

Precipitation and latent heating characteristics of the major Tropical Western Pacific cloud regimes

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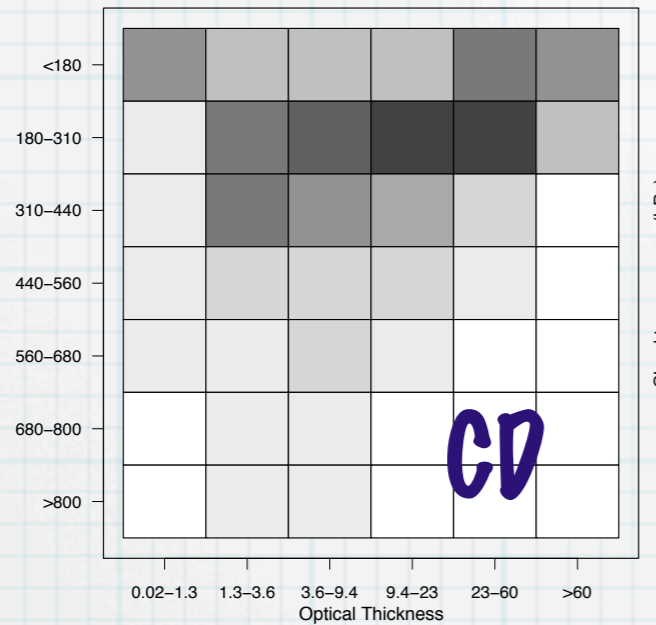
Method

- * Use ISCCP cloud regimes (Rossow et al. 2005) - daily regimes
- * Match with TRMM observations ("daily means") - pixel classification - 2.5 deg grid
- * TWP region (10°N-10°S, 130°-170°E) only
- * examine precipitation and latent heating behaviour by regime

