

WAIS warming event simulated with the E3SM* and GISS ModelE

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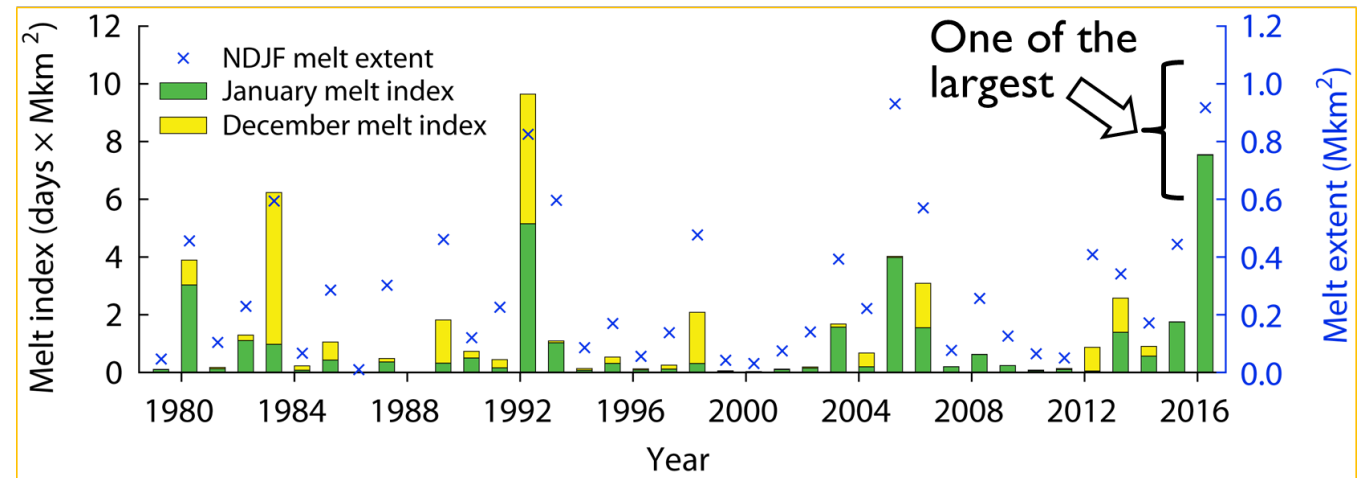
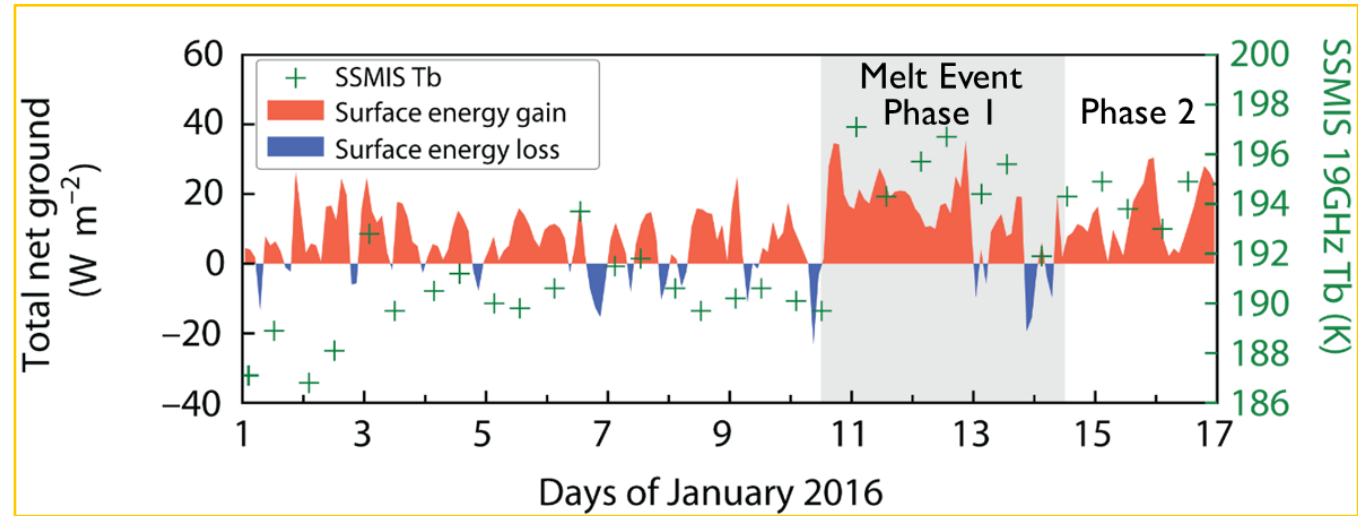
