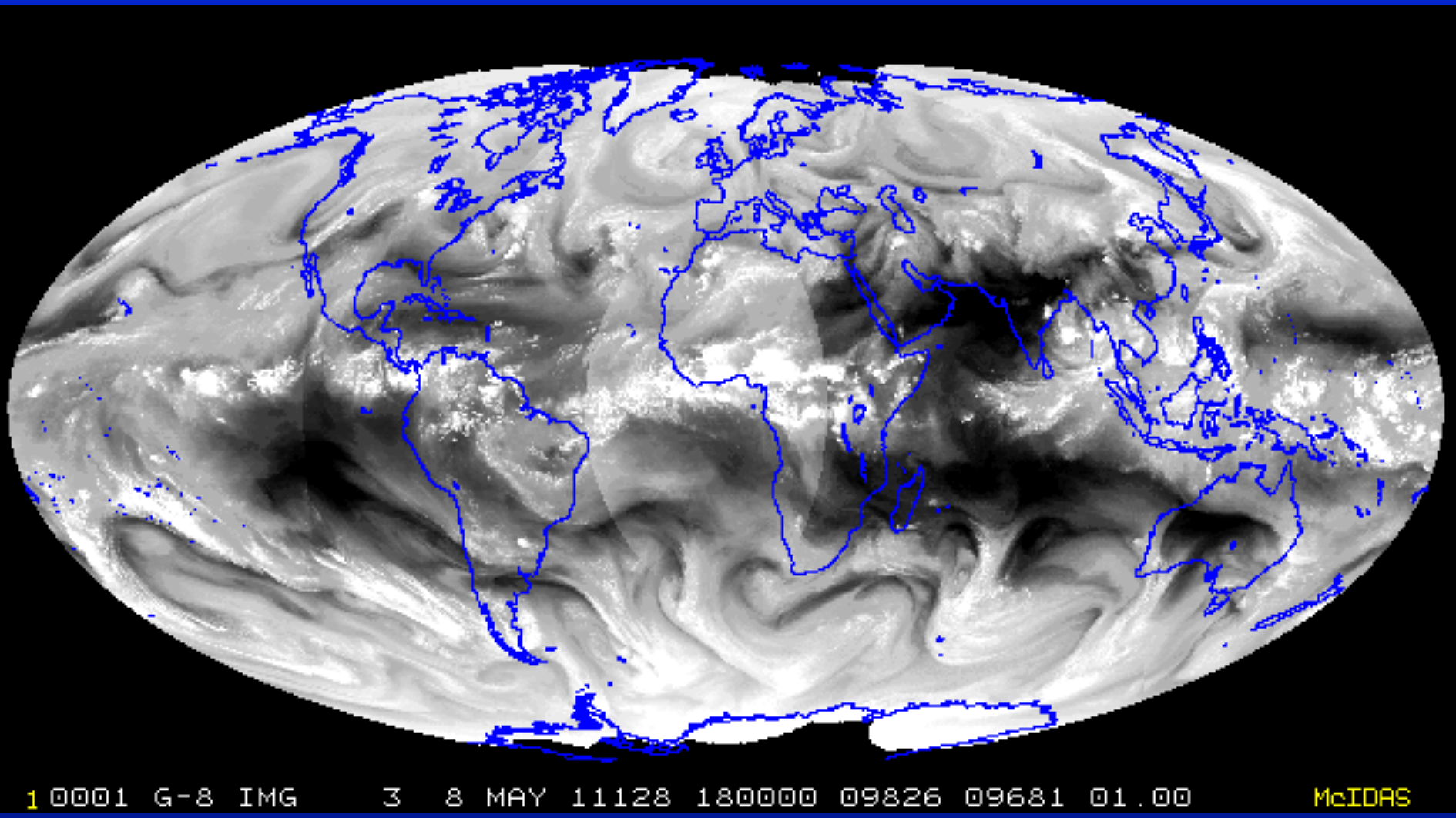
(Personal) Paradigm Shifts re: the Water Cycle… at the climate/weather interface

