

# Land Ice Modeling Update

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Los Alamos National Laboratory

Land Ice Working Group Meeting  
CESM Workshop  
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# CESM Land Ice Working Group

## Leadership

- Co-chairs: William Lipscomb (LANL), Jesse Johnson (U. Montana)
- Science liaison: Stephen Price (LANL)
- Software liaison: William Sacks (NCAR)

## LIWG info

- Web site: [http://www.cesm.ucar.edu/working\\_groups/Land+Ice/](http://www.cesm.ucar.edu/working_groups/Land+Ice/)
- Email list: <http://mailman.cgd.ucar.edu/mailman/listinfo/ccsm-liwg>

## Community Ice Sheet Model (CISM) development

- New subversion repository: <https://svn-cism-model.cgd.ucar.edu/>
- Repo access form:  
[http://www.cesm.ucar.edu/working\\_groups/Software/secp/repo\\_access\\_form.shtml](http://www.cesm.ucar.edu/working_groups/Software/secp/repo_access_form.shtml)
- CISM-dev mailing list:  
<http://mailman.cgd.ucar.edu/mailman/listinfo/cism-dev>

# Ice sheets in CESM

## Current status:

- CESM1.0 includes Glimmer-CISM 1.6 (shallow-ice, Greenland only)
- Surface mass balance computed in CLM in multiple elevation classes
- Recently added new compsets (1850, 20<sup>th</sup> c., RCP 8.5) for CMIP5 simulations

## Near-term model improvements (summer 2011):

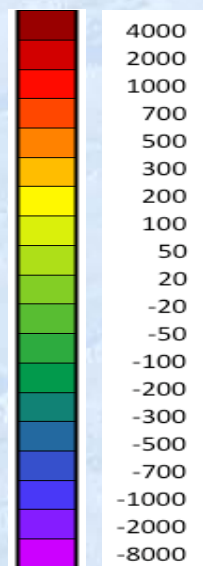
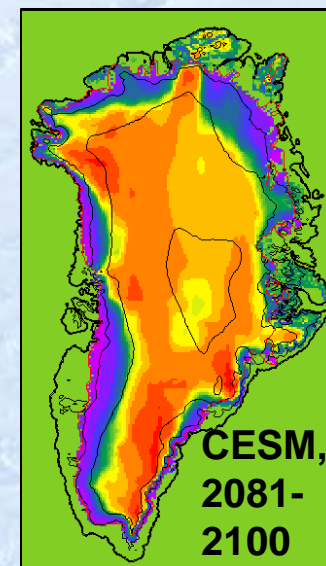
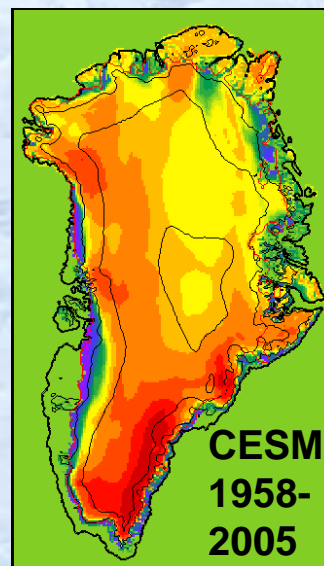
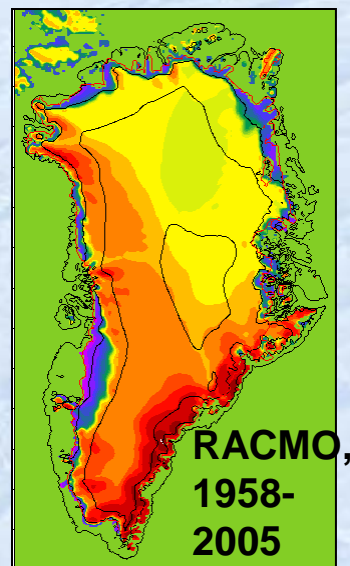
- Glimmer-CISM 2.0 (parallel, higher-order ice-sheet dynamics)
- Improved initialization data sets for Greenland and Antarctica
- New compsets for standalone ice-sheet testing

Greenland surface  
mass balance (mm/yr).

