
***TWP-ICE CRM/SCM/LAM/GCM
intercomparison studies: A few
lessons learned***

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thanks to

Jon Petch and Adrian Hill, UK Met Office

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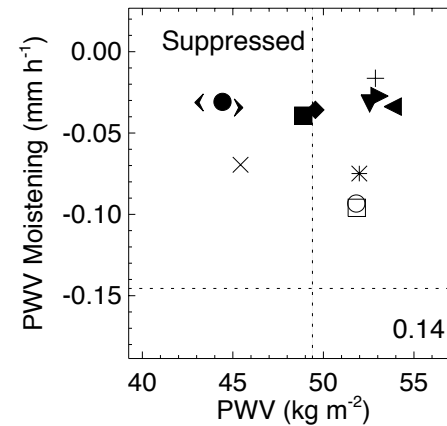
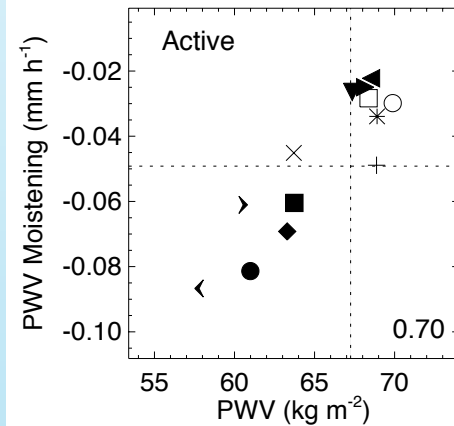
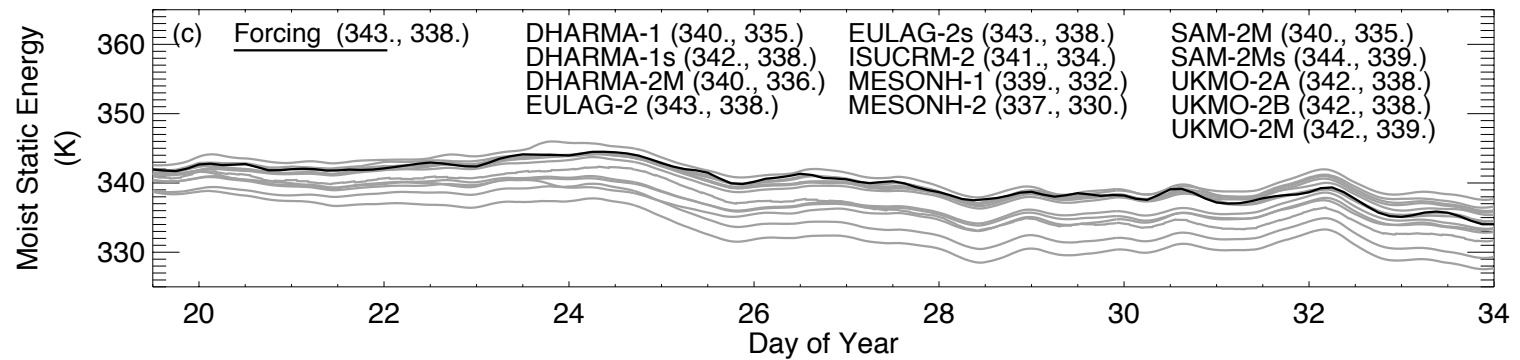
Laura Davies and Christian Jakob, Monash Univ.

and all the participants!

TWP-ICE CRM and cross-model-class inter-comparison studies: A few lessons learned



- CRMs with periodic BCs are prone to MSE drift (predicted SH and LH fluxes + radiative flux divergence differ variably from VARANAL large-scale forcing) [Fridlind et al., 2012]
 - **LESSON #1**: may be better to simply avoid long (> 7-d) CRM simulations if comparison with tropical observations is a goal (relaxation not popular)



