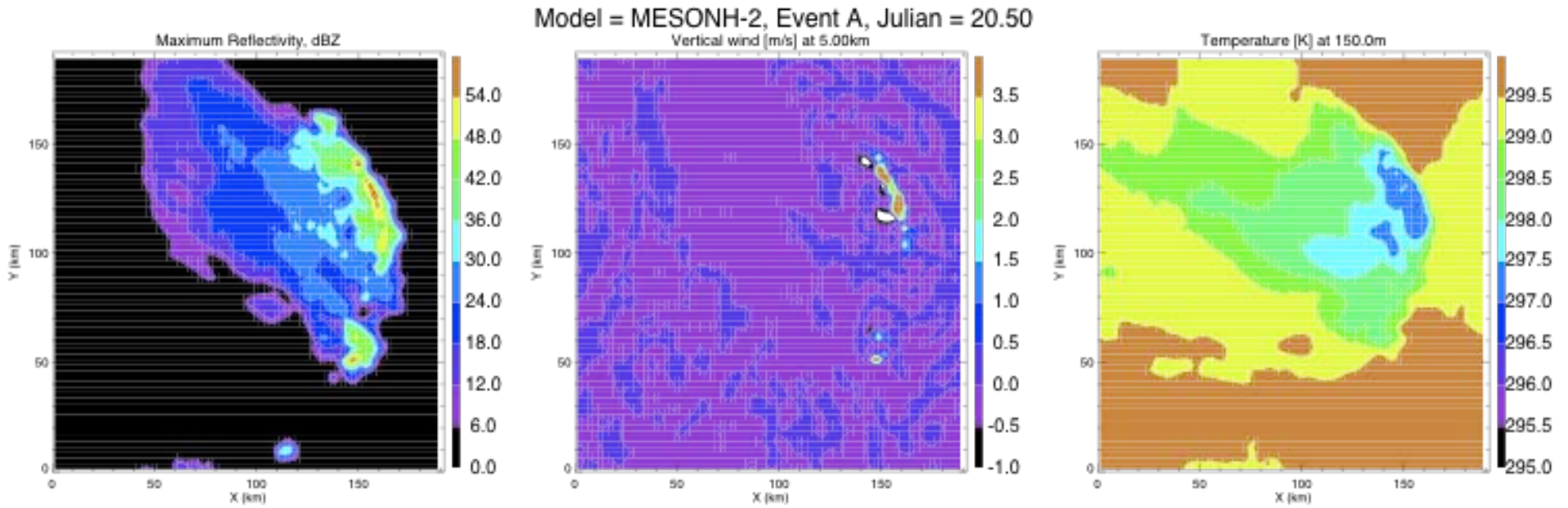
TWP-ICE CRM Wrap-Up



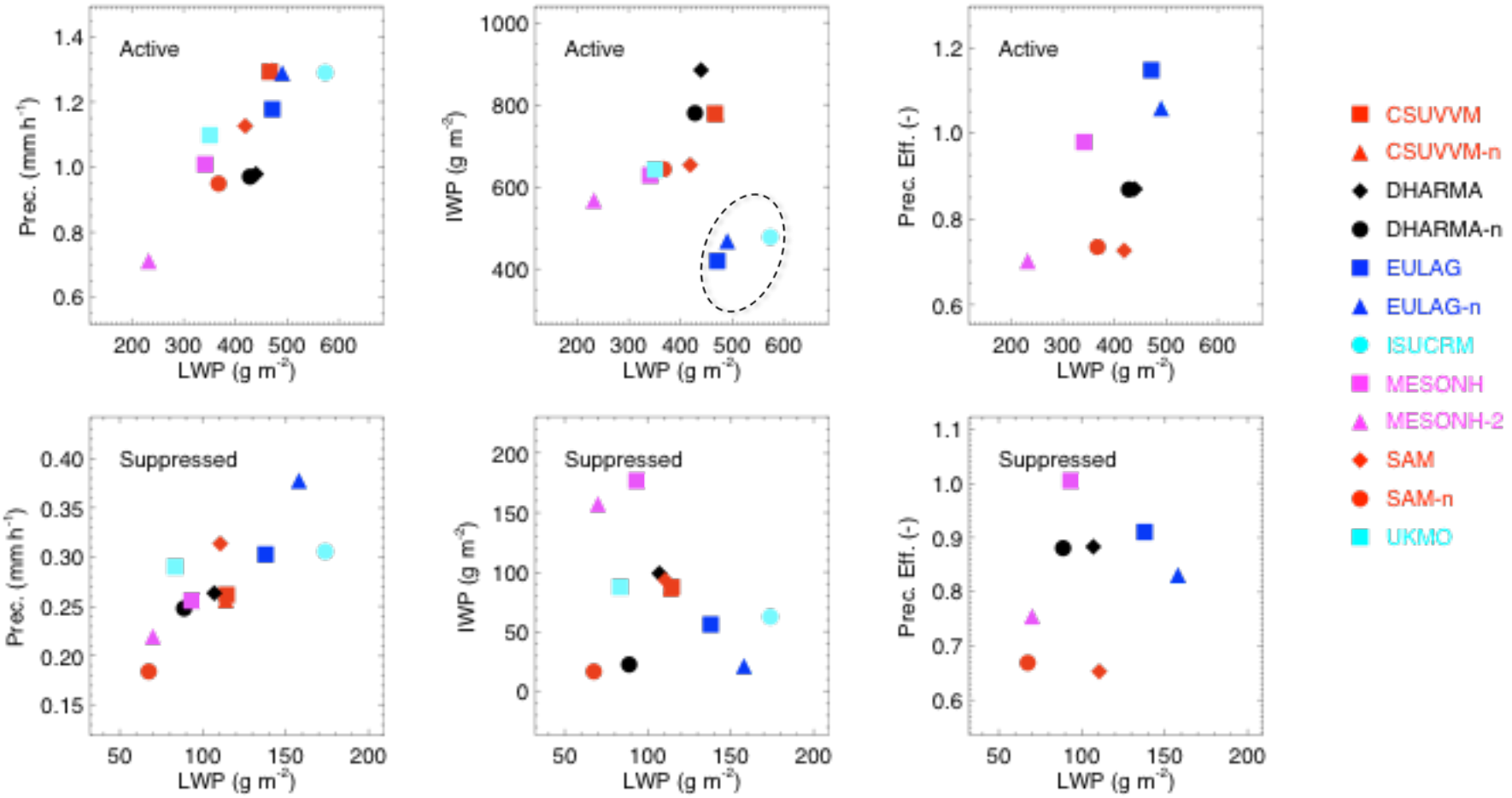
Ann Fridlind, Andrew Ackerman, Jean-Pierre Chaboureau, Jiwen Fan, Wojciech Grabowski, Adrian Hill, Todd Jones, Hugh Morrison, Sunwook Park, Jean-Pierre Pinty, Xiaoqing Wu, Adam Varble, Ed Zipser, Aga Smith-Mrowiec

