



Tropical Precipitation Structures and their Self-Similarity

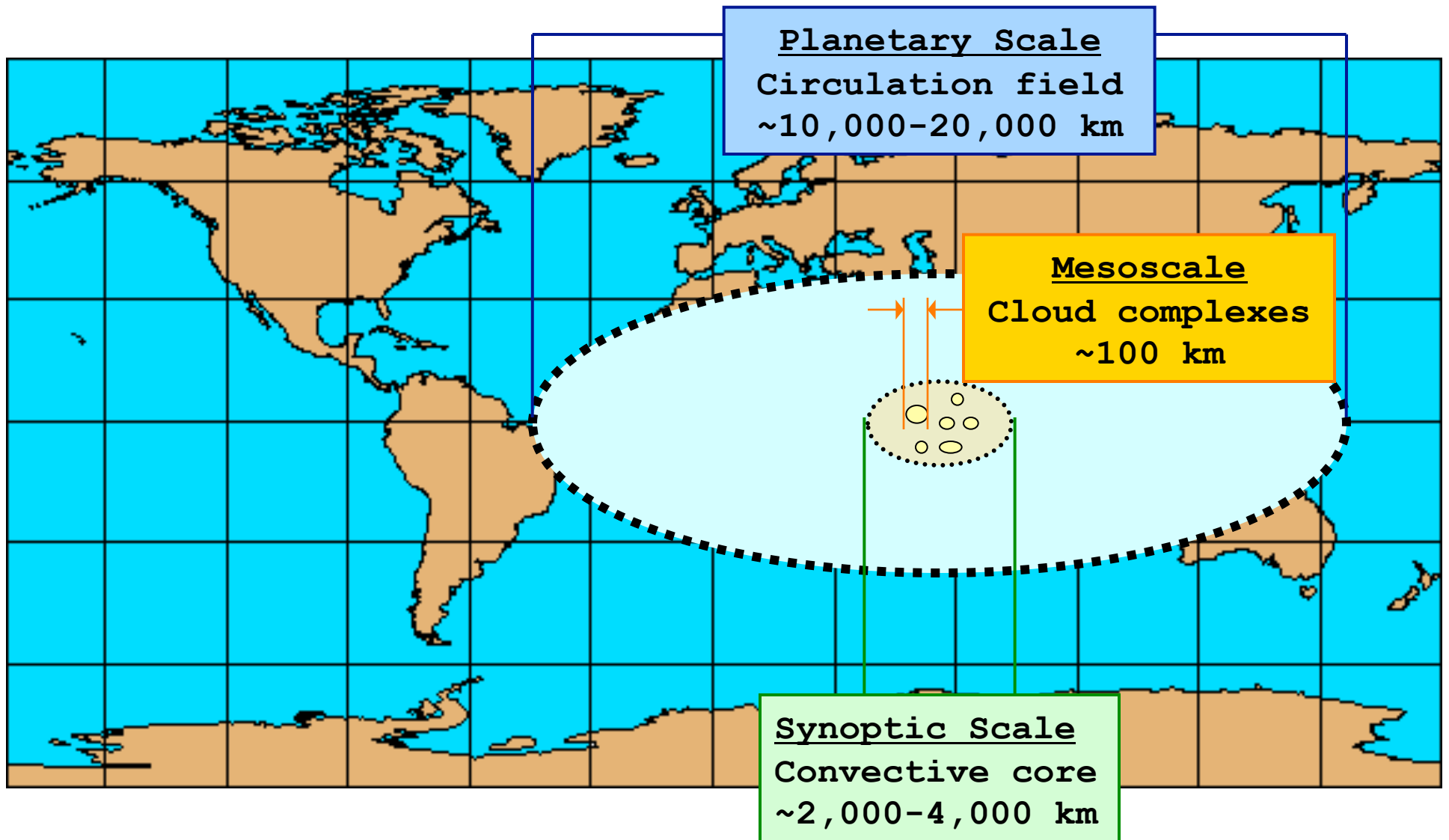
**Gregory Elsaesser
Colorado State University
CMMAP Graduate Student Colloquium 2009**

Before we discuss precipitation structures...