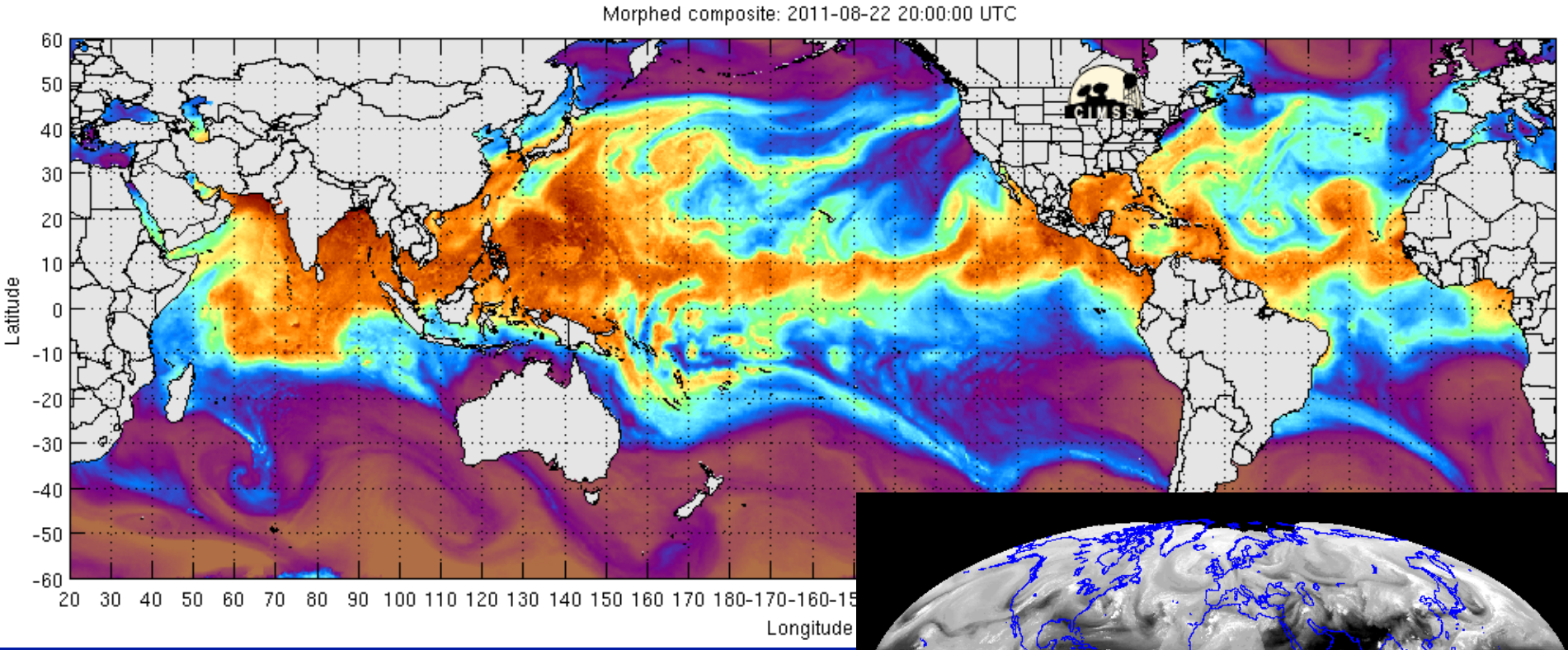
Atmospheric arm of

GOES Water-Vapor Channel Imagery

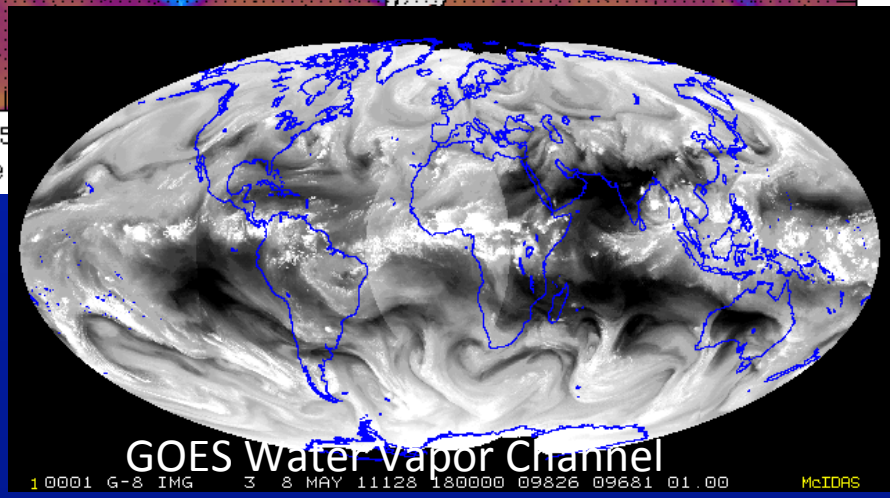


SSM/I Integrated (Total Column) Water Vapor

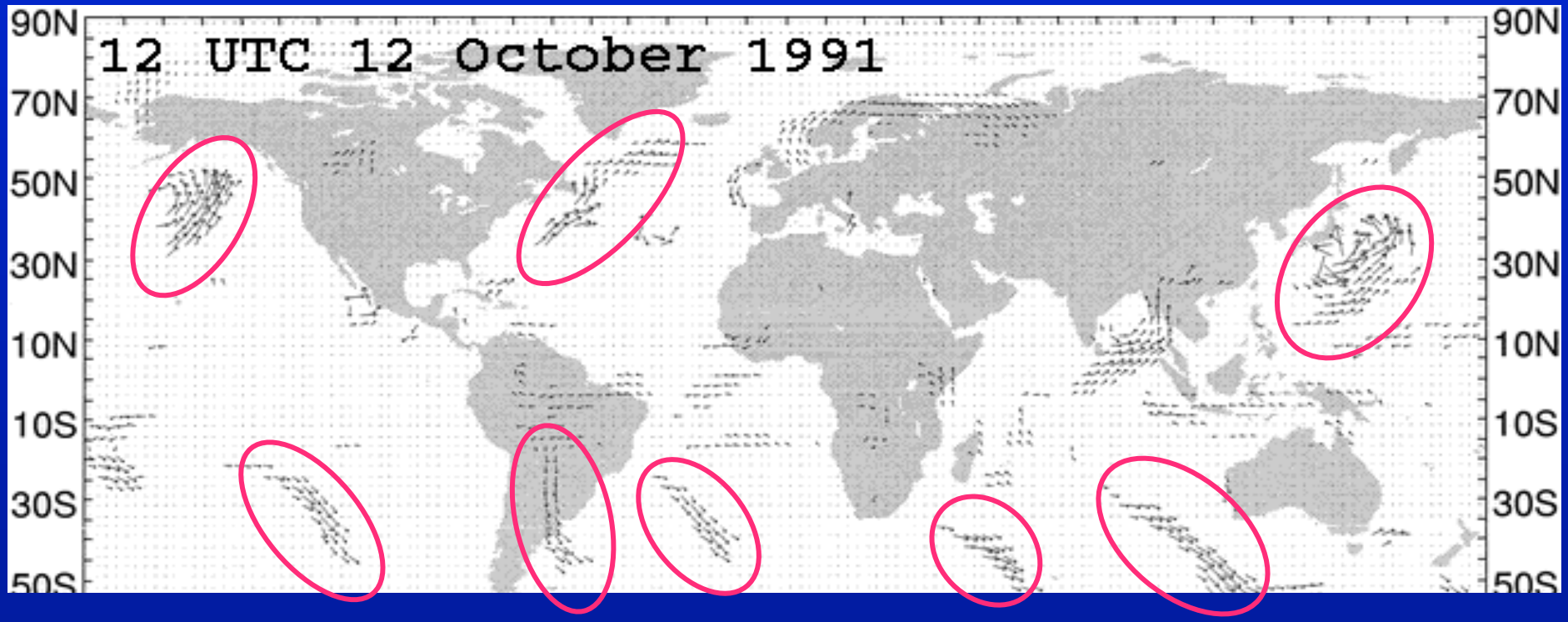
72 hours beginning on 25 August 2011 (Last Week)