ASR Science Team Meeting • 15 March 2010

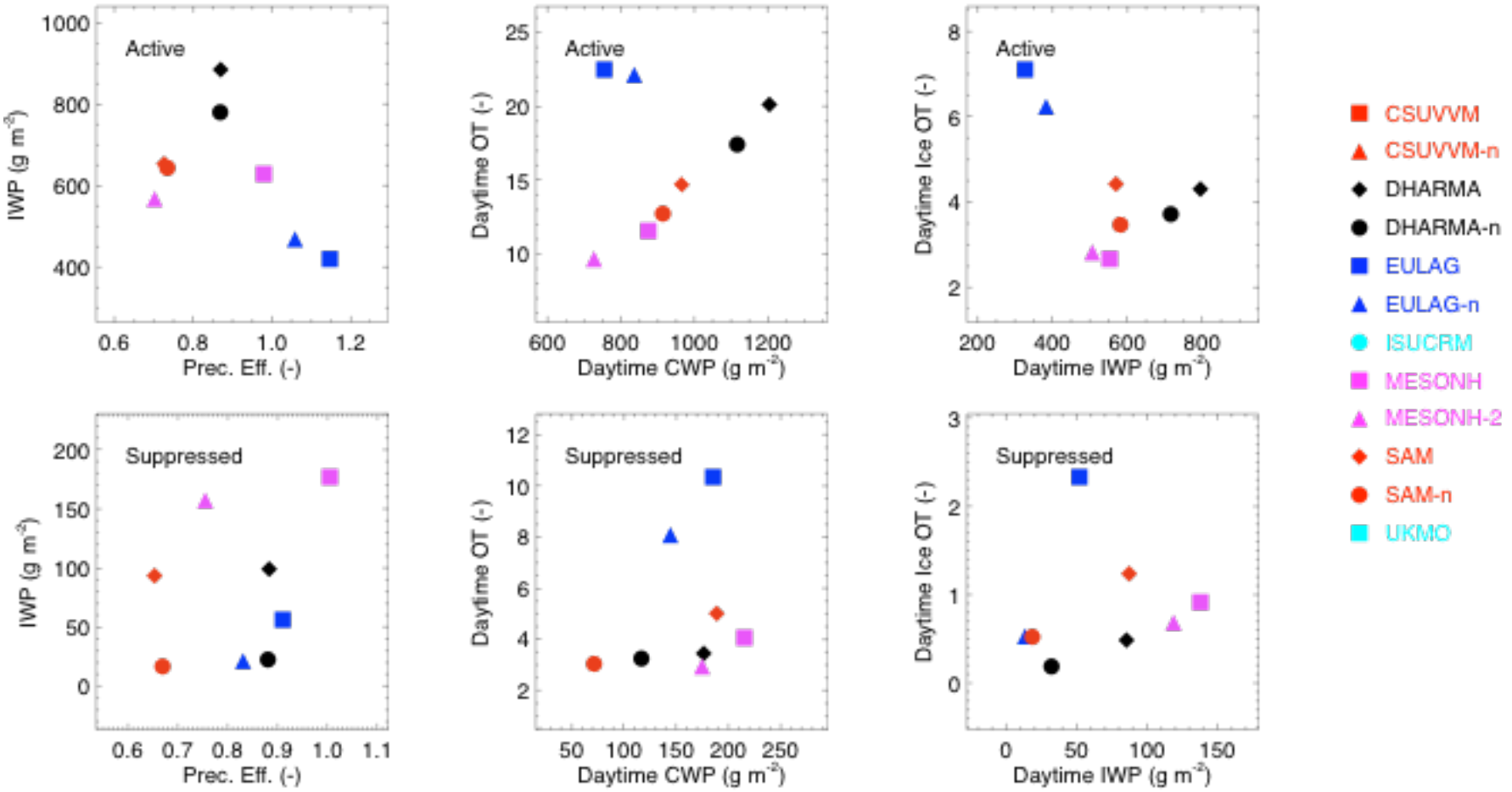
Submissions (Thank You!)

Model	Dim	ΔX	ΔZ	Micro	dBZ	Sens
CSUVVM	3D	1 km	100–1000 m	single		✔
DHARMA	3D	0.9 km	100–250 m	single	✔	✔
EULAG	2D	1 km	100–300 m	double	✔	✔
ISUCRM	2D	3 km	100–1000 m	single		
MESONH	3D	1 km	100–250 m	single	✔	
MESONH-2	3D	1 km	100–250 m	double	✔	
SAM	3D	1 km	100–400 m	double	✔	✔
UKMO	3D	0.9 km	225–500 m	single	✔	