(Slide Stolen from Matt Masarik)

MULTI-SCALE STRUCTURE (Convectively Coupled Waves)



Cloud and Precipitation Structures

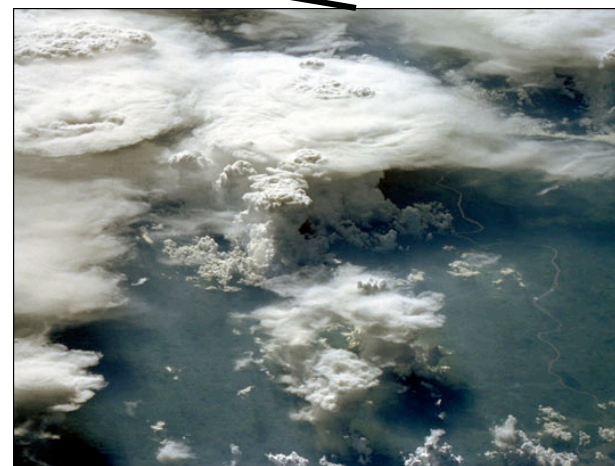


Mesoscale
Cloud complexes
~100 km

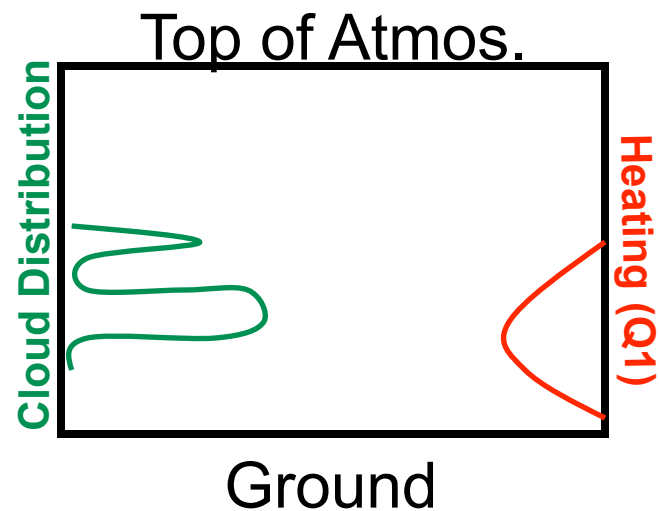
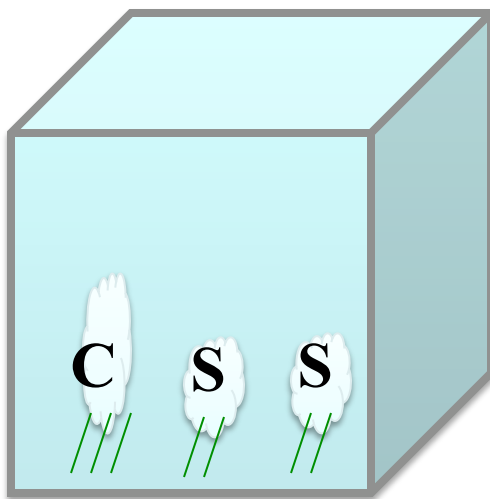
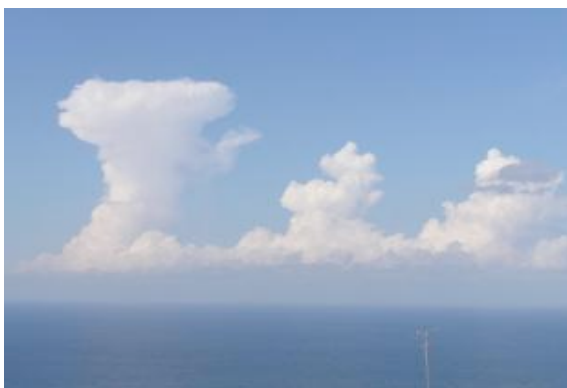