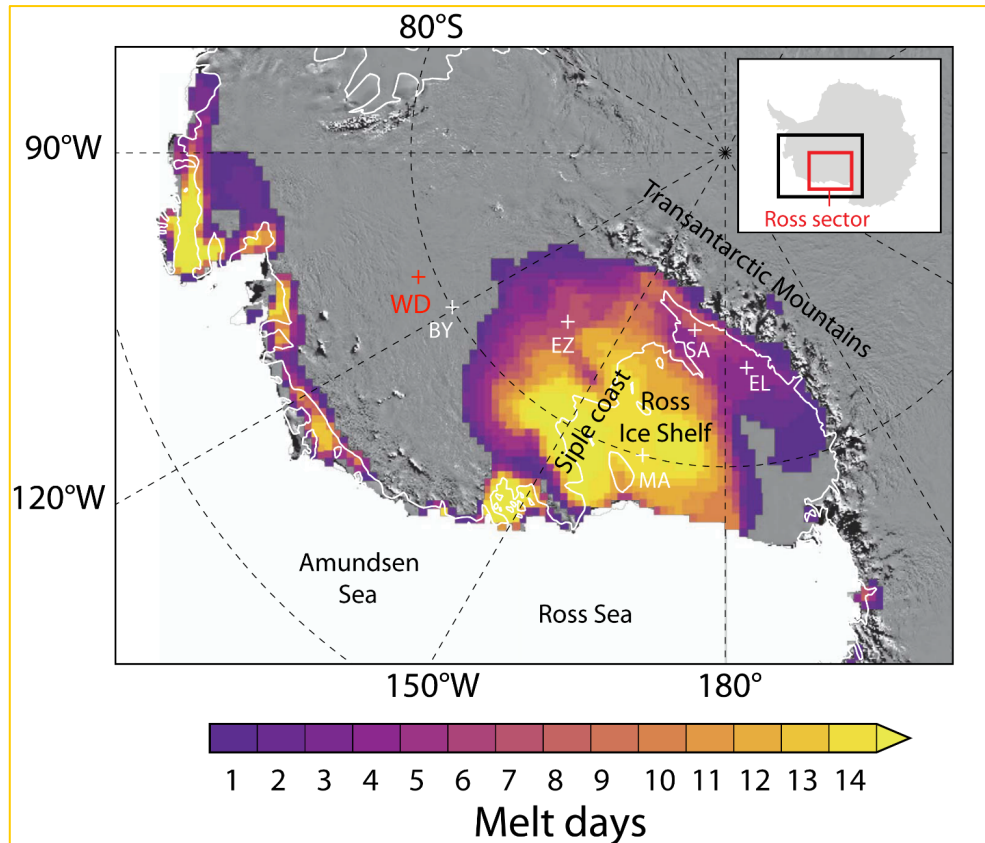
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**DOE Energy Exascale Earth System Model (E3SM), formerly known as ACME*