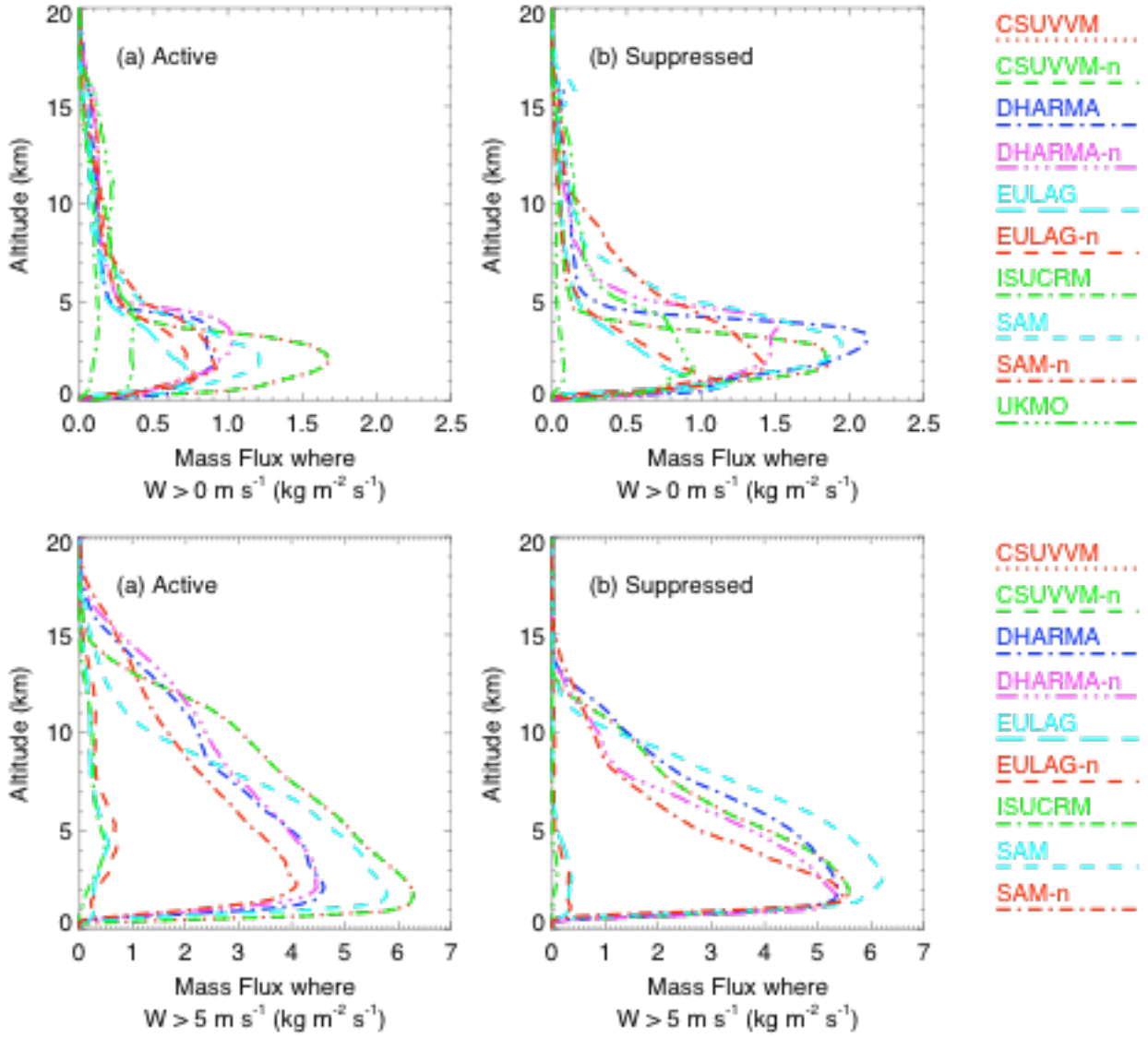
Everything varies by ≈ 2X



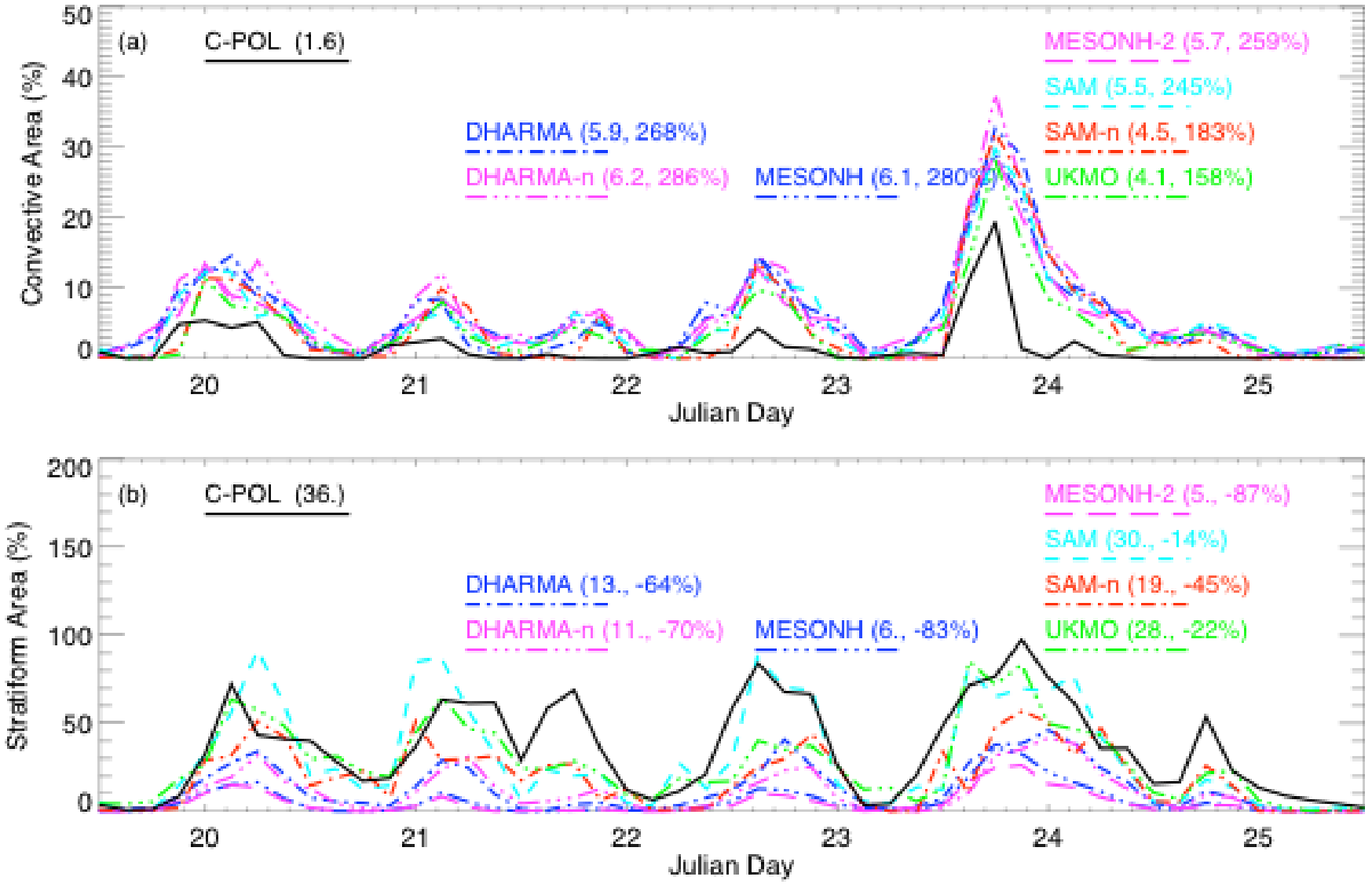
Everything varies by ≈ 2X



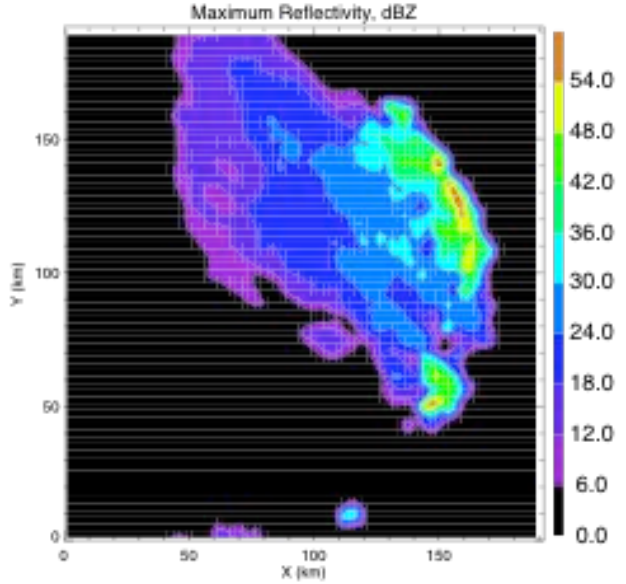
Except mass flux (2X–5X)