SSM/I = Special Sensor Microwave Imager



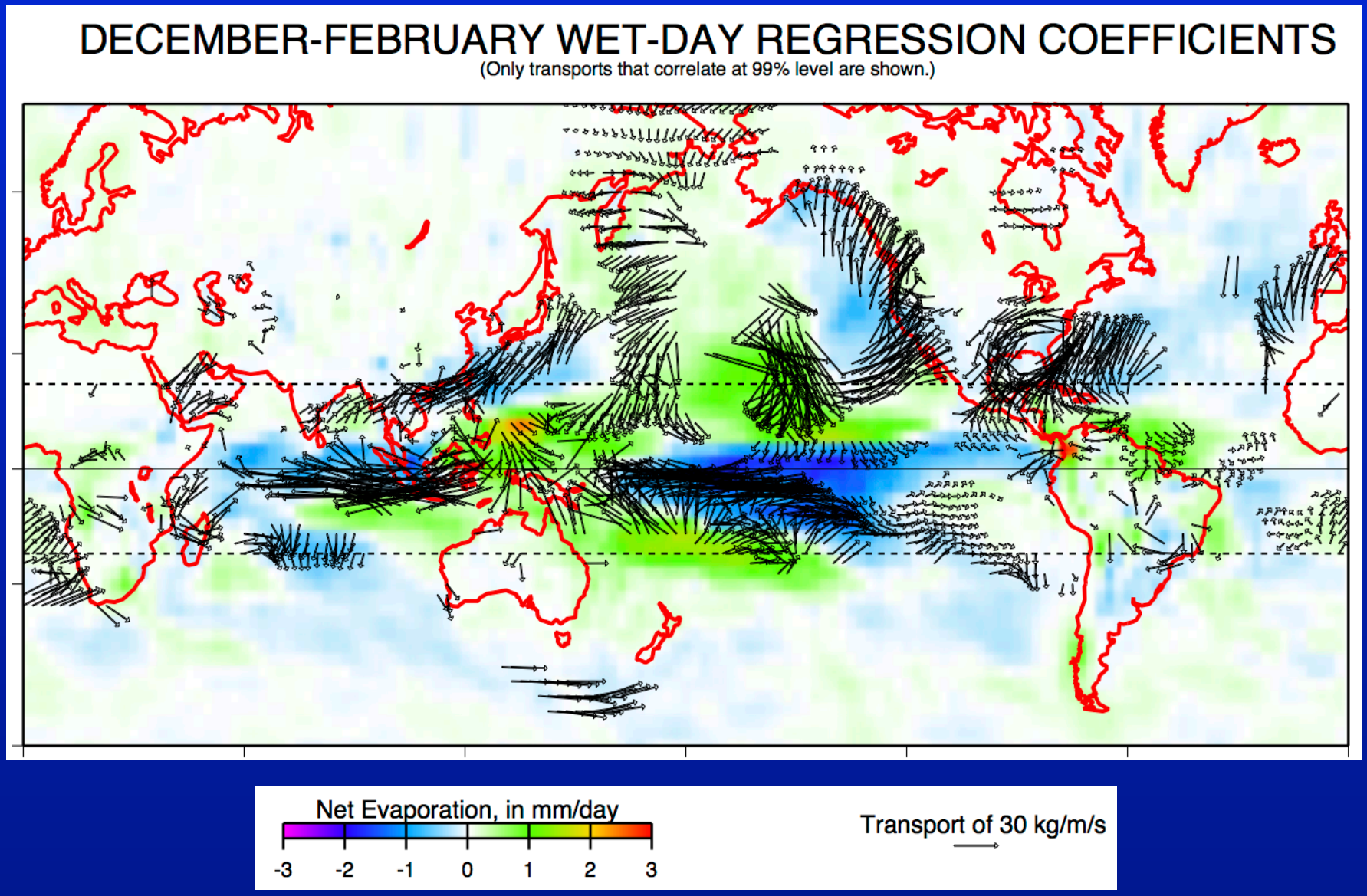
Zhu & Newell 1998: *Diagnostic study using ECMWF (model-based) forecasts*



Atmospheric rivers contain 95% of poleward water vapor flux outside the Tropics, in <10% of the zonal circumference

NOTE: This burst-i-ness is an emergent property in models & nature.