January 2016 Extensive Surface Melt Event in West Antarctica



GCM Evaluation

Currently-being-developed GCMs

- EAMv1, Atmospheric component of E3SM
- NASA GISS ModelE

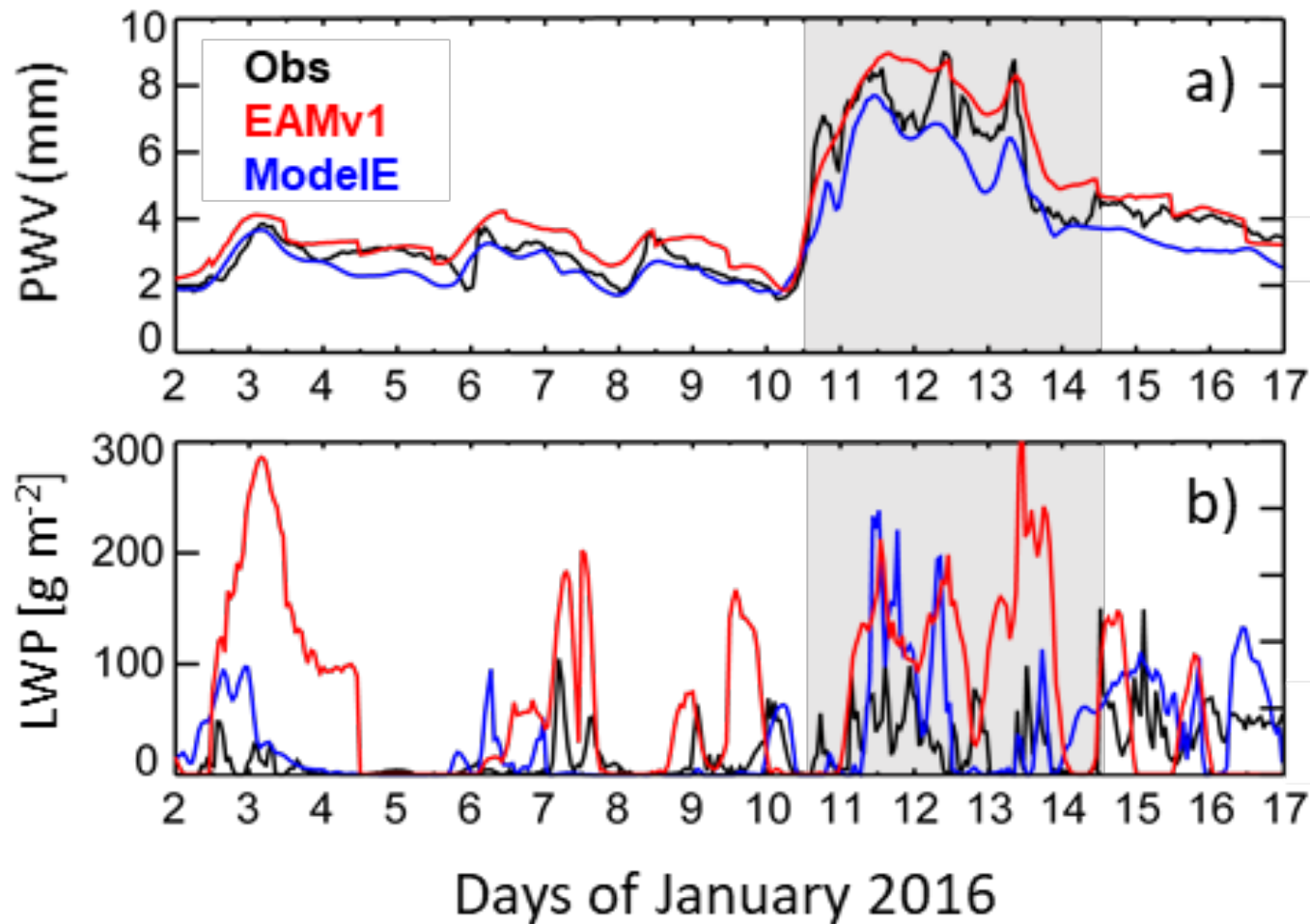
Boundary conditions use ERA5

- EAMv1 run in hindcast mode; 12-36 h hindcast period shown here
- ModelE nudged to ERA5

Evaluation data

- Nicolas et al. data: PWV, LWP, surface fluxes (radiation and turbulence)