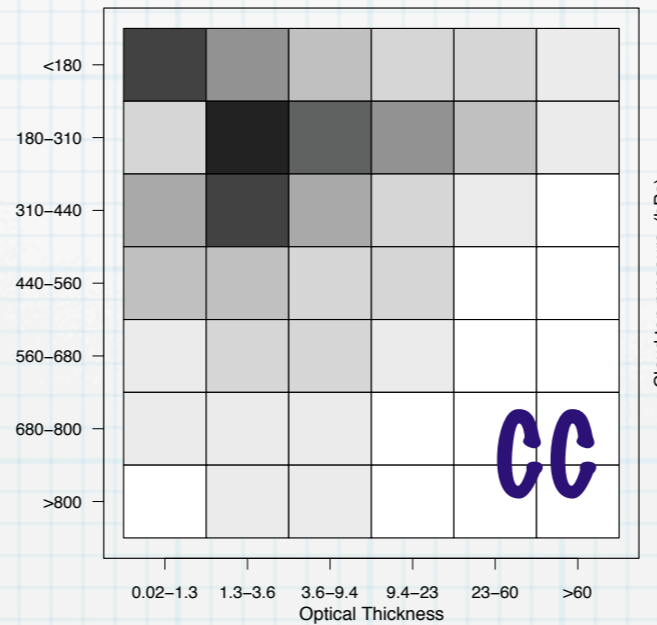
ISCCP cloud regimes

active

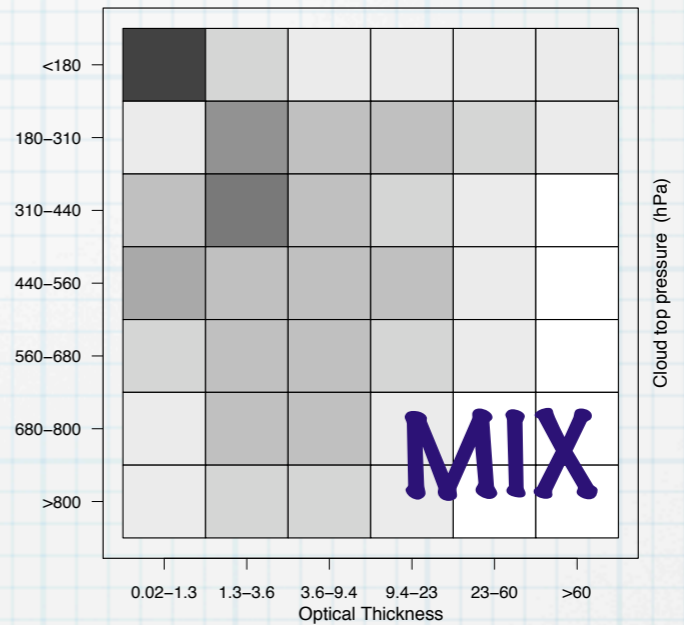
CD - RFO=15% **15%**



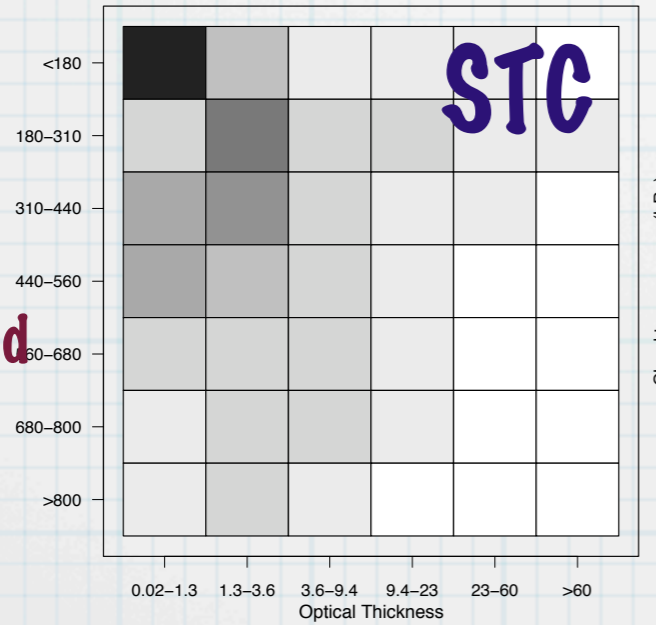
CC - RFO=11% **11%**