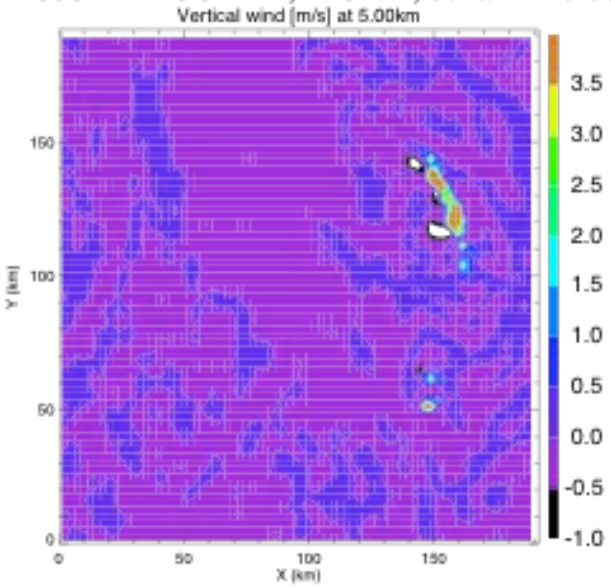


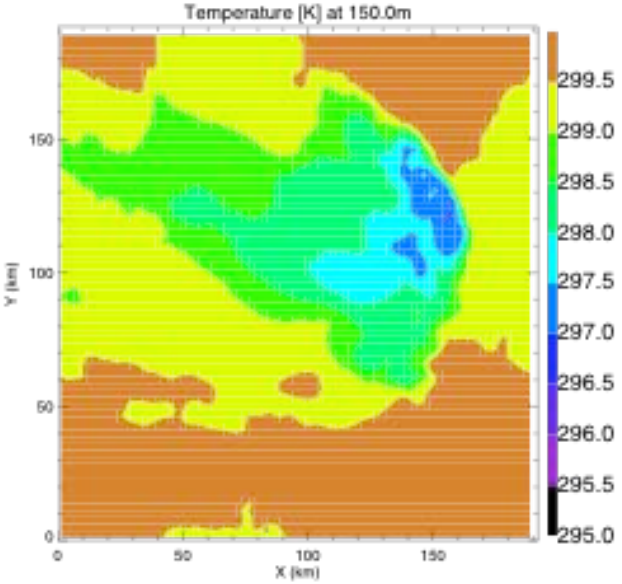
And except stratiform area (6X)



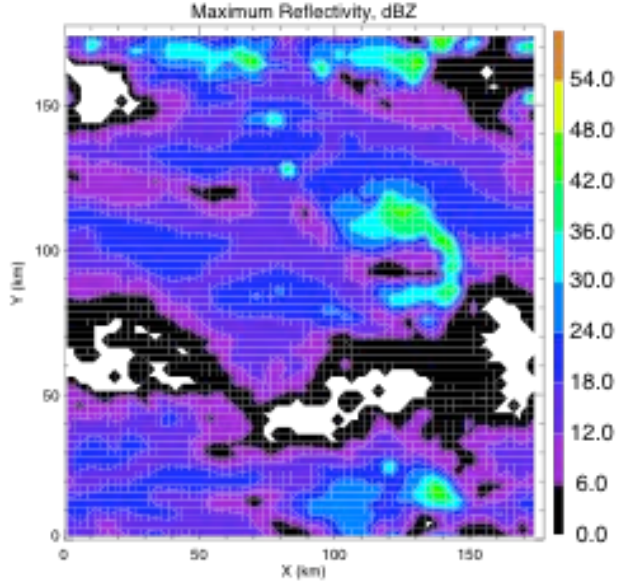
Model = MESONH-2, Event A, Julian = 20.50