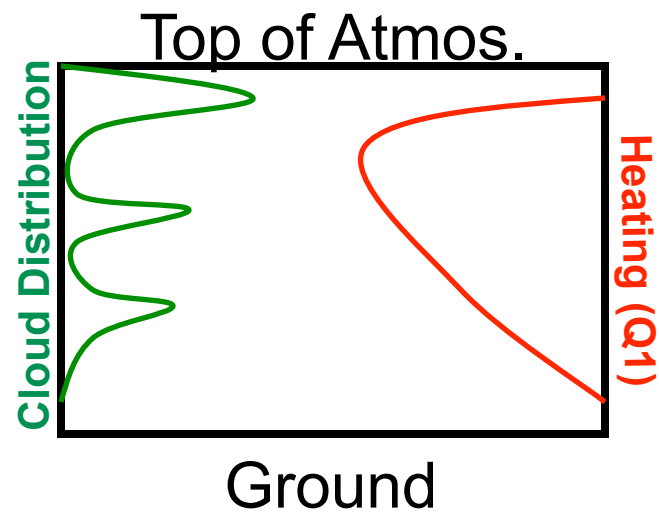
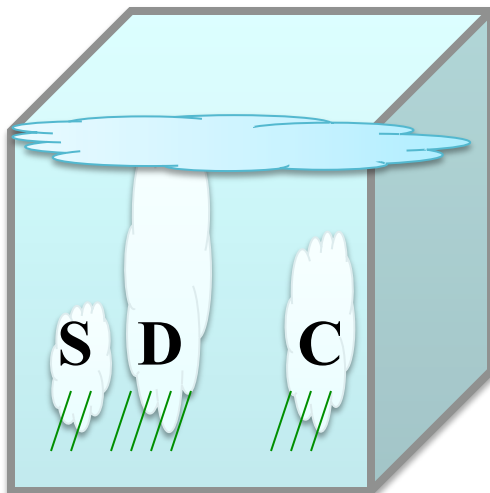
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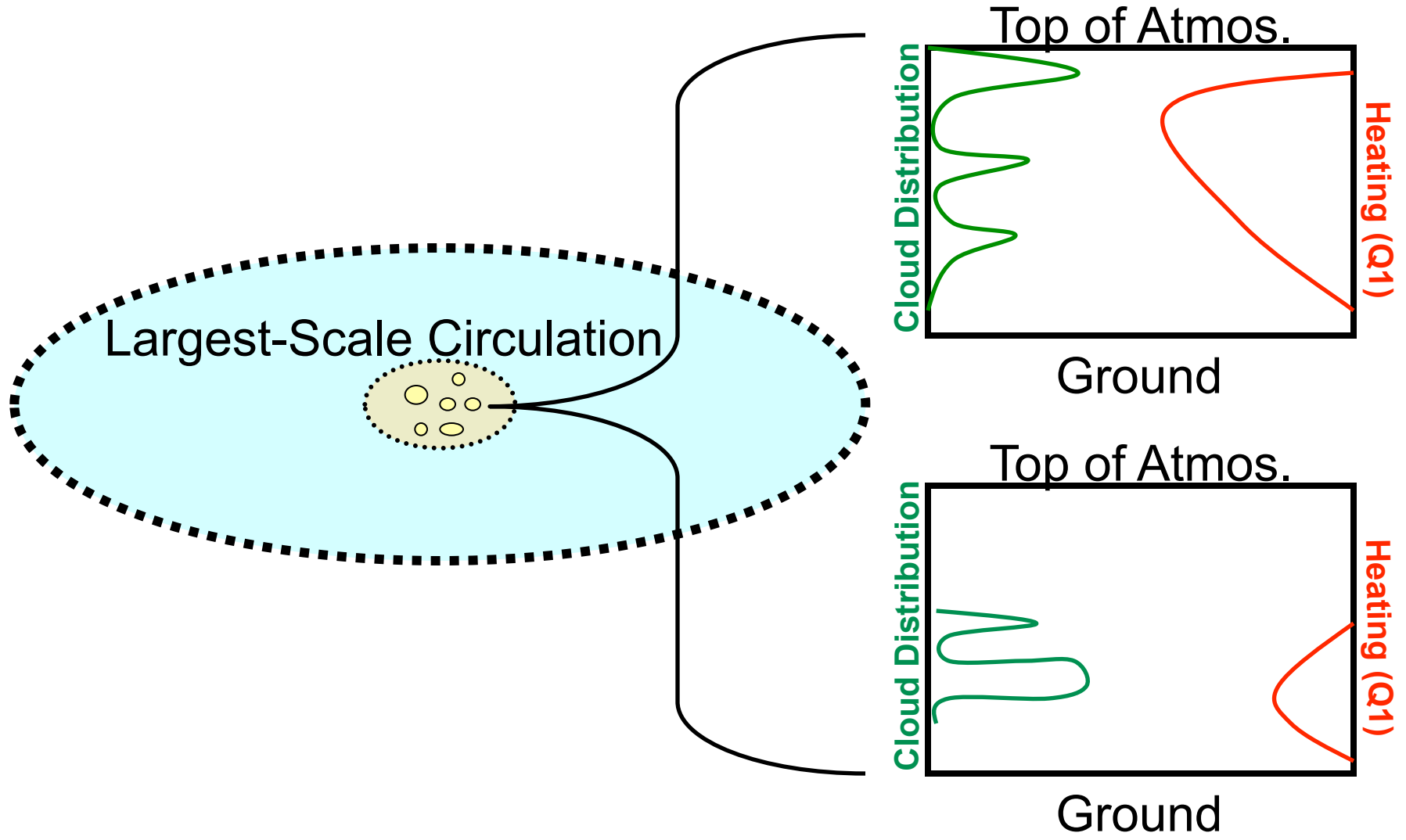
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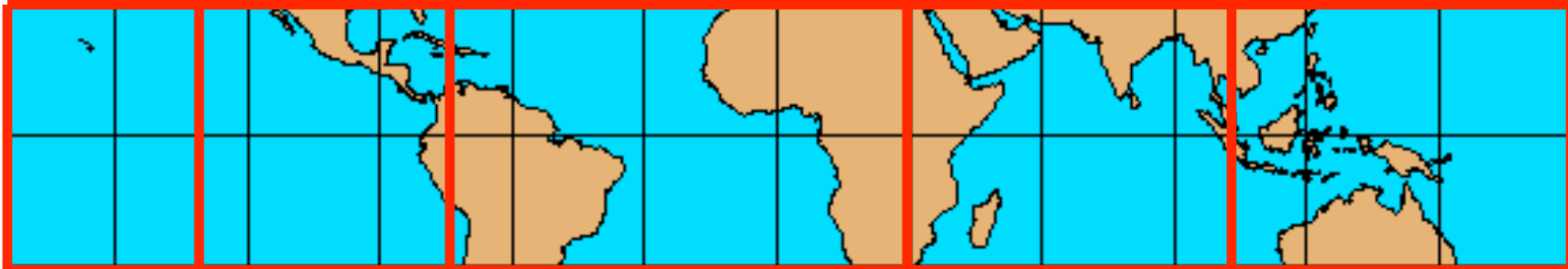
Cloud and Precipitation Structures