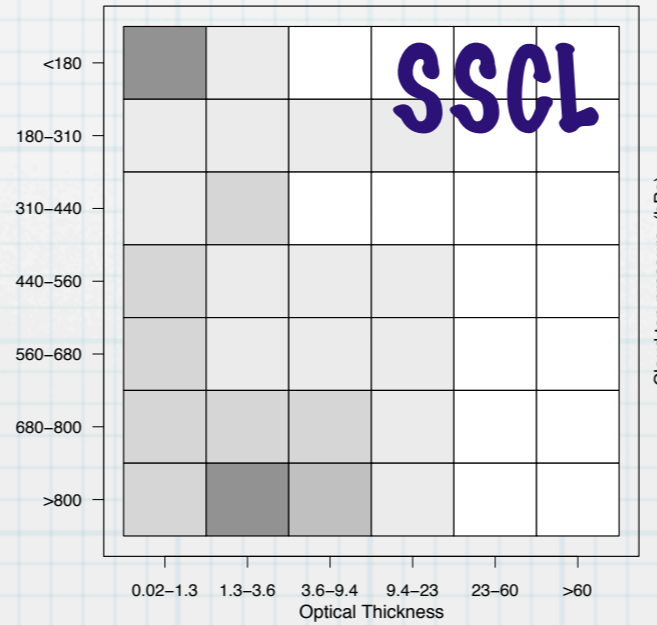
MIX - RFO=33% **33%**



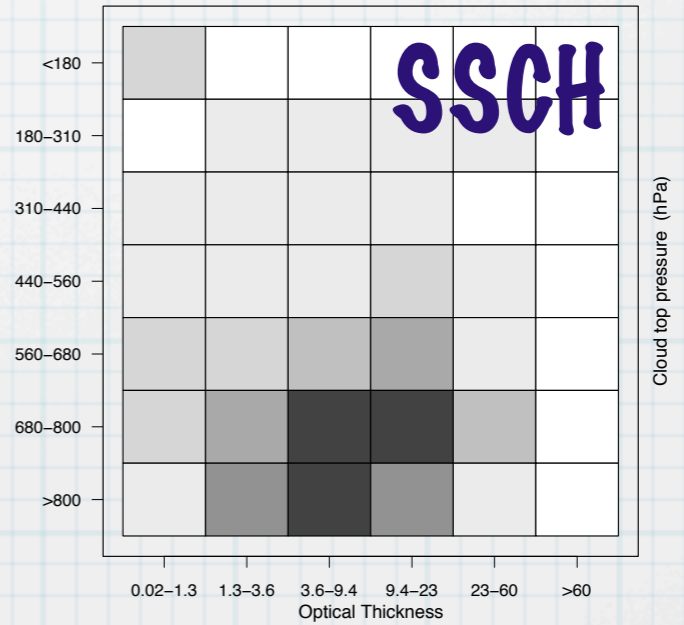
STC - RFO=14% **14%**



SSCL - RFO=25% **25%**



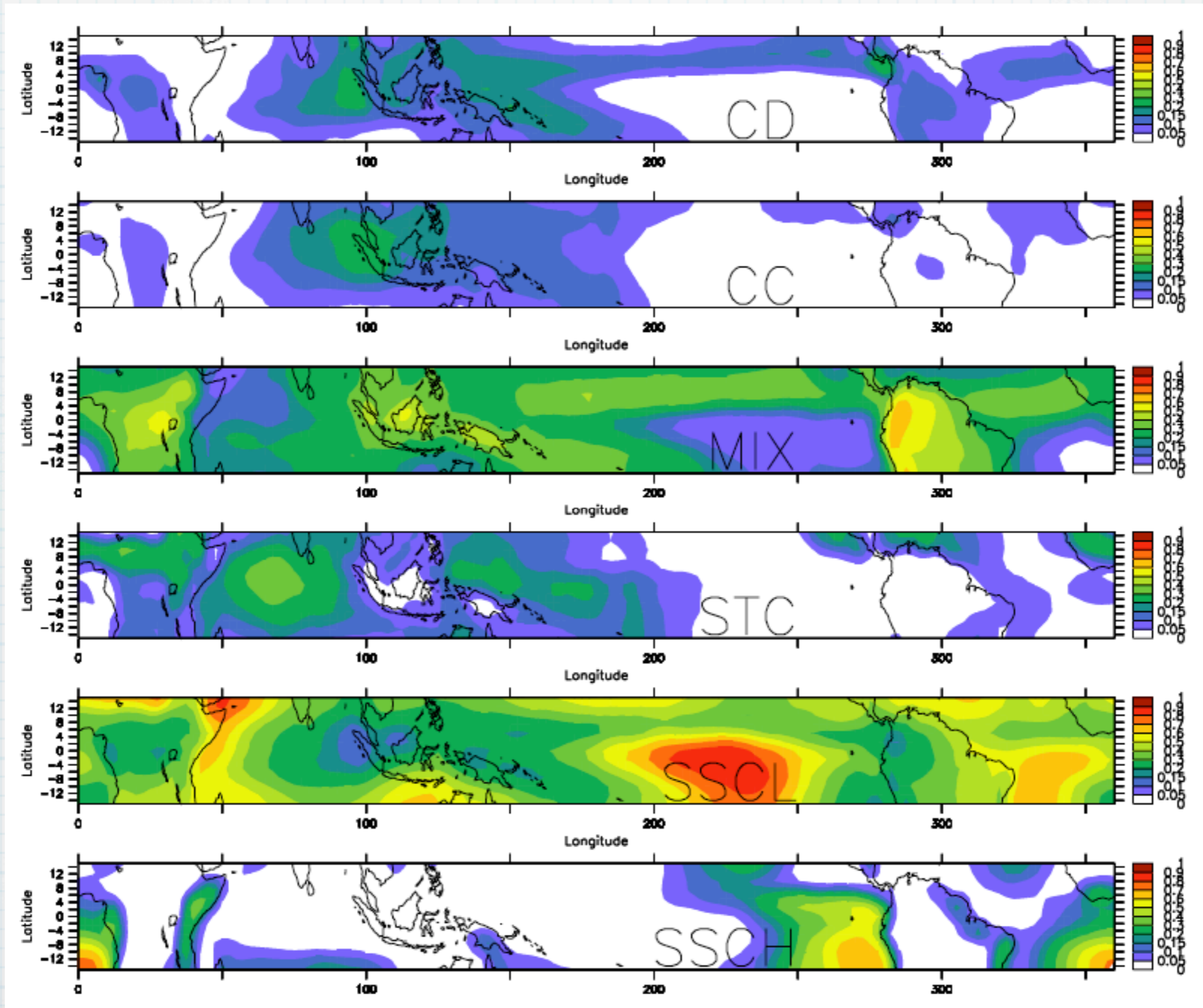