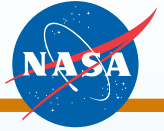
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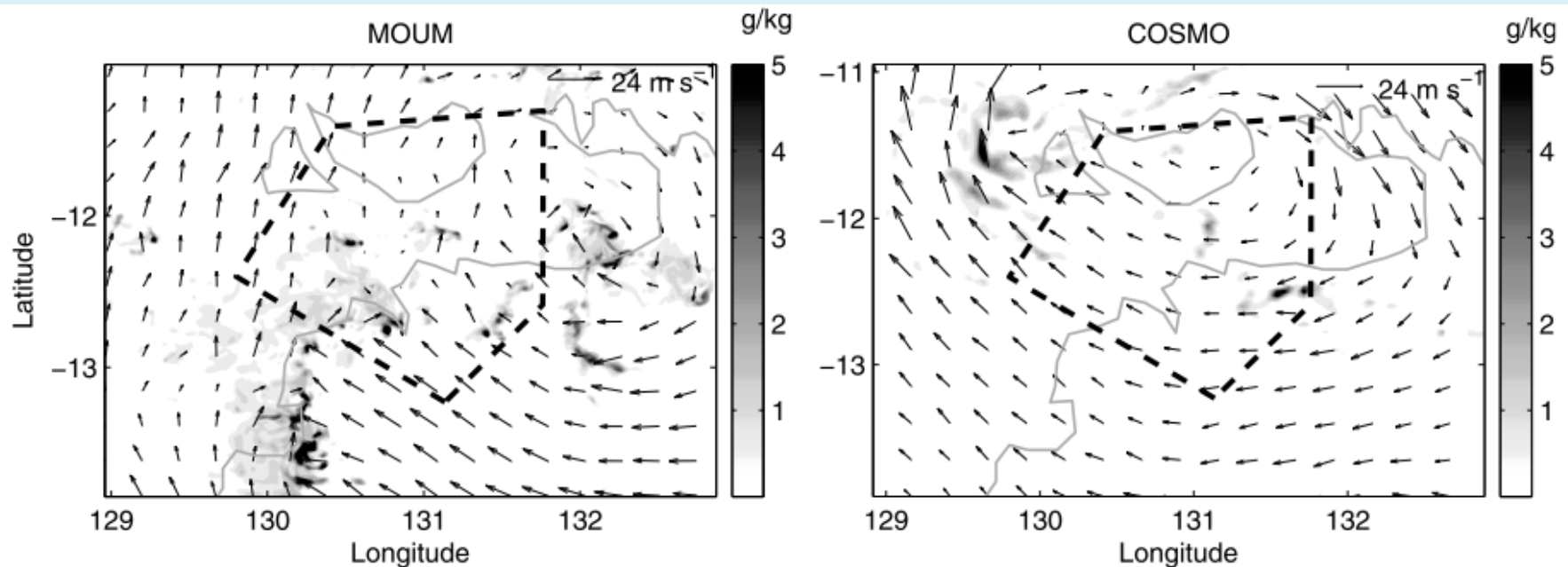


- CRMs with periodic BCs are prone to MSE drift (predicted SH and LH fluxes + radiative flux divergence differ variably from VARANAL large-scale forcing) [Fridlind et al., 2012]
 - LESSON #1**: better to keep CRM simulations short (<several days) if comparison with tropical observations is a goal (SCM-style relaxation unpopular)
- Rigorous CRM-SCM comparison does require identical initialization and BCs [Petch et al., submitted]
 - LESSON #2**: if SCM and CRM studies differ in LS forcing and CRM-SCM comparison is a goal, incorporate an identically forced sensitivity test

Model type reference	LEM/CRM Fridlind et al (2012)	LAM Zhu et al (2012)	Global Lin et al (2012)	SCM Davis et al (2013)
Number of models	10	6	9	9
Horizontal domain size	200-300 km ²	400-500 km ²	Global	One column
Analysis area	domain	average of grid boxes overlapping with the TWP-ICE variational analysis domain	average of grid boxes overlapping with the TWP-ICE variational analysis domain	1 grid box
Horizontal grid length (km)	0.9 - 3	1 - 3	20 - 250	25 - 200
Vertical grid length around 500 mb (km)	0.18-0.6	0.3-0.5	0.3-1.0	0.3-1.0
Forecast lead time analysed	Free running for whole period	12 to 36 hours	24 to 48 hours	Free running for whole period
Forcing	Variational analysis	Nested in global models driven by EC analysis	ECMWF analysis	ECMWF Variational analysis



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- LAM simulations tend to locate intense rain events variably in space and time [Zhu et al., 2012]
 - **LESSON #3**: statistical comparison could have benefits beyond matched spatiotemporal comparison



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- GCM/LAM/CRM/SCM comparison would benefit from choosing at least one common theme and a unique set of diagnostics, e.g., stratiform and convective rainfall [Lin et al., 2012]
 - LESSON #4**: unique diagnostics require run-time calculations that can't be done after-the-fact, so a clear focus on joint scientific questions *in advance* would be beneficial