Atmospheric Vapor Transports associated with Nino3.4 SSTs, 1948-2000



Dettinger et al. 2004 JHydromet

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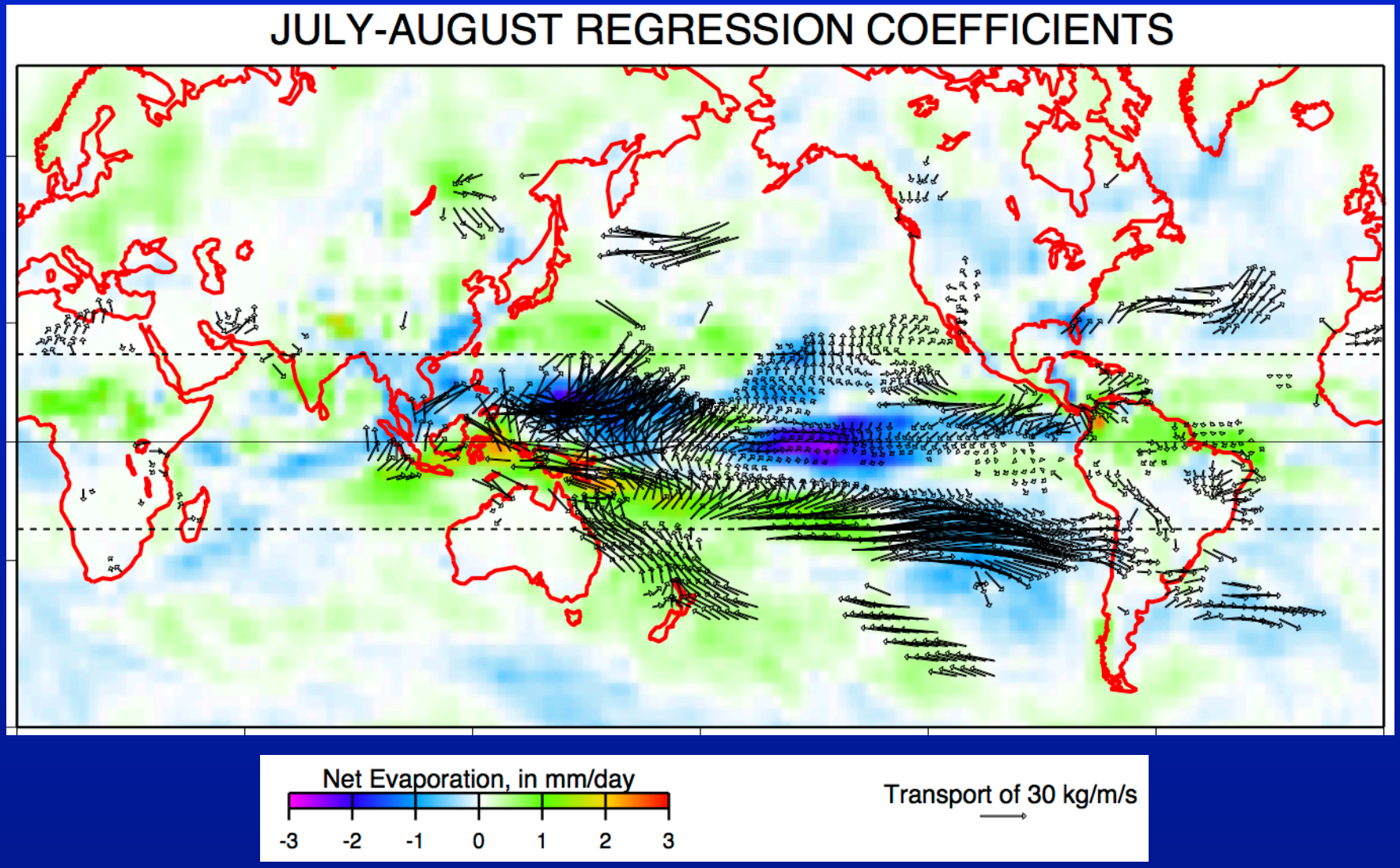

Dettinger et al. 2004 JHydromet

What then IS the right way to conceptualize the atmospheric arm of the water cycle?

