaps on the side of modelers and observationalists. We bridge that gap with the *Cryospheric Model Comparison Tool (CmCt)*.

Approach

- develop online tool to process and compare realizations of ice sheet change from models and observations
- provide qualitative and quantitative metrics for use in assessing model skill at mimicking observed changes
- demonstrate the tool by conducting and evaluating



Map of ICESat vs. model elevation differences in 2007 (left) and scatter plot of the same (right).



Map of Greenland mass trend between 2003-2013 (in m of water equiv. height) from GRACE observations (left) and from a high-resolution, CISM-Albany simulation (right).

Impact

- simulations demonstrate that quantitative metrics provided by CmCt are able to distinguish simulations of differing skill
- modelers avoid need for expertise in processing of large, complex data sets
- datasets can be altered or augmented remotely by relevant experts
- CmCt is extensible; new types of validation data, new metrics, and new geographic regions (e.g. Antarctica) can be added

Reference: Price, S.F., M.J. Hoffman, J.A. Bonin, I.M. Howat, T. Neumann, J. Saba, I. Tezaur, J. Guerber, D.P. Chambers, K.J. Evans, J.H. Kennedy, J. Lenaerts, W.H. Lipscomb, M. Perego, A.G. Salinger, R.S. Tuminaro, M.R. van den Broeke, and S.M.J. Nowicki. 2017. An ice sheet model validation framework for the Greenland ice sheet. *Geophysical Model Development*, **10**, doi:10.5194/gmd-10-255-2017 .