Cloud and Precipitation Structures



Cloud and Precipitation Structures (TRMM Satellite Observations)



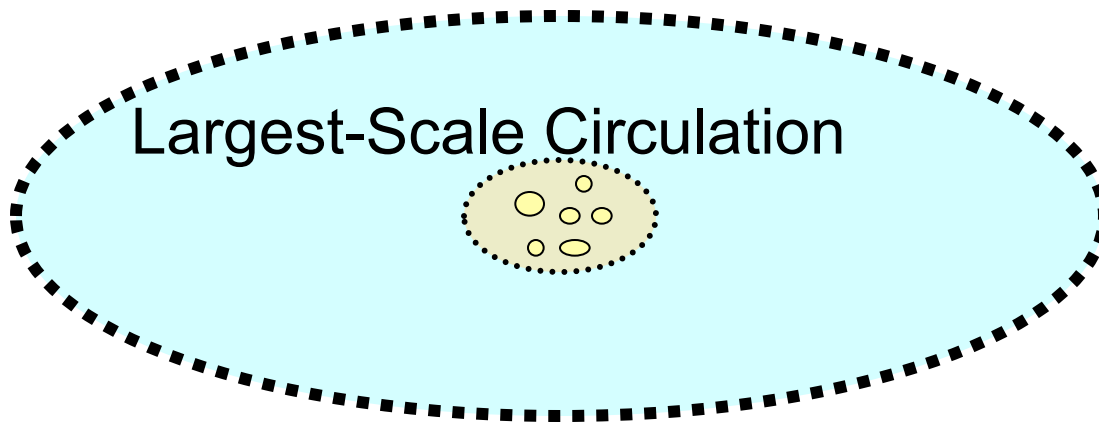
CPAC

EPAC

ATLA

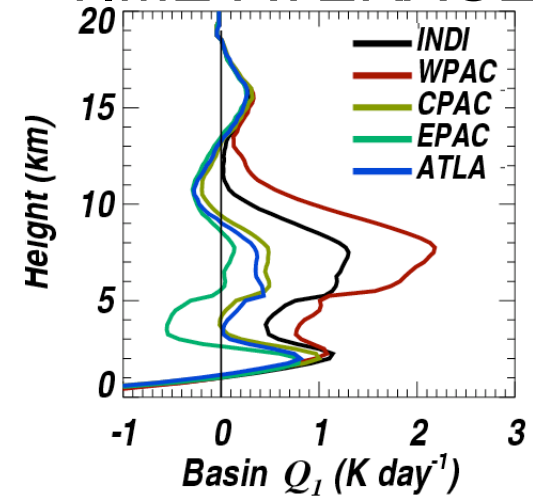
INDI

WPAC

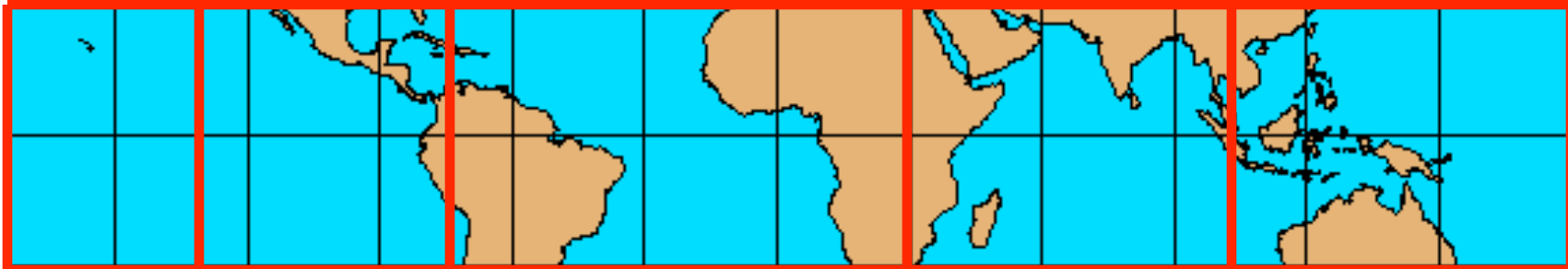


Largest-Scale Circulation

TIME-AVERAGE