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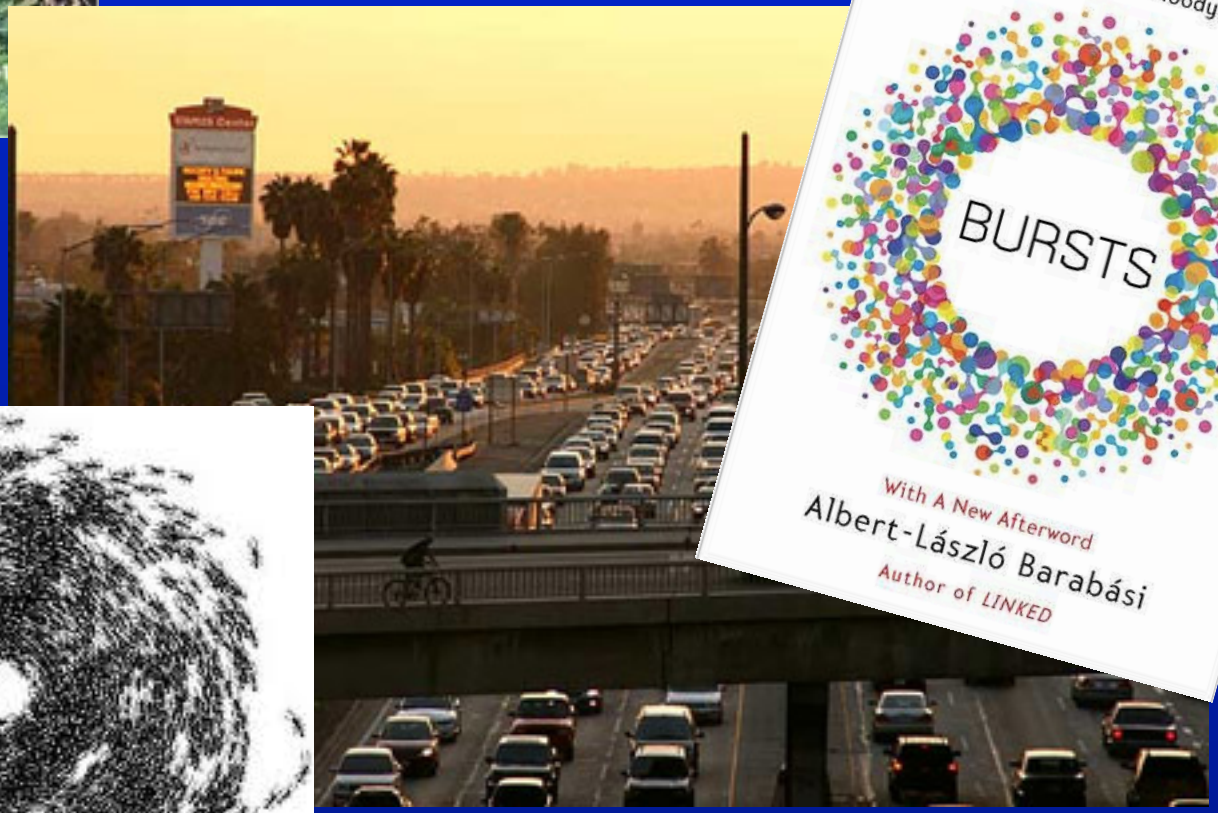
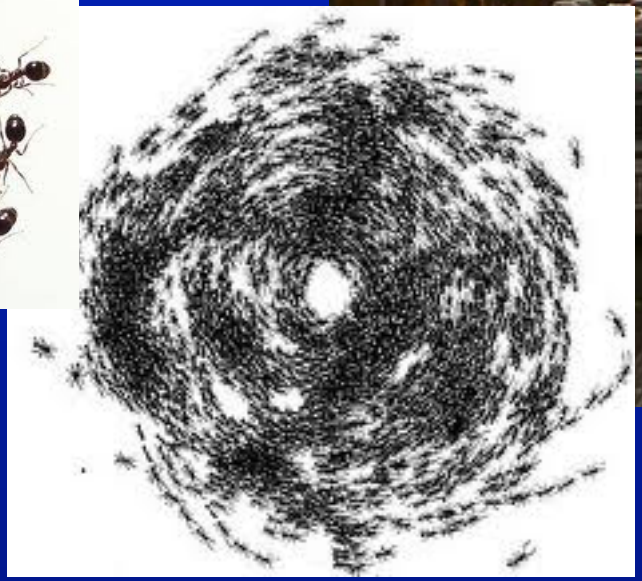
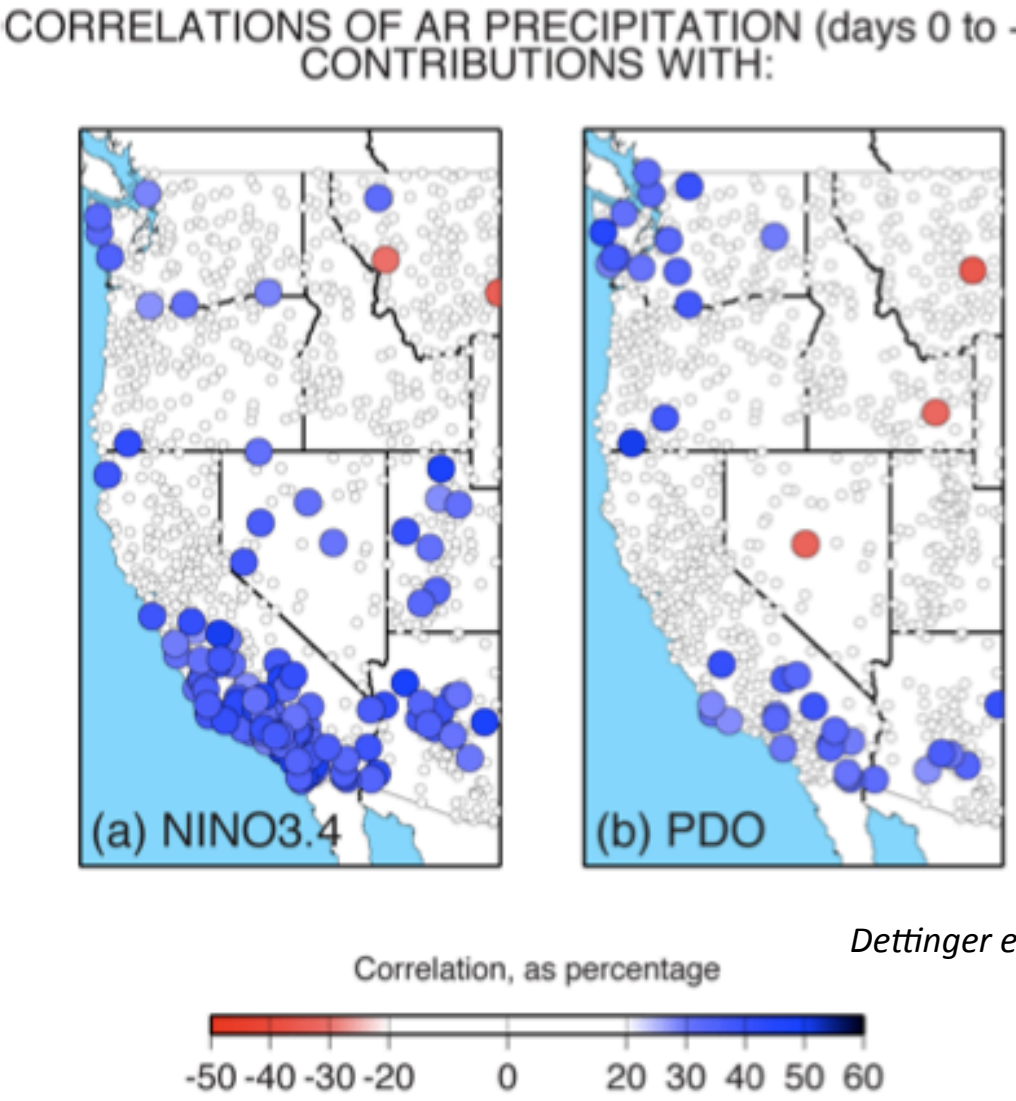


