

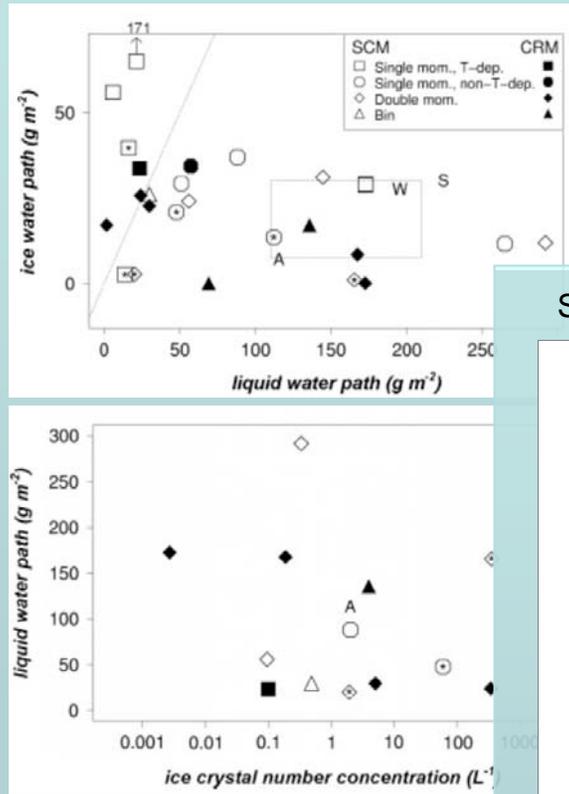
ISDAC – based model intercomparison

(Mikhail Ovchinnikov, [mikhail\(at\)pnnl.gov](mailto:mikhail(at)pnnl.gov))

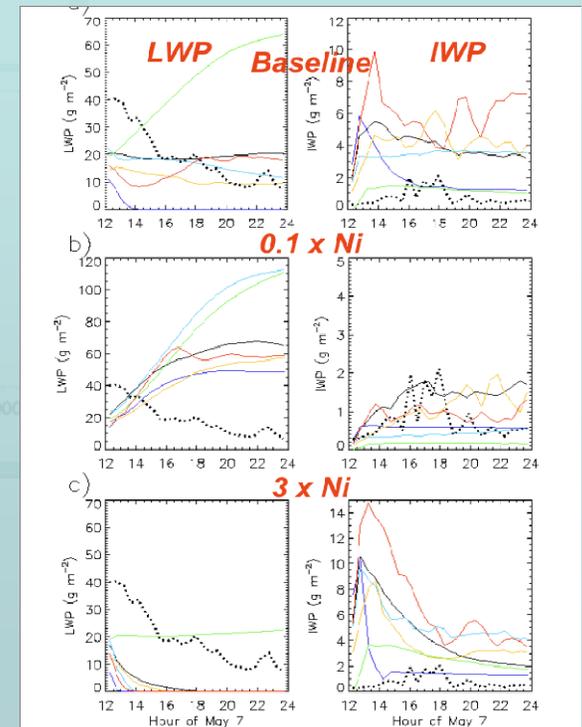
To build on previous intercomparisons (M-PACE, SHEBA, etc)

- Large spread of LWP and IWP among models (CRM and SCM) for the same case, initial profiles, large scale forcing, etc. (M-PACE)
- Uncertainty in ice nucleation mechanisms plays a big role
- ... but constraining ice number does not eliminate LWP spread (SHEBA)
- For many models there is a sharp transition from mixed-phased to ice-only clouds when N_i is increased (SHEBA)

M-PACE results (Klein et al. 2009)



SHEBA results (Morrison et al. 2011)



ISDAC – based model intercomparison (cont)

Dynamics-microphysics-radiation interactions are important and need to be understood and modeled better

Possible approaches & next steps:

- Role of dynamics: Additional diagnostics for vertical velocity, TKE, buoyancy flux, etc.
- Role of microphysics: Constrain other parameters or process rates for ice (e.g., size-mass ratio, deposition growth rate, sedimentation velocity, etc.)
- Role of radiation: Unified parameterized radiation/heating rates calculations,

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Flight 31 case

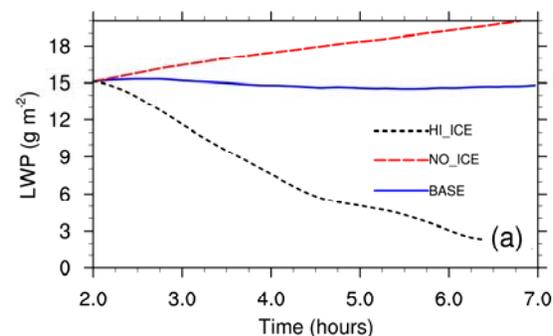
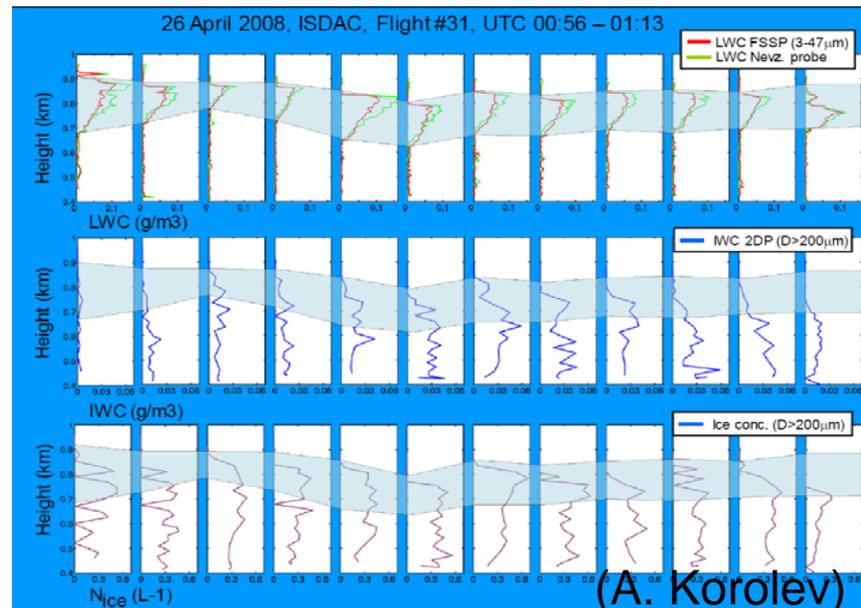
The simpler case the better

Long-lived mixed-phase stratus cloud

Elevated (decoupled) mixed layer with temperature inversion above and slightly stable layer below

Temperature inversion and cloud top height are nearly constant

Preliminary model simulations reproduce a quasi-steady state mixed-phase cloud



ISDAC – based model intercomparison

Plans, logistics, etc

ASR & GCSS (or its successor)

ASR: Data for initialization, forcing and evaluating the simulations

Align with a focus group (e.g., on mixed-phase clouds or Arctic processes)

GCSS: Broader participation

Vast model assessment and boundary layer modeling expertise

Target models: LES/CRM (SCM & Regional to follow?)

Setup details under development:

- Initial profiles, large-scale subsidence, spatial resolution
- Data format
- Timeline:
 - Case description (Summer 2011)
 - First model results (Fall 2011)
 - Follow-up at the working group meeting (Fall 2011)
 - ...