The causes of US Midwest surface temperature errors in climate models

The detailed diagnostics developed in CAUSES project provide the tools necessary for the model builders to use ARM observations to improve their models.

Is what we learn at SGP representative of what is happening elsewhere?

Large correlation of temp error over Midwest with temp error at SGP.

Theoretical analysis: relative contribution of error from evaporative fraction & from radiation in hindcast and CMIP5 models.

Evap fraction error explains 0-5 K of error, and most of error, when error is large.

Radiation error explain 0-2 K of the error.

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If a cloud error: what kind of cloud, and is it frequency of occurrence or radiative properties?

For CAM5 can show: deep cloud regime is too frequent but has too small radiative impact when it occurs.

For GA6: deep cloud regime is too rare.

Large correlation of temp error over Midwest with temp error at SGP.

GASS

“CAUSES”: A project led by LLNL and UKMO. 9 institutes & 11 models→4 papers JGR-A