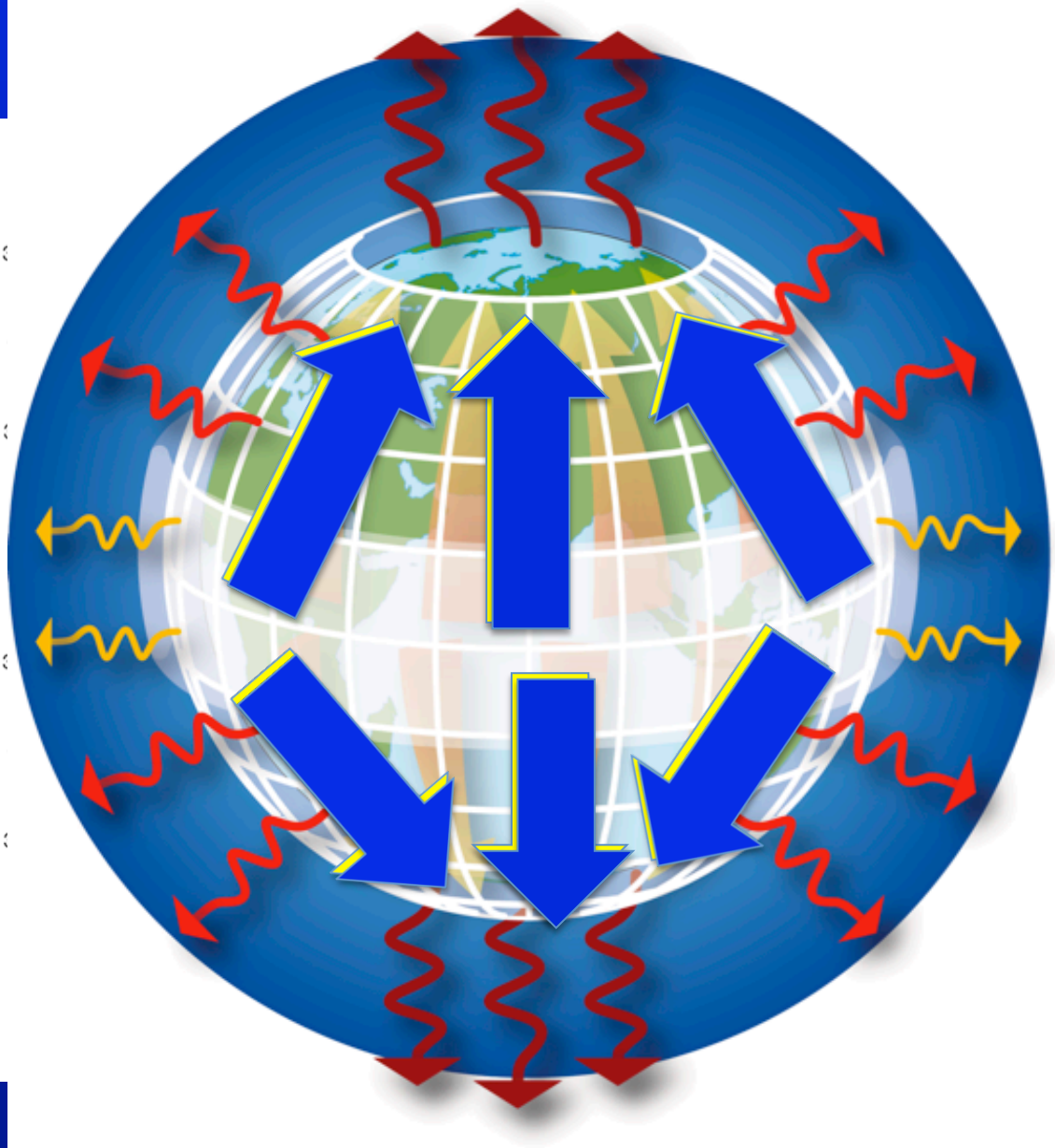


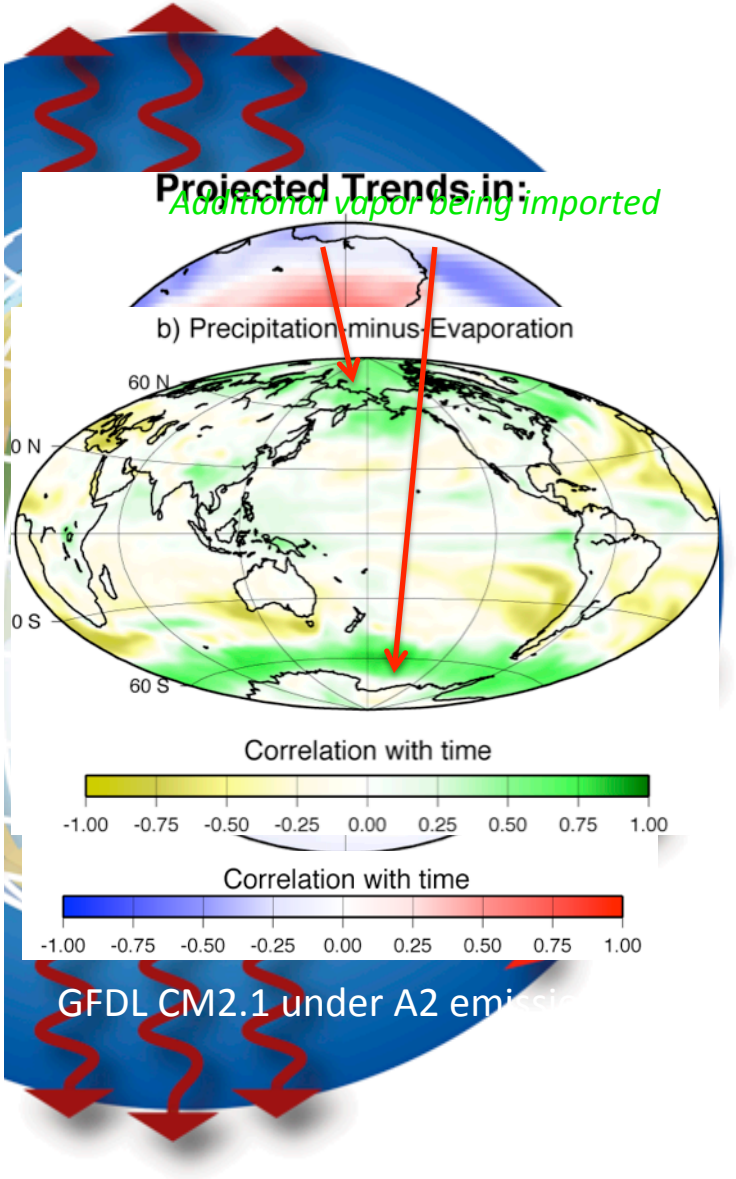
The atmospheric part of the water cycle is much more “burst-y” than we tend to conceptualize!

How does the fraction of annual precipitation derived from landfalling ARs vary with tropical-Pacific modes?