SSCH - RFO=2% **2%**



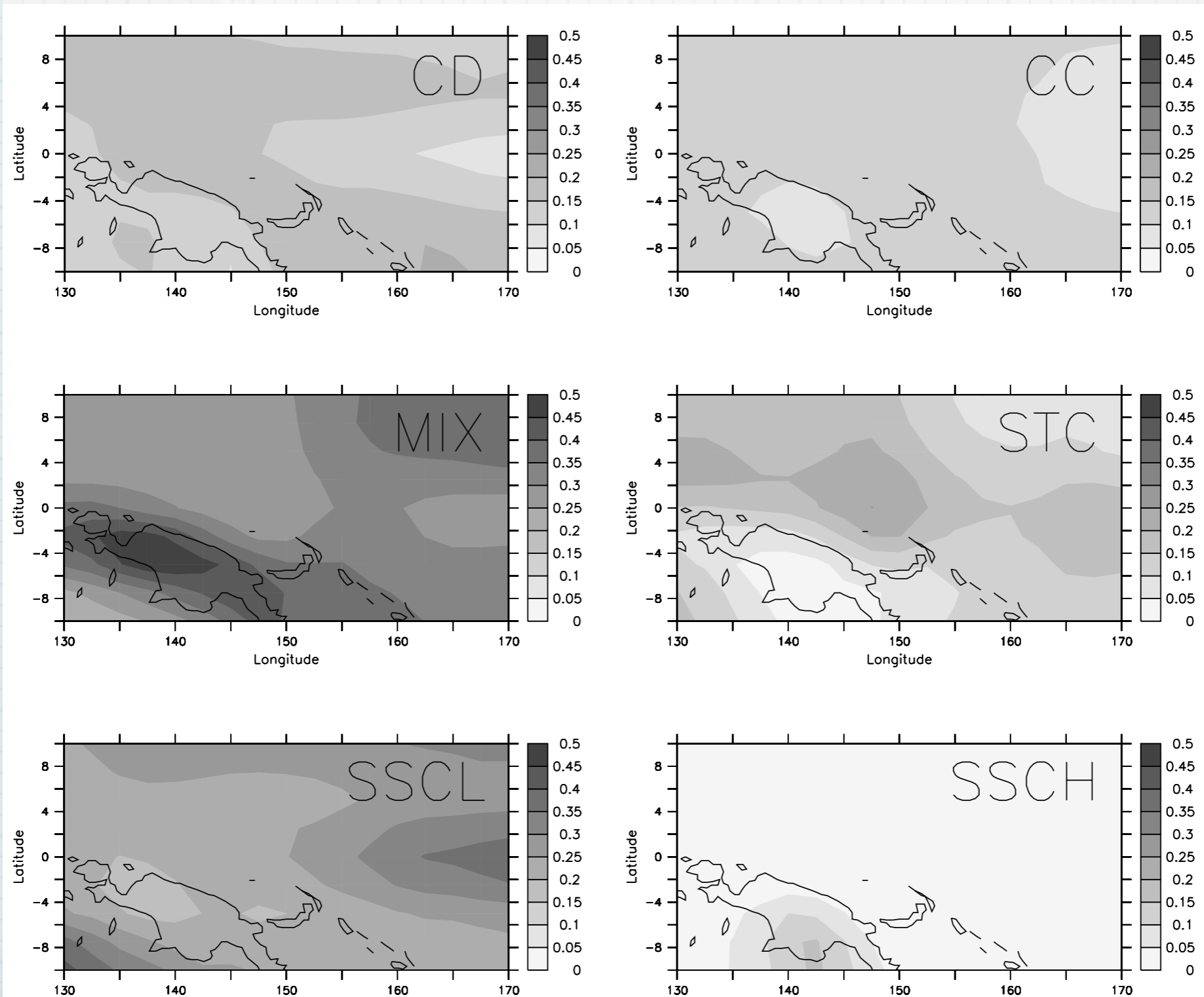
suppressed



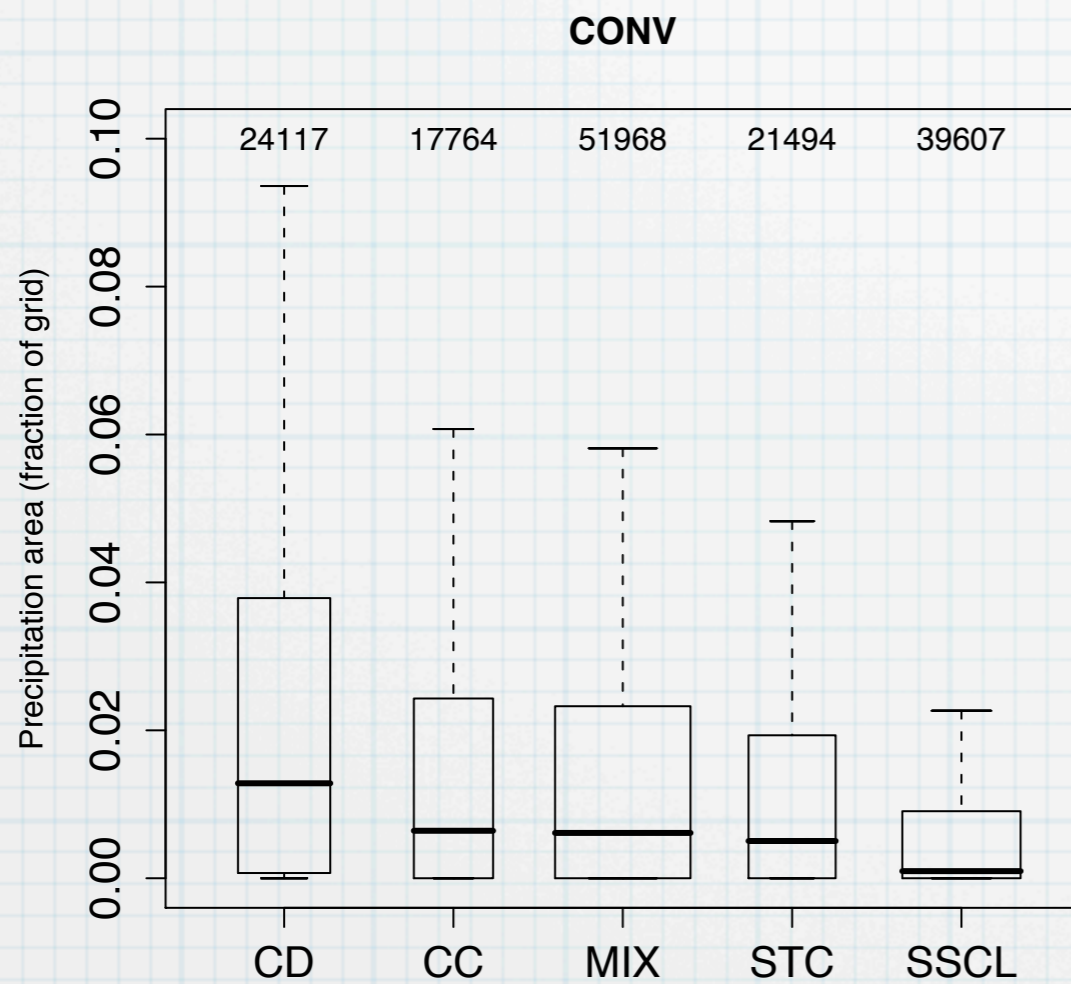
Tropical ISCCP regimes - relative frequency of occurrence - 1998-2003