Cloud and Precipitation Structures (TRMM Satellite Observations)



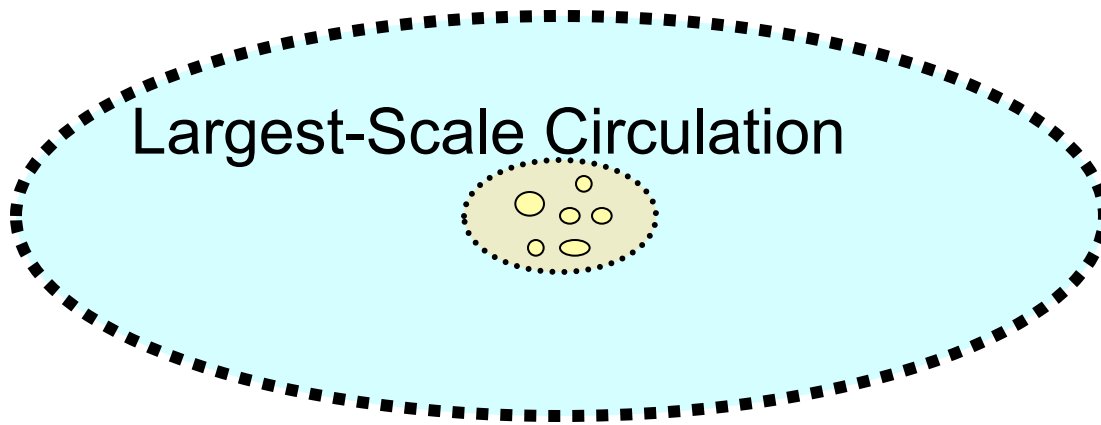
CPAC

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ATLA

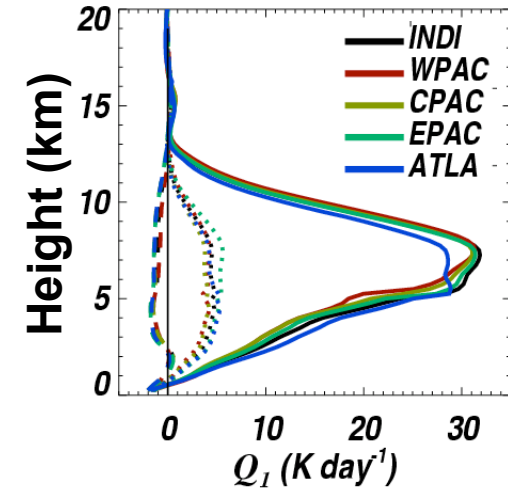
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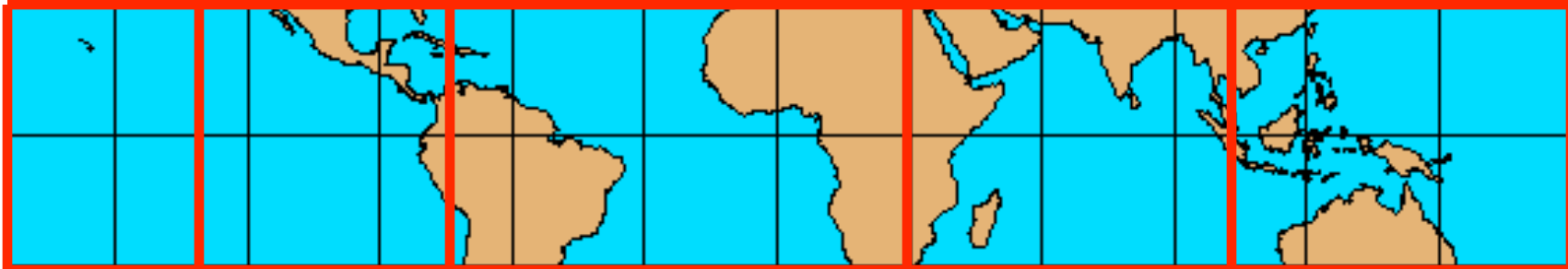