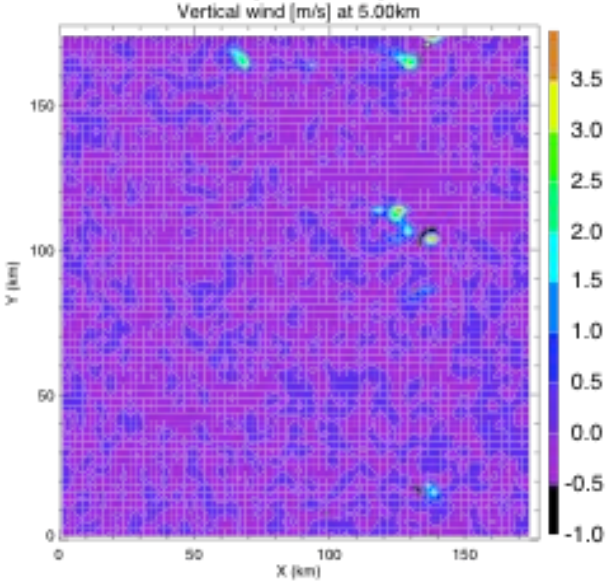


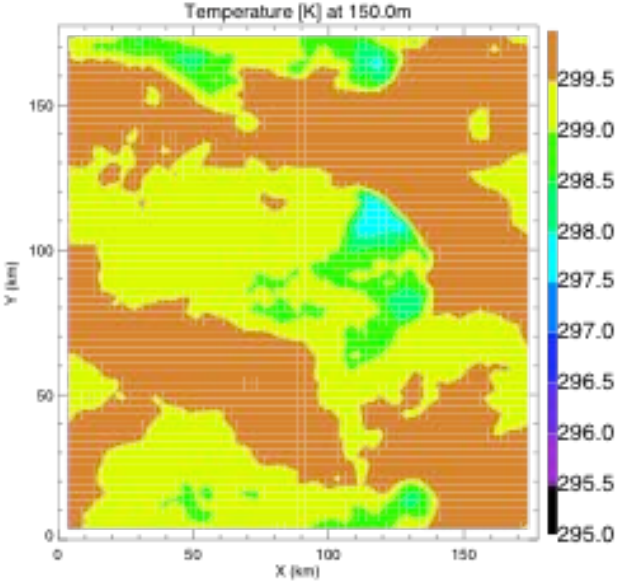




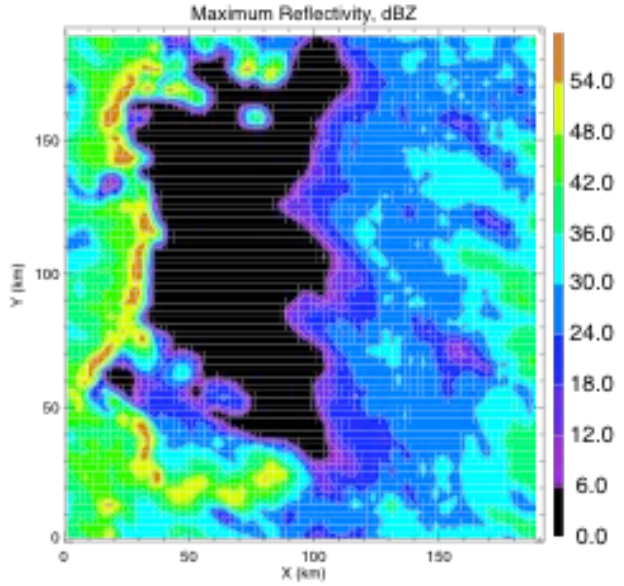
Model = UKMO, Event A, Julian = 20.50

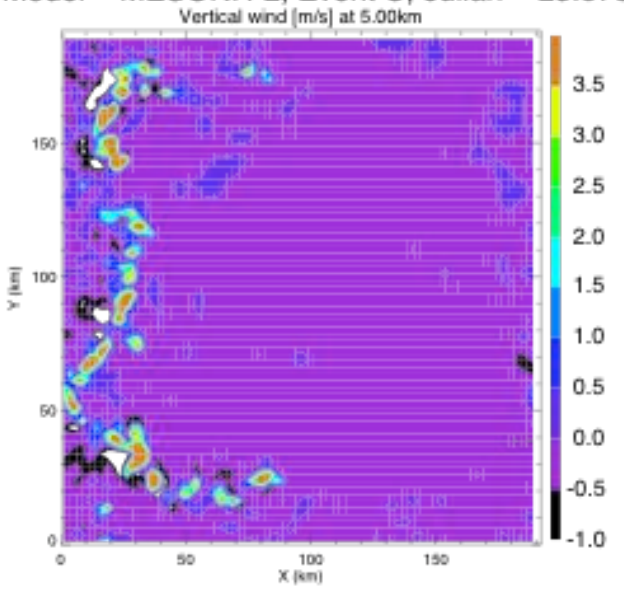


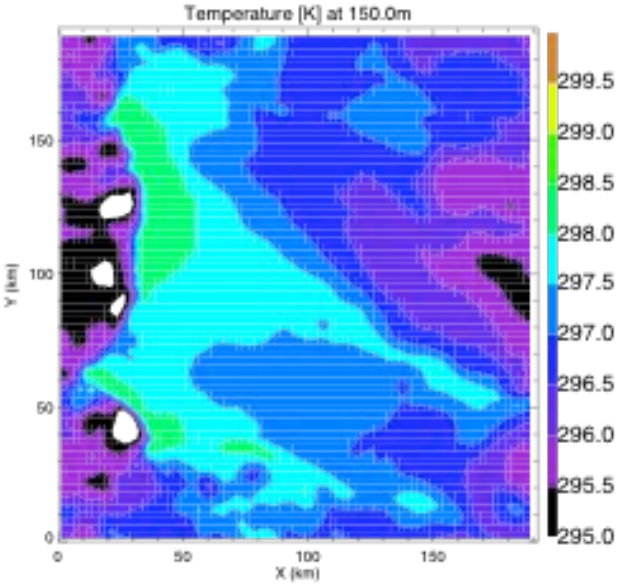




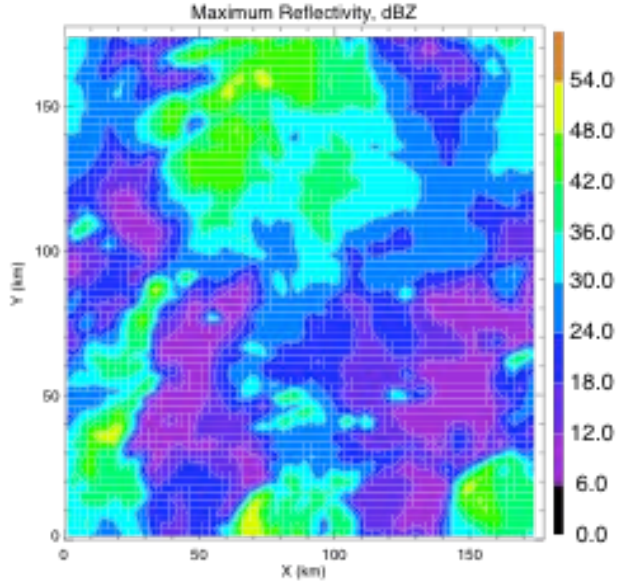
Model = MESONH-2, Event C, Julian = 23.875