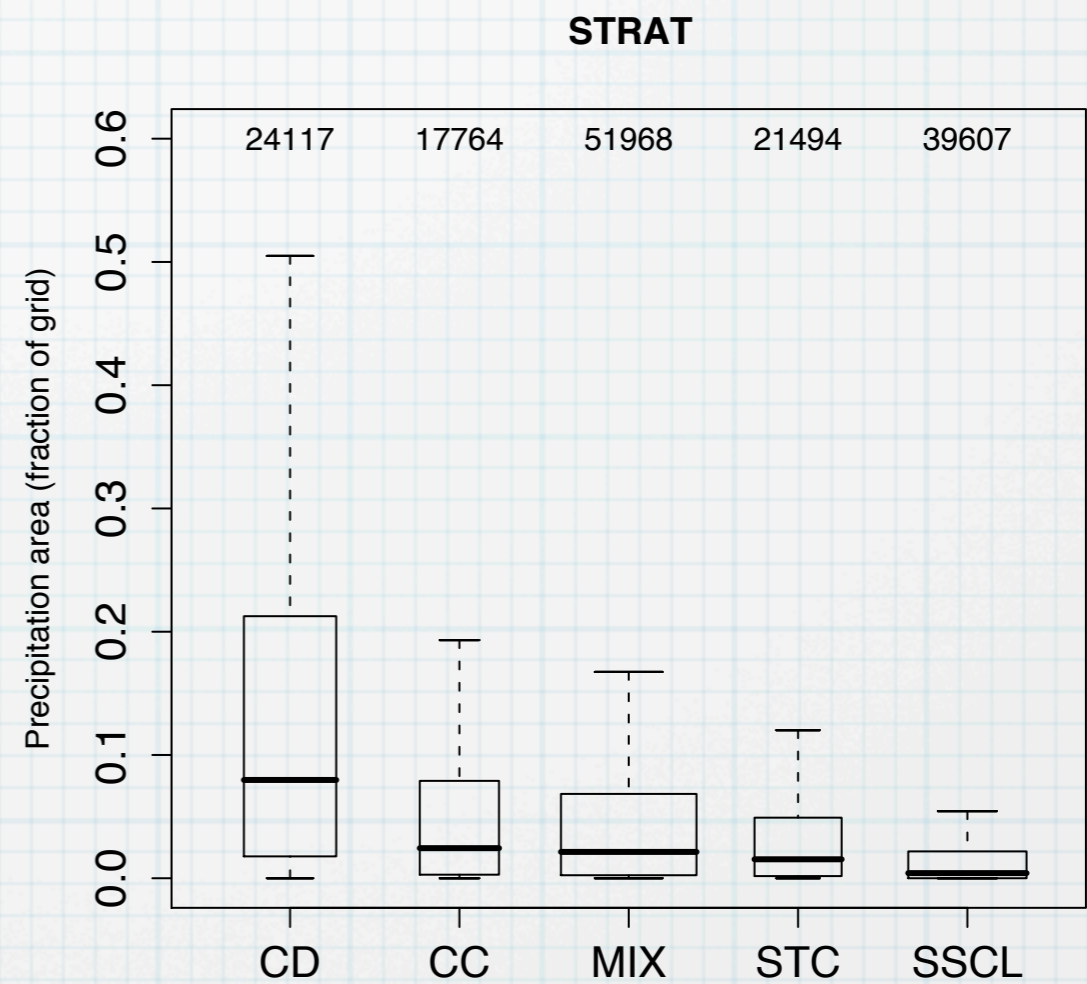
Cloud regimes in the TWP 1998-2003



Rain area fraction

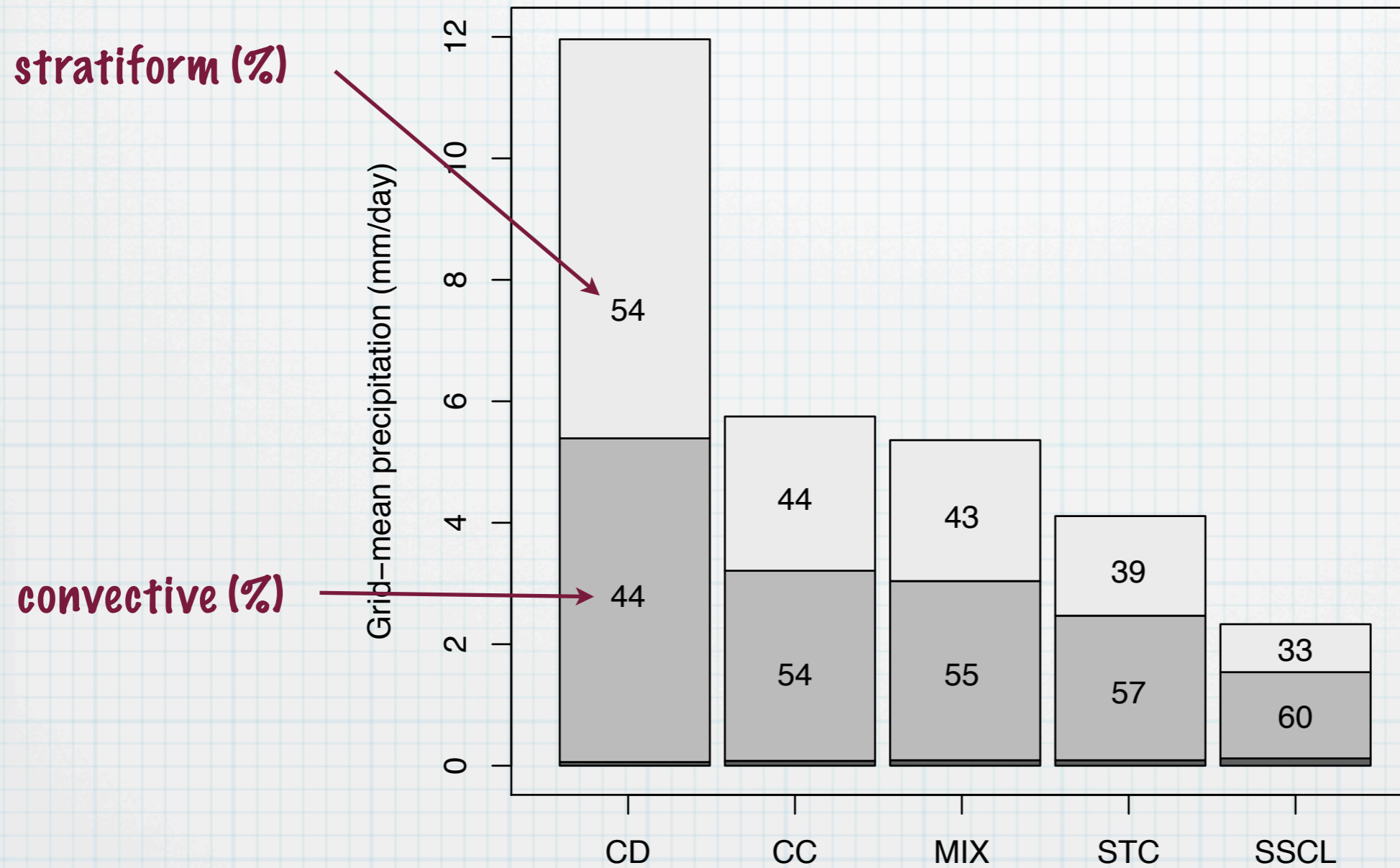


Convective



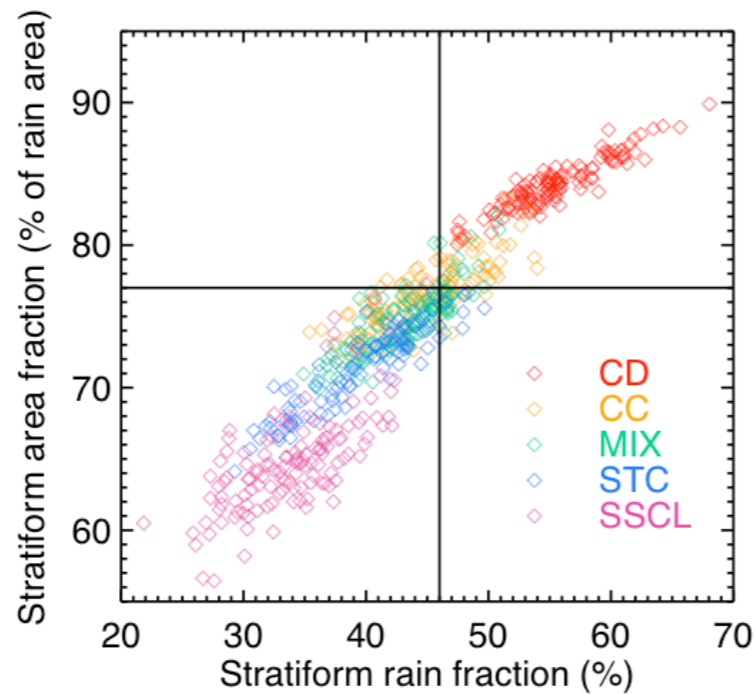
Stratiform

Rain amount

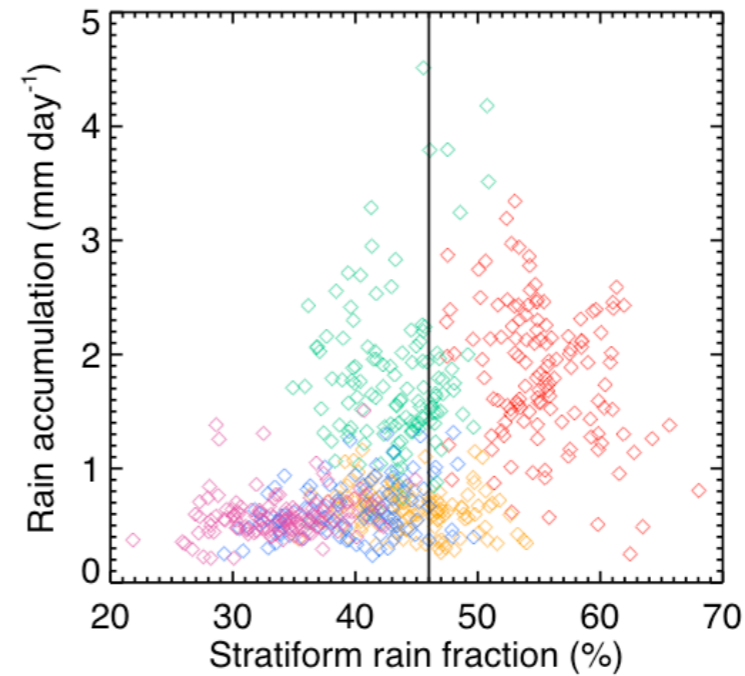


Stratiform rain fraction vs ...