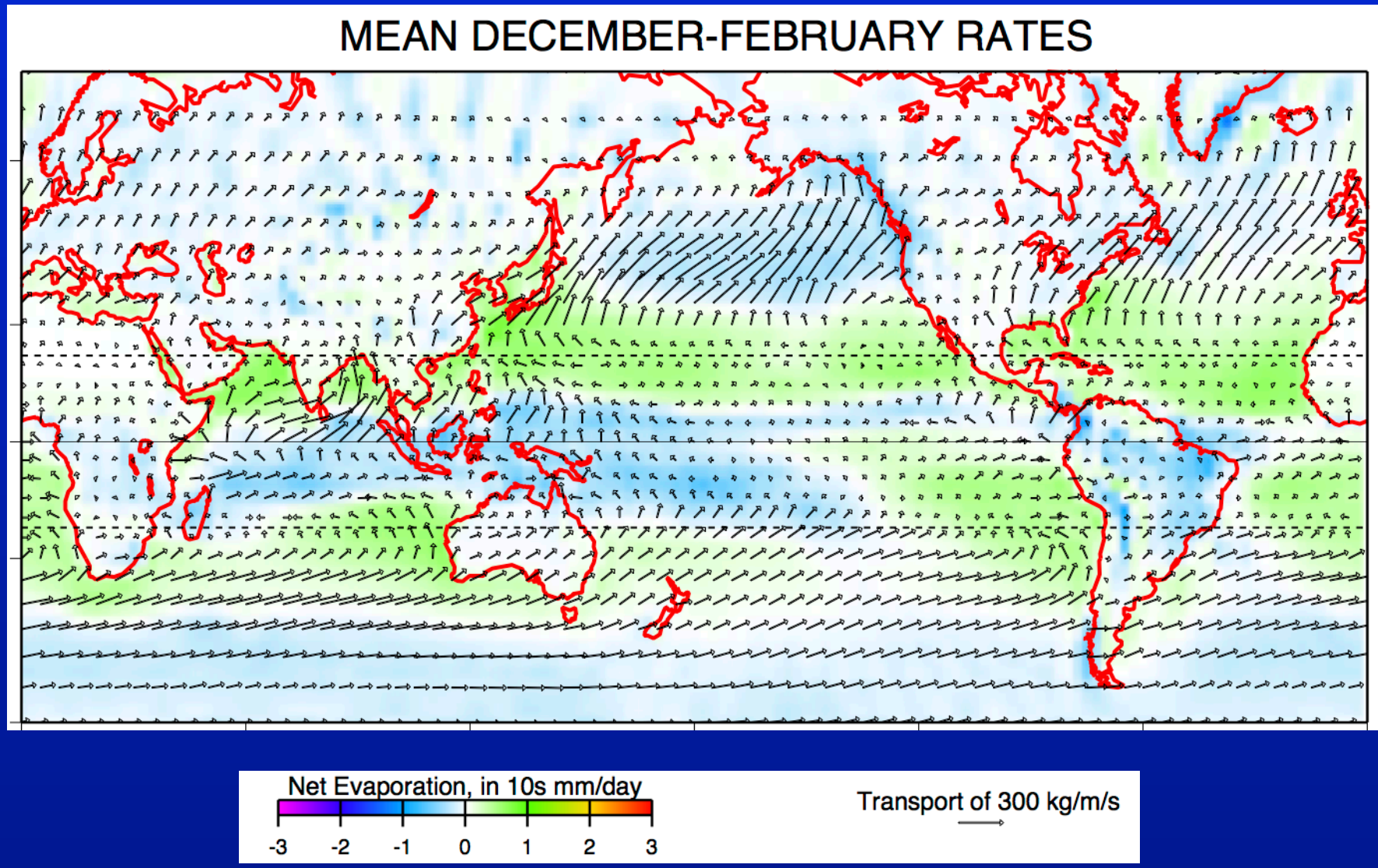
Dettinger et al., 2011, Water



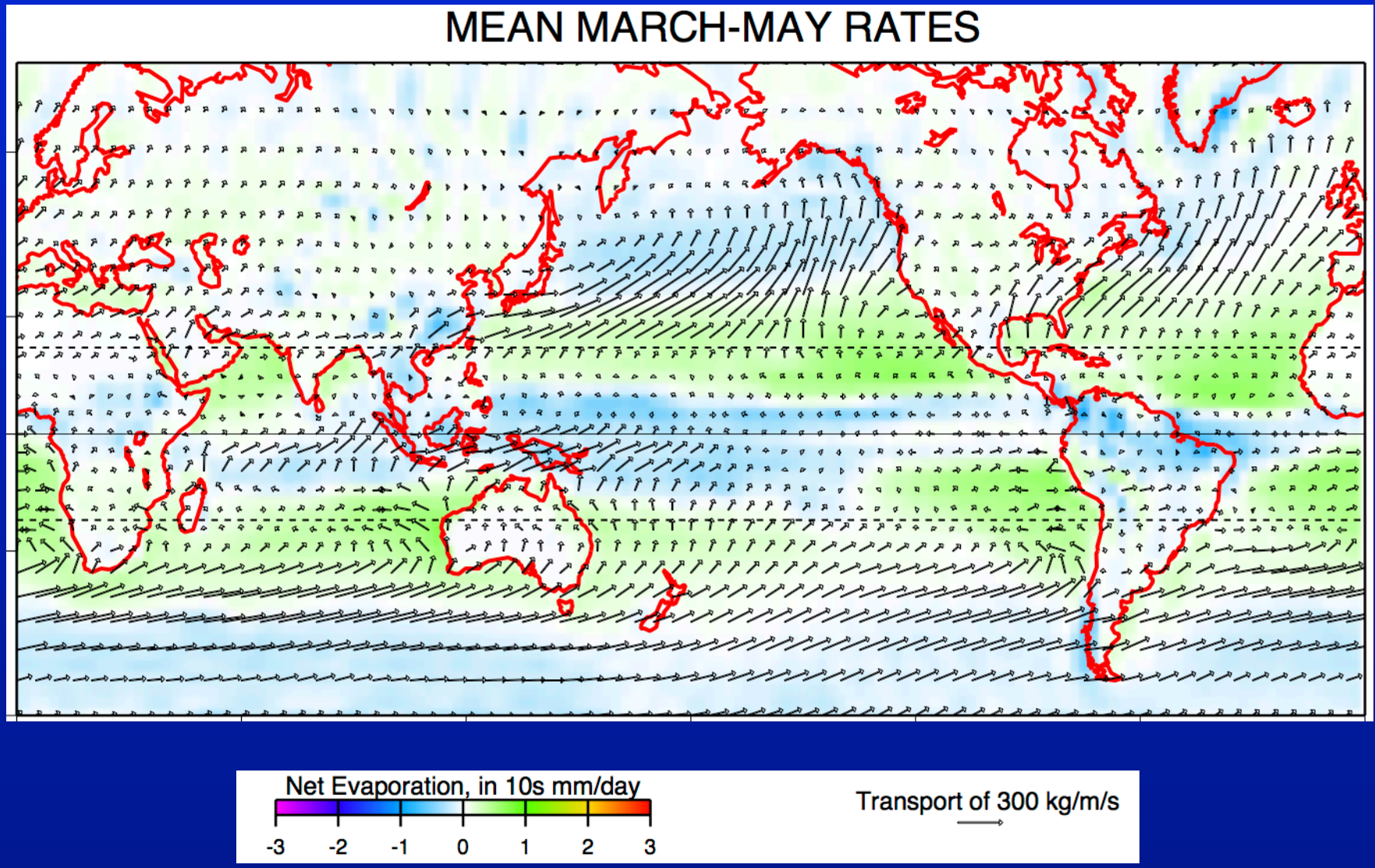


GFDL CM2.1 under A2 emissi

Seasonal Cycle of Atmospheric Vapor Transports, 1948-2000