Largest-Scale Circulation

REGIME-AVERAGE



Cloud and Precipitation Structures (TRMM Satellite Observations)



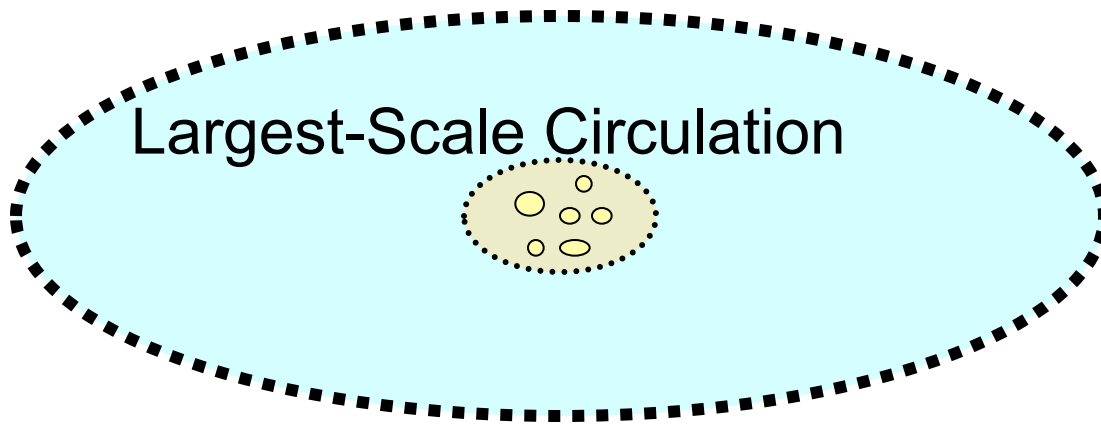
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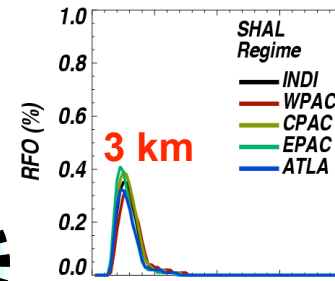
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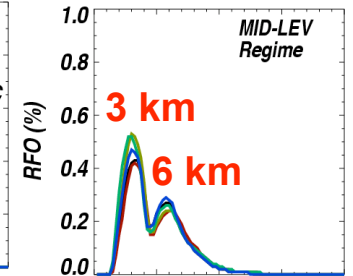
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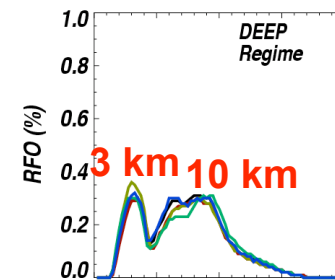
Largest-Scale Circulation



Cloud Top



Cloud Top



Cloud Top

Save the text for last...

- The nature of precipitation regimes at the 100-200 km scale has been investigated, and using new satellite-based products and conceptual frameworks, regime heating structures, rainfall and cloud regimes are now well quantified through use of satellite products (less need for imposing idealized heating when studying tropical waves/clouds).
- We can reproduce significantly different average precipitation backgrounds with the same repeating precipitation regimes, no matter where you are in the tropics.
- These primary regimes comprise larger scale systems and together, make up the (convective) heating that the systems “feel” - current work is now turning towards the larger-scale effects of these mesoscale heating ensembles.