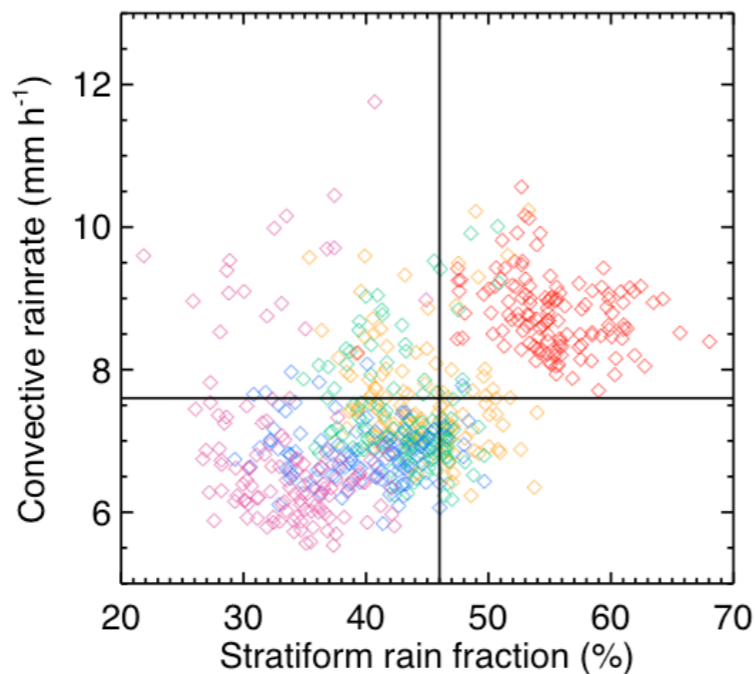
stratiform area fraction



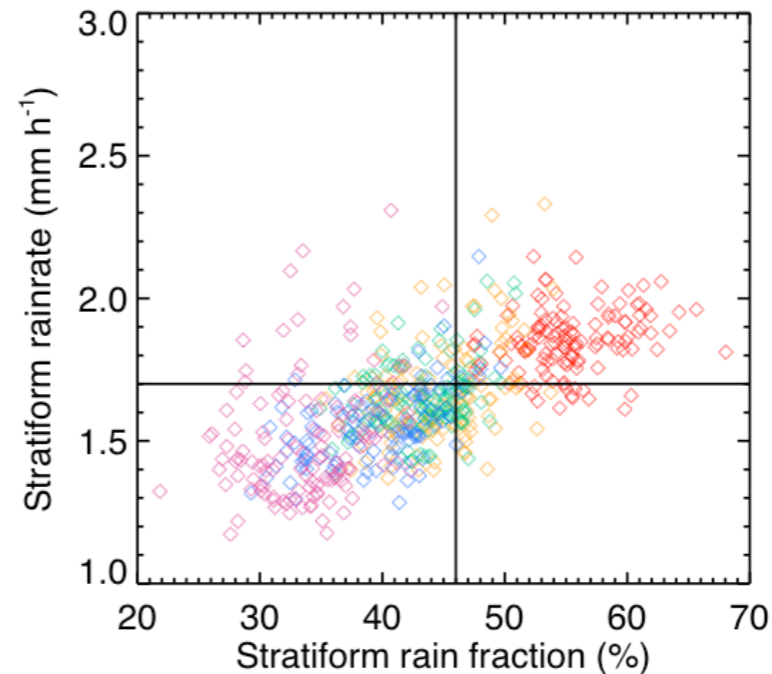
contribution to grid-mean rain