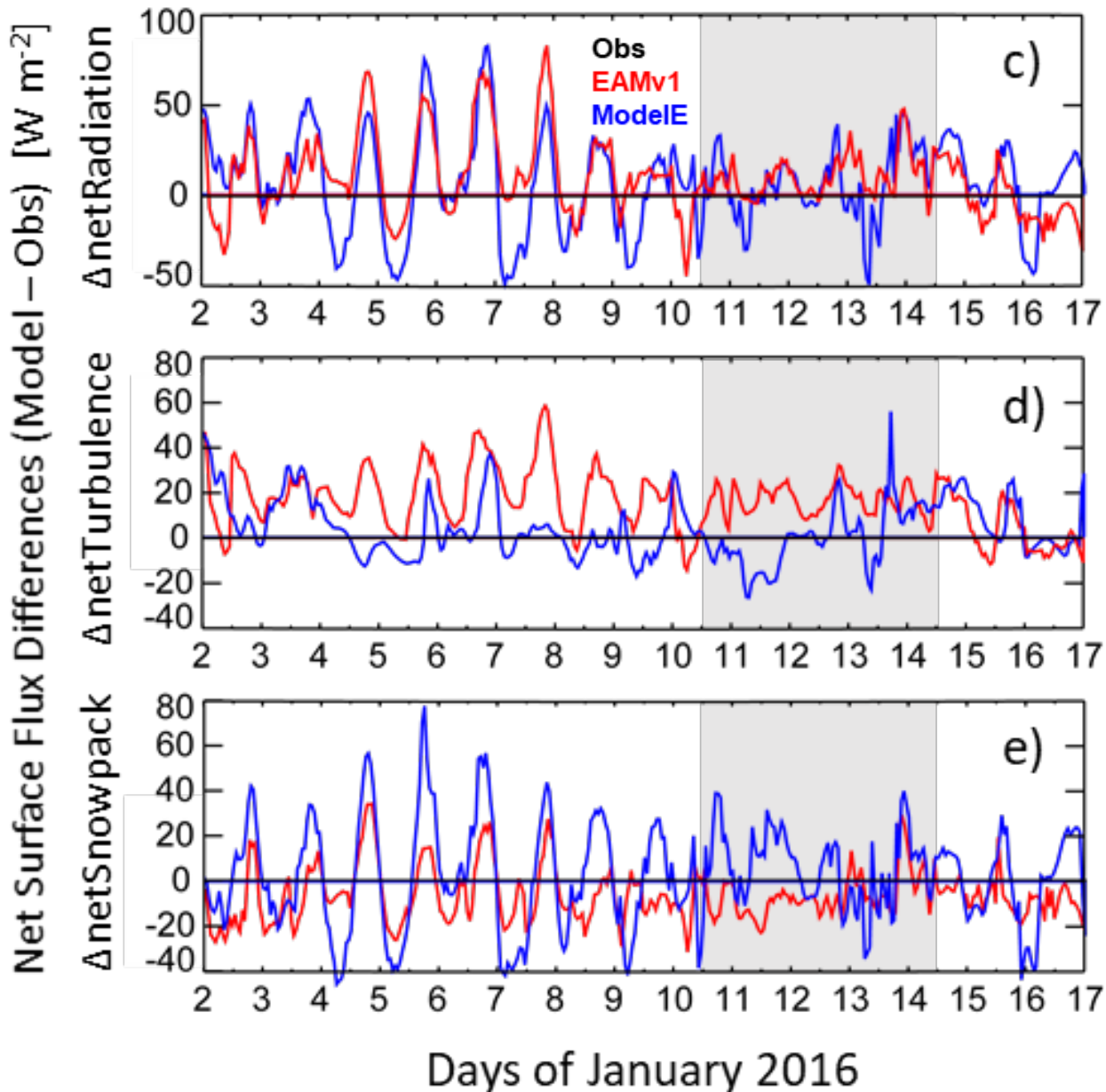
PWV and LWP Evaluation



PWV simulated well

LWP overestimated

Surface Flux Evaluations



netRadiation

- Tendency for a positive bias (too much energy into the snowpack)
- Attributable to + net LW flux

netTurbulence (+ upward)

- + Bias for EAMv1 (both SHF and LHF)
- ModelE generally performs well

netSnowpack

- $\text{netSnowpack} = \text{netRad} - \text{netTurbulence}$
- EAMv1 + biases cancel each other
- ModelE \pm netRad > good netTurb

LWP Biases contribute to LW Biases