**Red = net accumulation**

**Blue = net ablation**

(Courtesy of M. Vizcaíno)



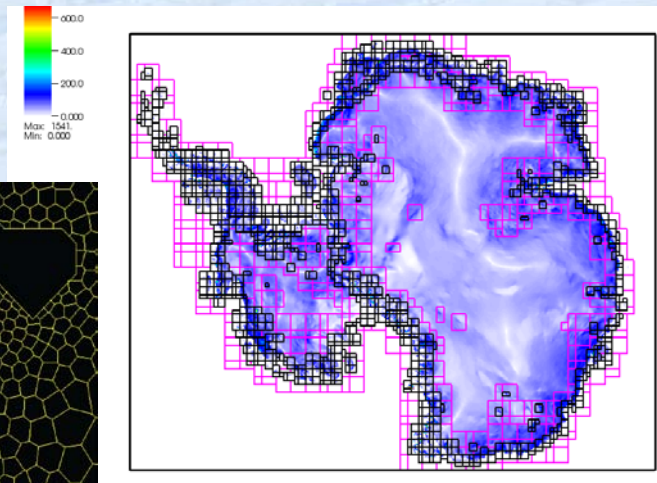
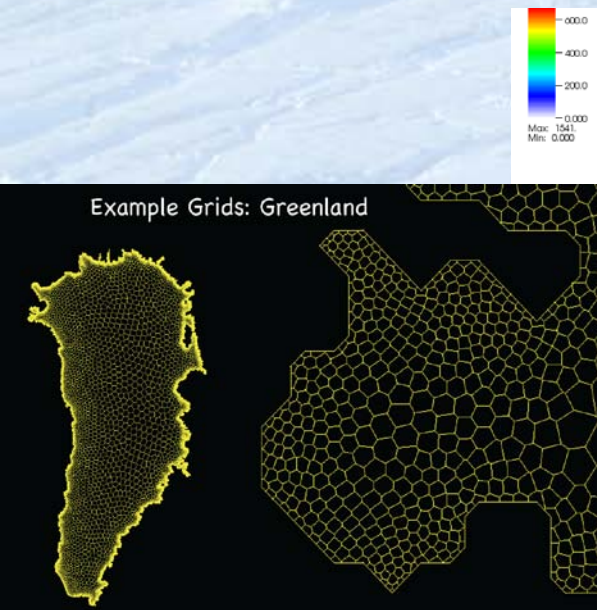
# Ice sheets in CESM

## Future CISM development:

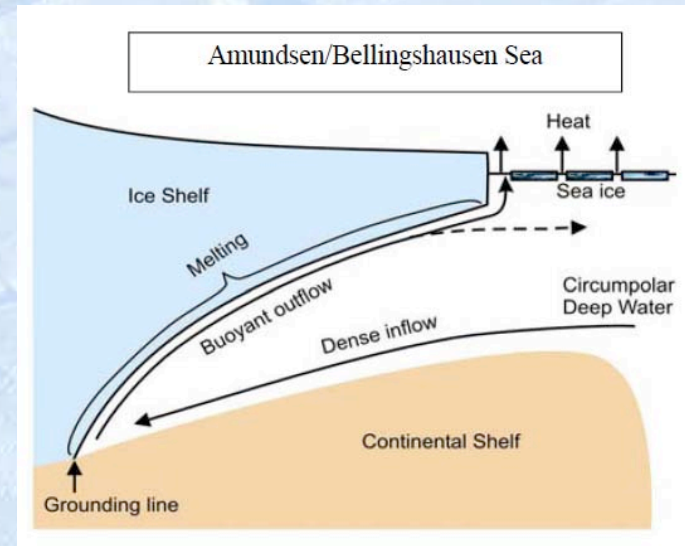
- New full-Stokes and higher-order dycores on adaptive and unstructured meshes
- Improved ice-sheet physics (e.g., basal hydrology, iceberg calving)

## Future CESM development for land ice:

- Two-way ice-sheet/land coupling with dynamic landunits
- Ice-sheet/ocean coupling for marine ice sheets (e.g., West Antarctica)
- Paleo ice sheet simulations (e.g., Laurentide)
- Evolution of mountain glaciers and ice caps (using CLM mass-balance scheme)



Variable-resolution Voronoi mesh for Greenland, adaptive mesh for Antarctica



Schematic of warm CDW reaching the grounding line (courtesy of A. Jenkins)