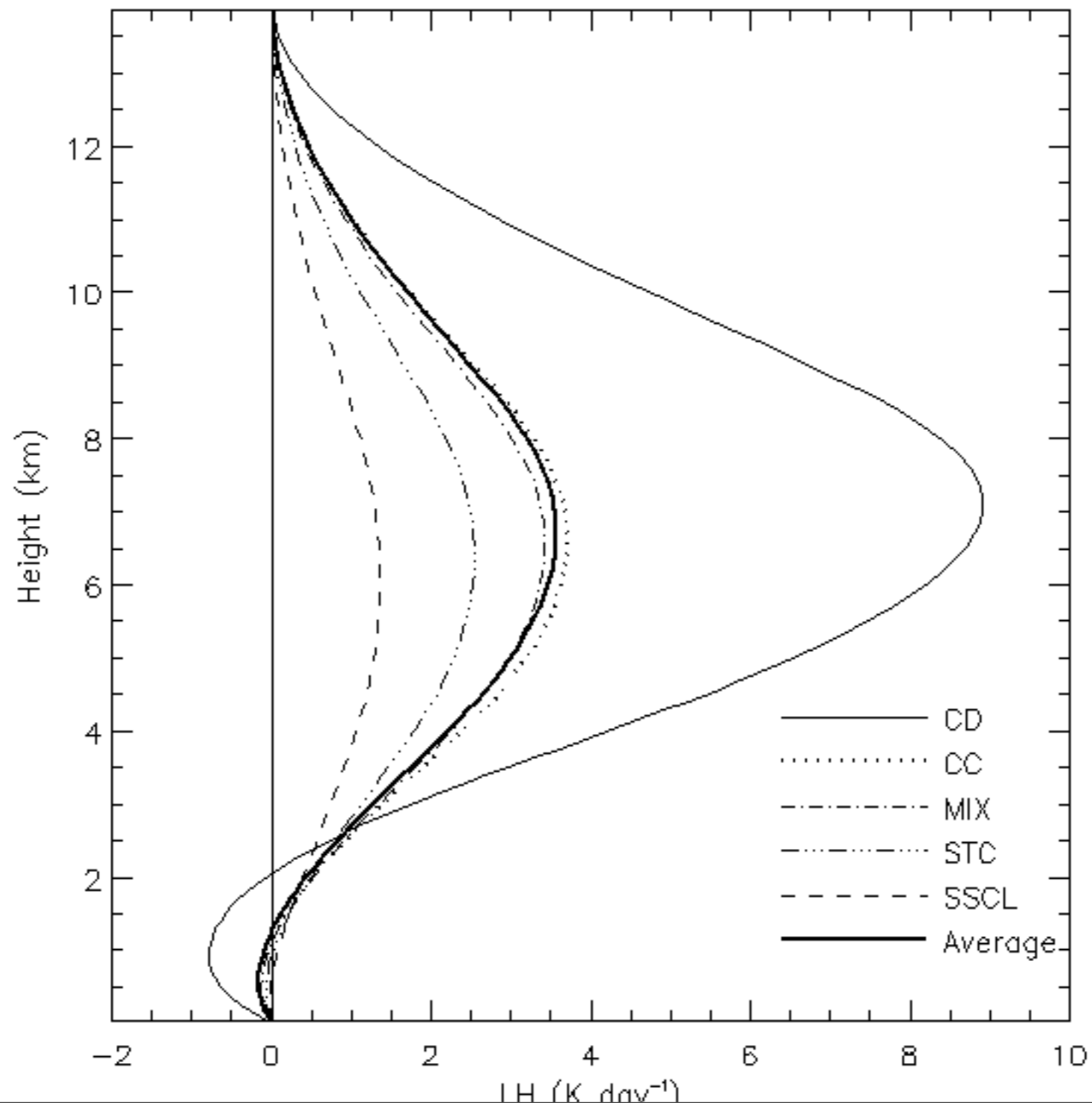
convective rain rate



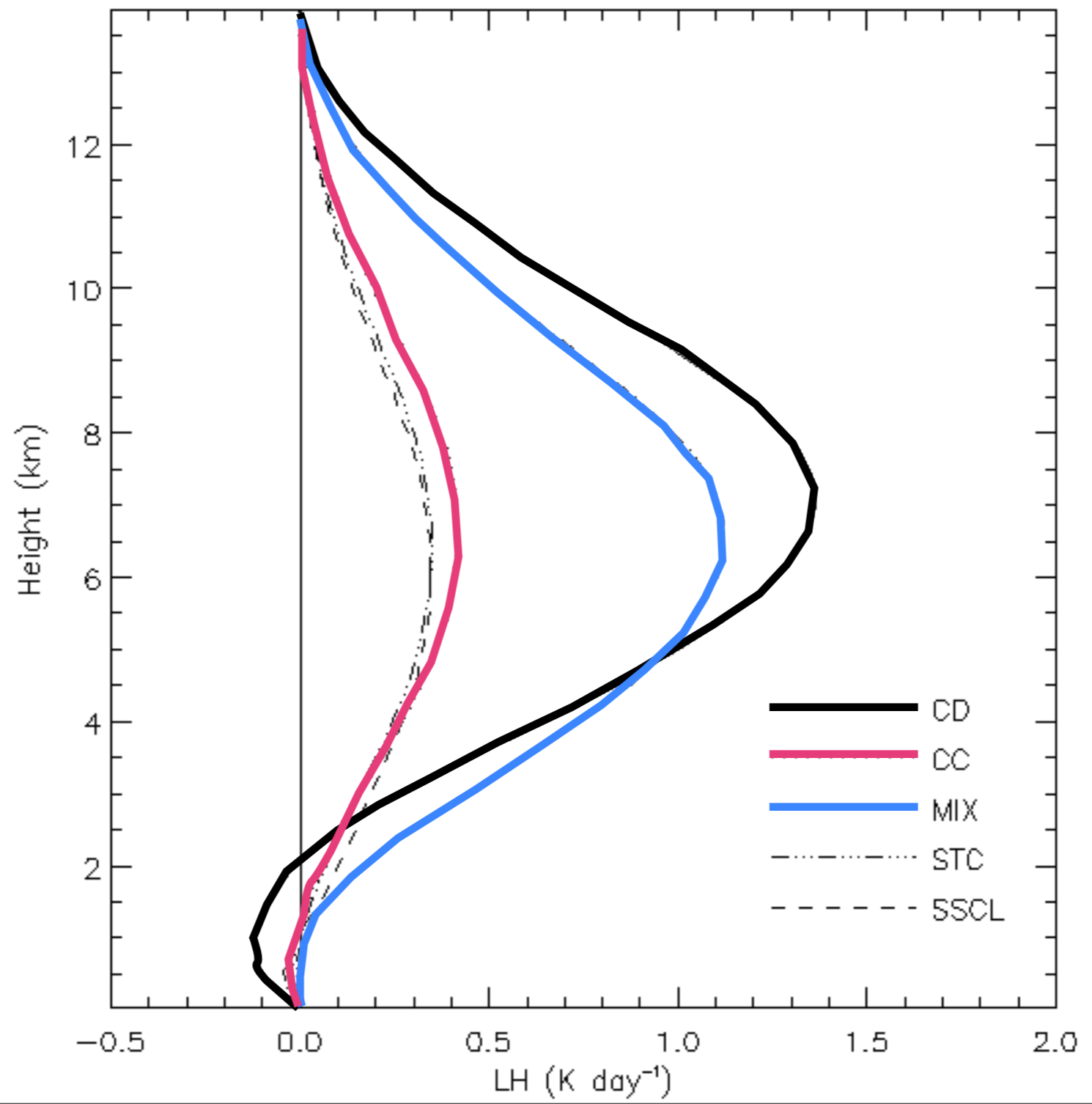
stratiform rain rate



Latent heating per regime