Seasonal Cycle of Atmospheric Vapor Transports, 1948-2000



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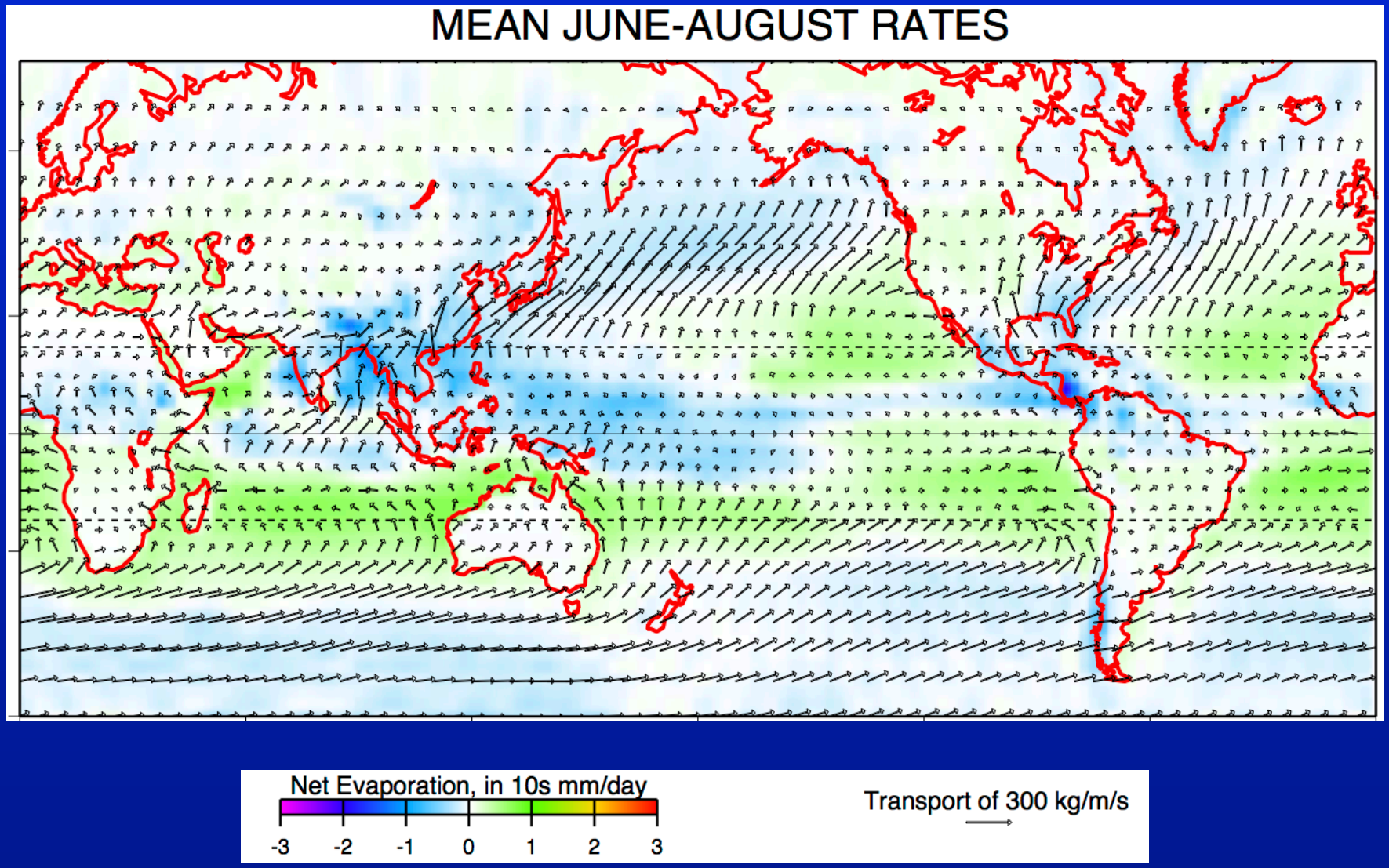

Seasonal Cycle of Atmospheric Vapor Transports, 1948-2000