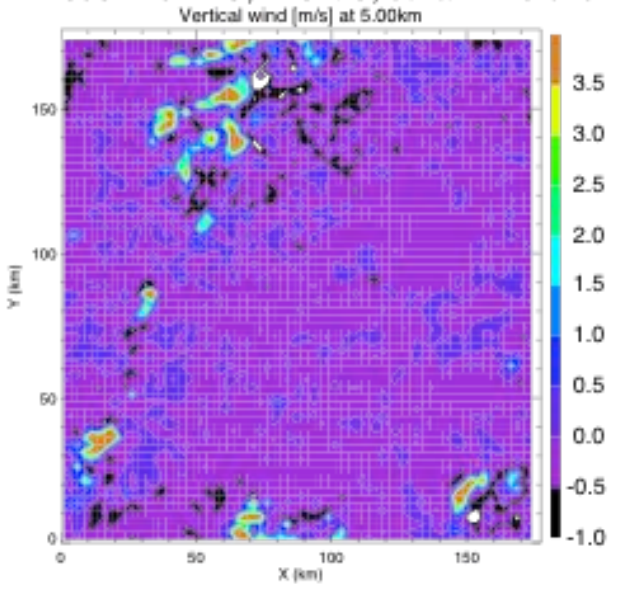


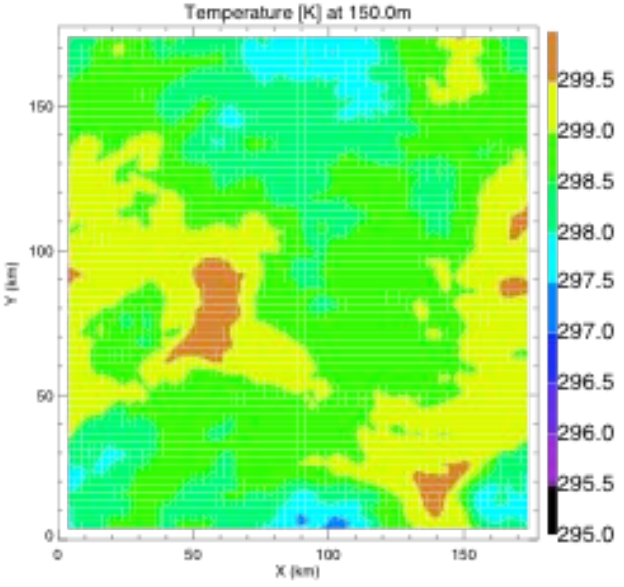




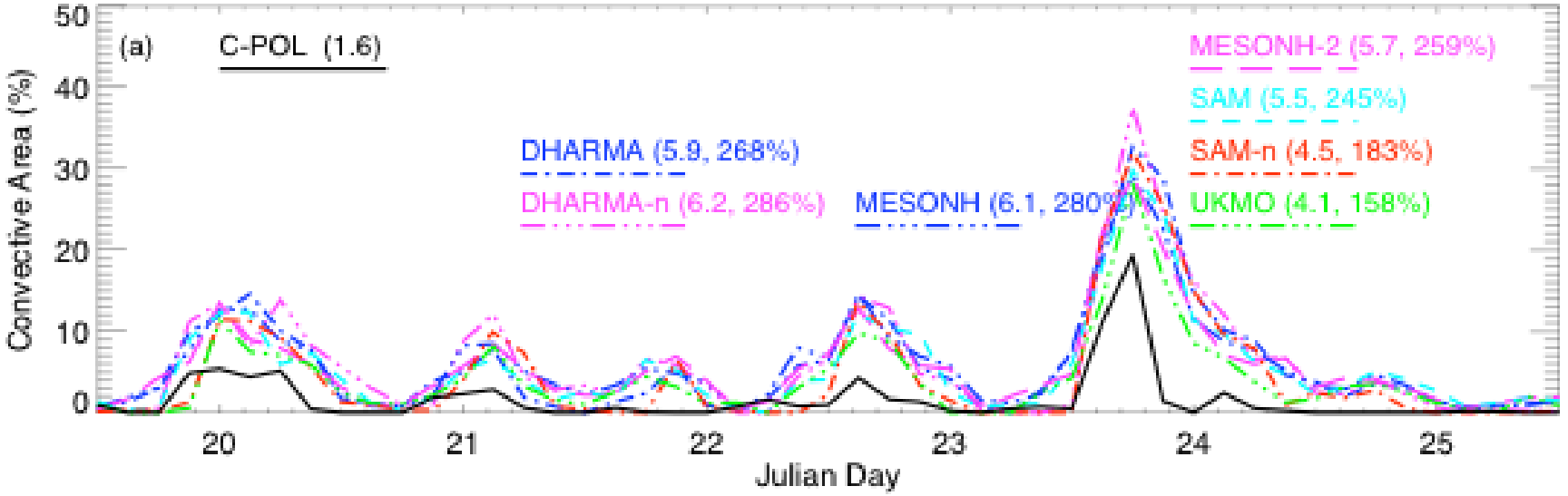
Model = UKMO, Event C, Julian = 23.875



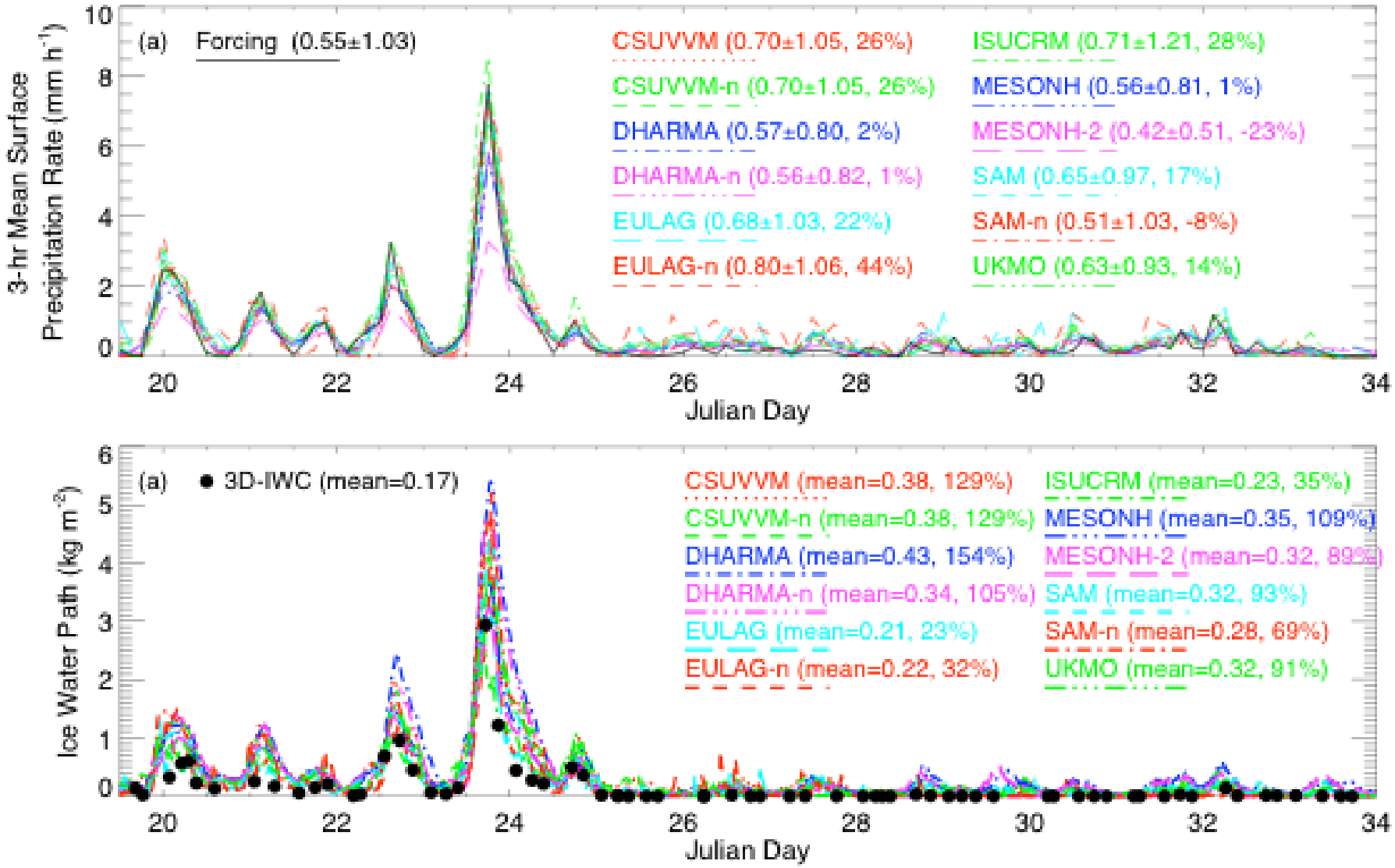




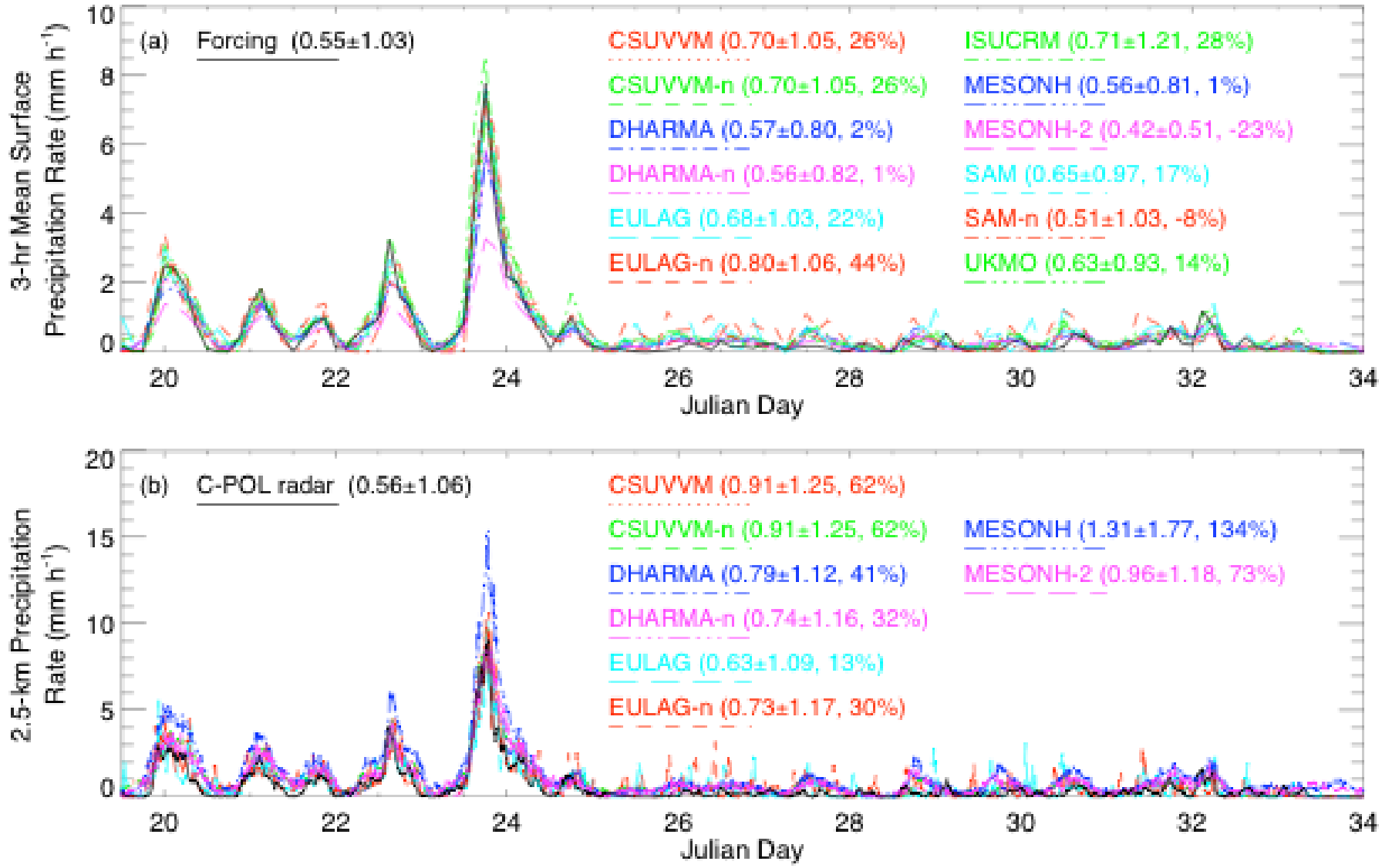
Convective area overestimated



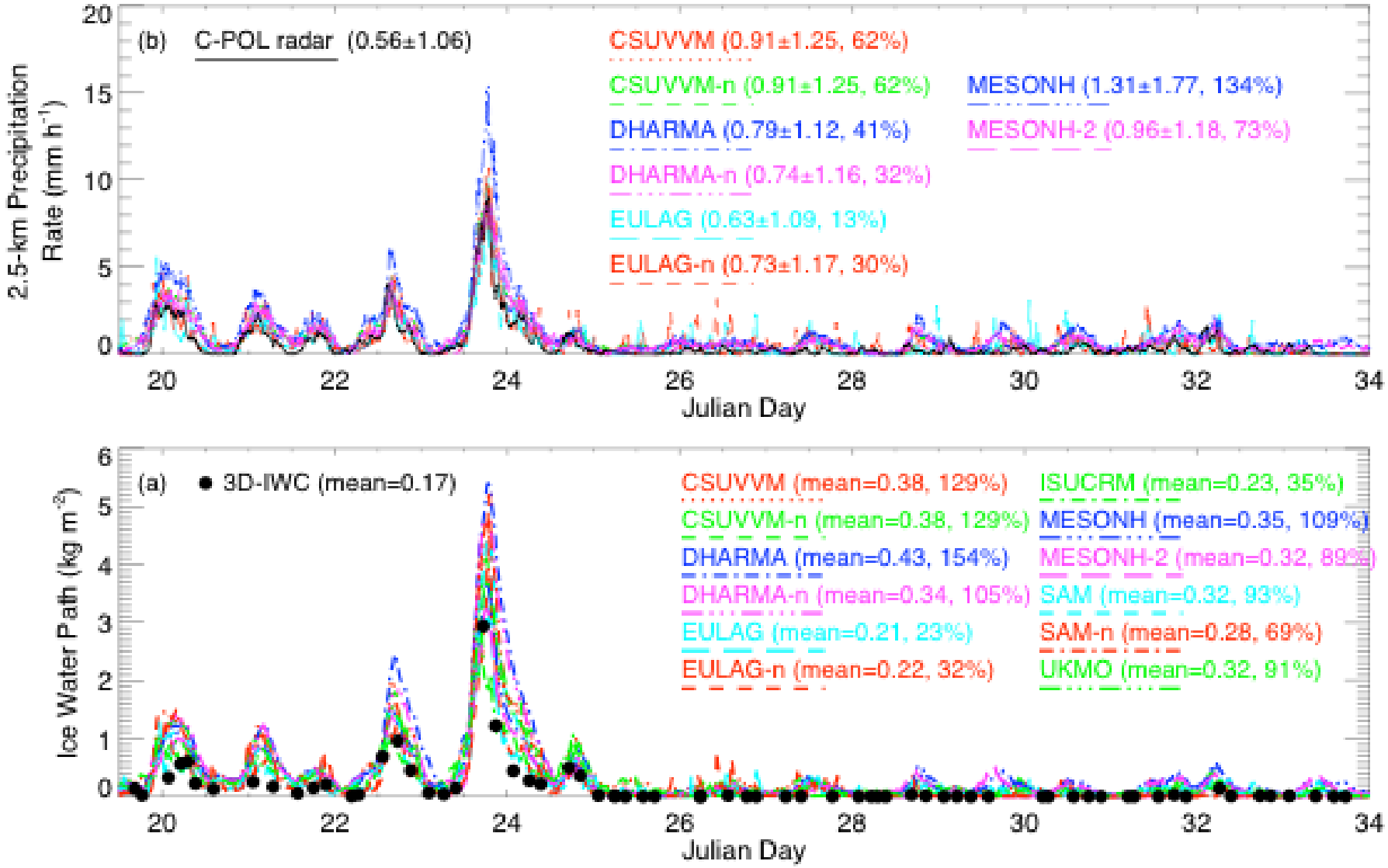
PRs = -23/+44% • IWP = +23/+154%



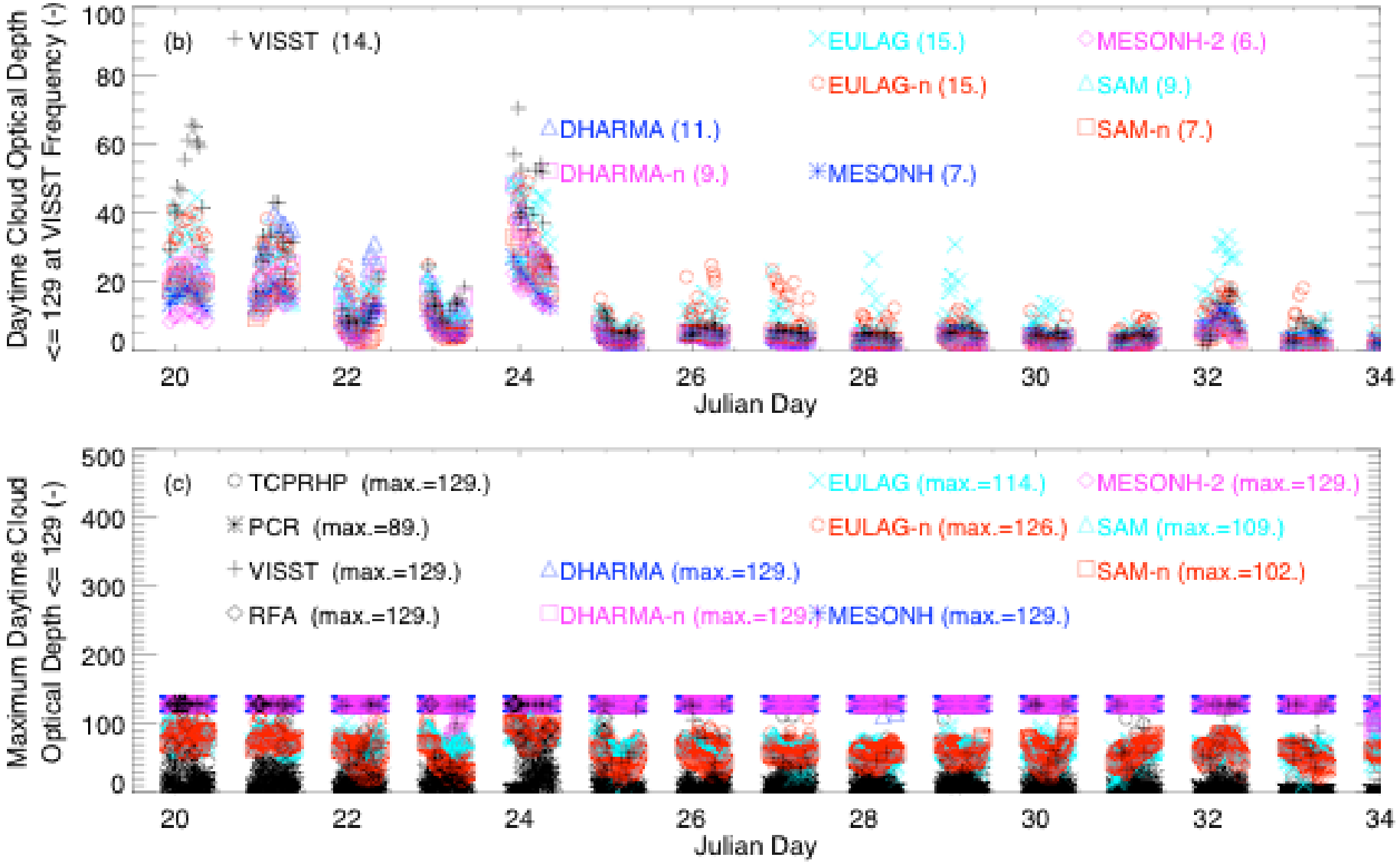
PR_2.5/PRs = 0.91-1.35-2.3



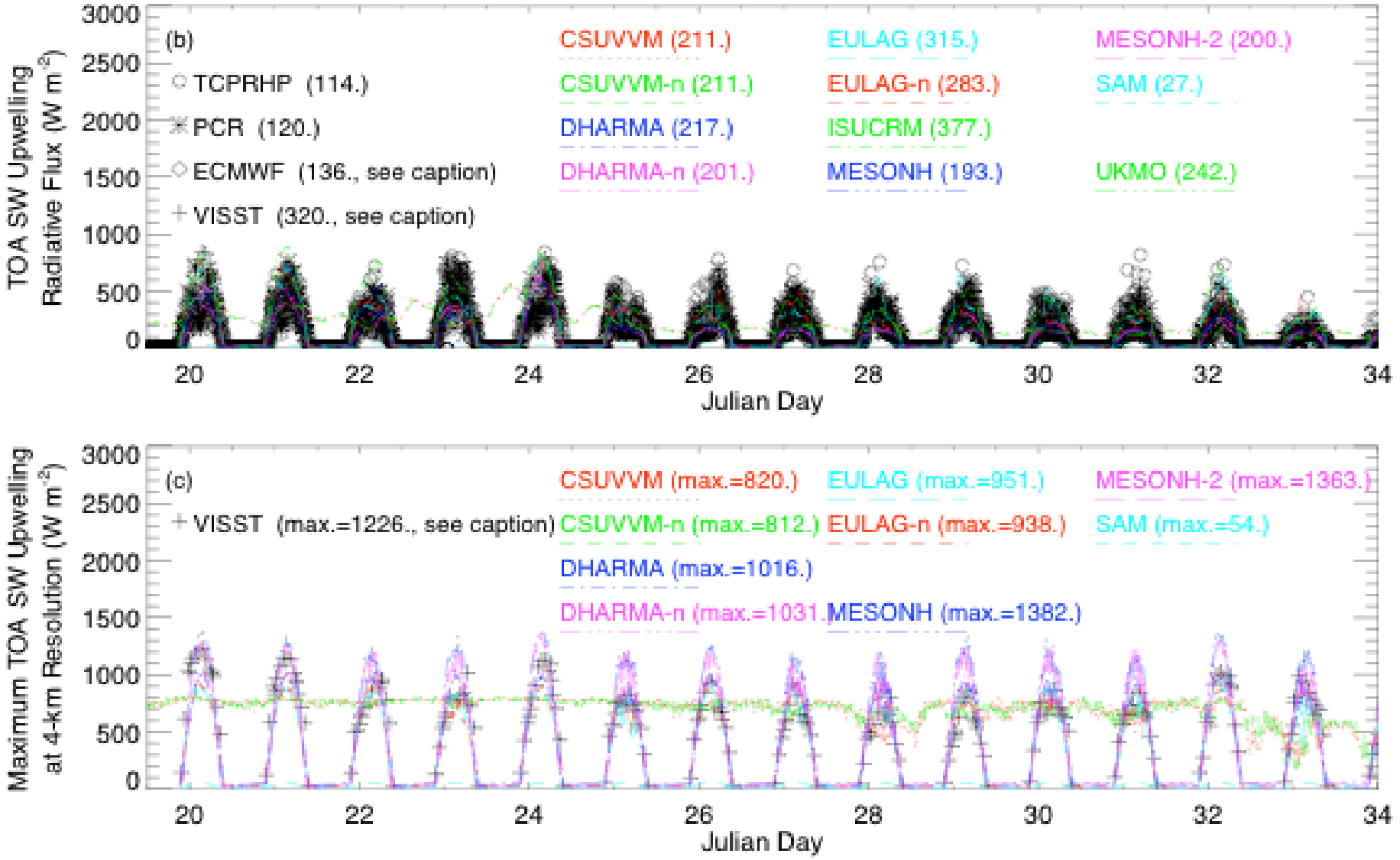
Issues in forcing assumptions?



Last note: radiative fluxes



Albedo generally underestimated



Overview

- Diagnostics
  - 2X range of most bulk measures
  - 6X range of stratiform area (3D models only)
    - good target for improving microphysics if forcing is adequate
    - good target for *understanding* models regardless
  - 5X range of w > 5 m/s mass fluxes in 2D vs 3D
- Are CRMs constrained?
  - systematic model biases suggest issues with forcing
    - apparent overestimates of updraft areas, PR(2.5 km), IWP
  - issues with forcing?
    - advection of condensate (temporally limited time periods)
    - assumption that PR(sfc) = PR(2.5km)?
    - application of uniform domain mean ascent/descent (role of resolved scale?)
  - quantification of forcing uncertainties should be a high priority
    - more than uncertainty in precipitation retrieval, need methodology and application
    - affects SCM studies, CRM use for SCM improvements, CRM microphysics studies
    - quantification can be added in a re-processing framework
  - cloud structure a more powerful constraint *for CRMs* than averages?
    - analyzing point/profile data in context of structure should be a goal