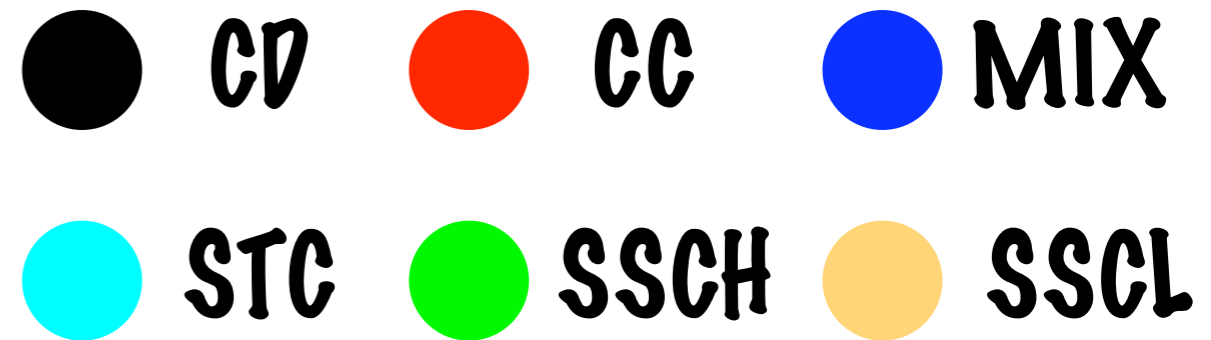
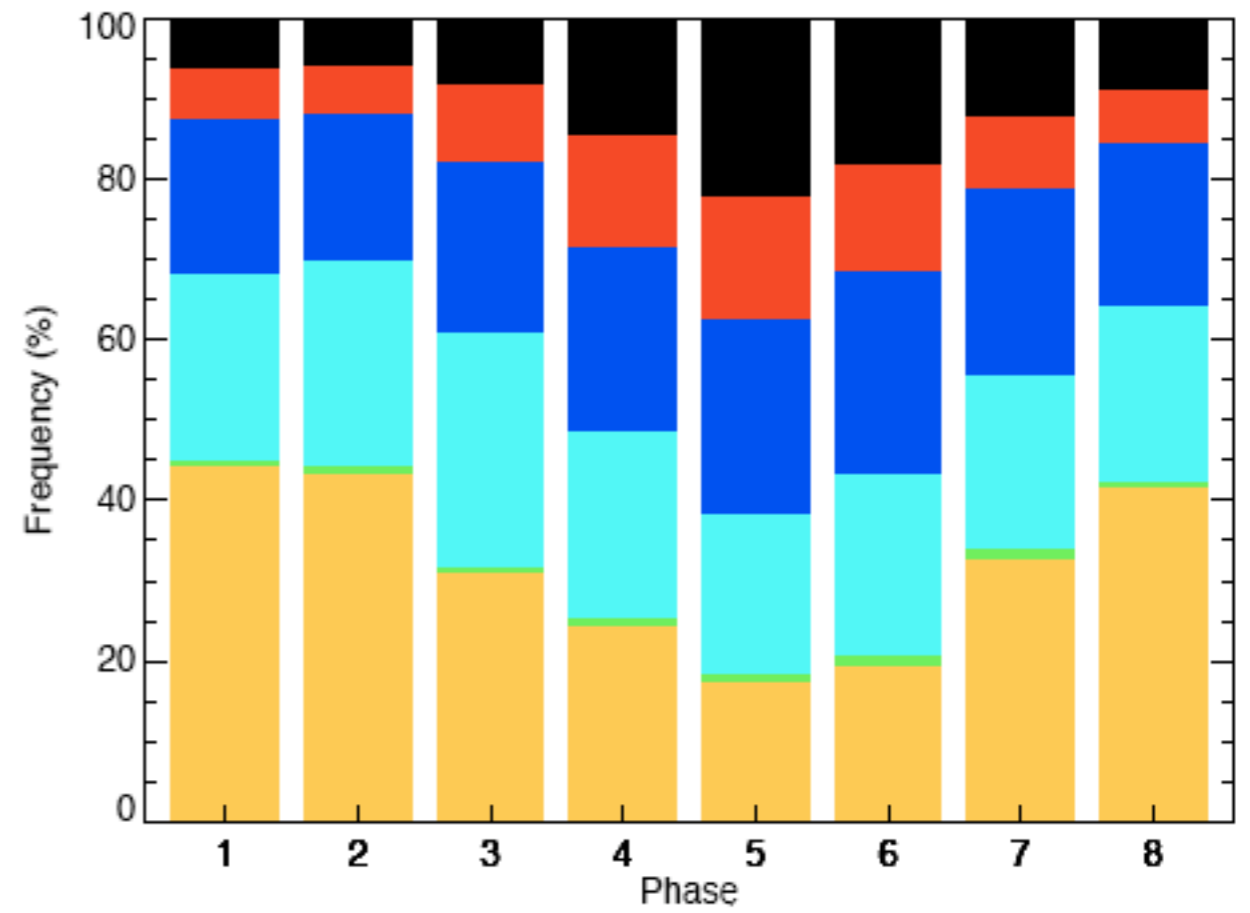
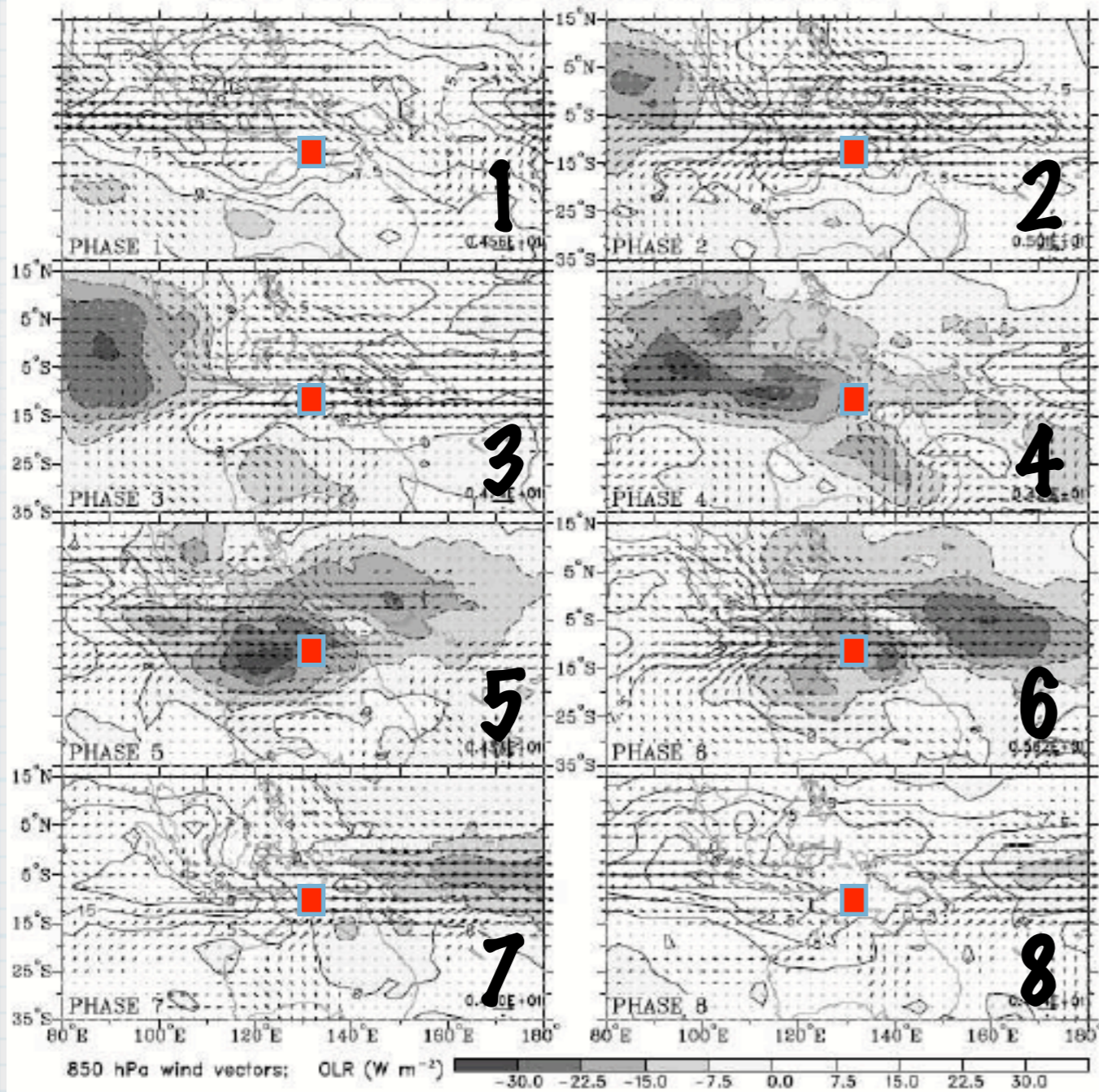


Latent heating contribution to TWP



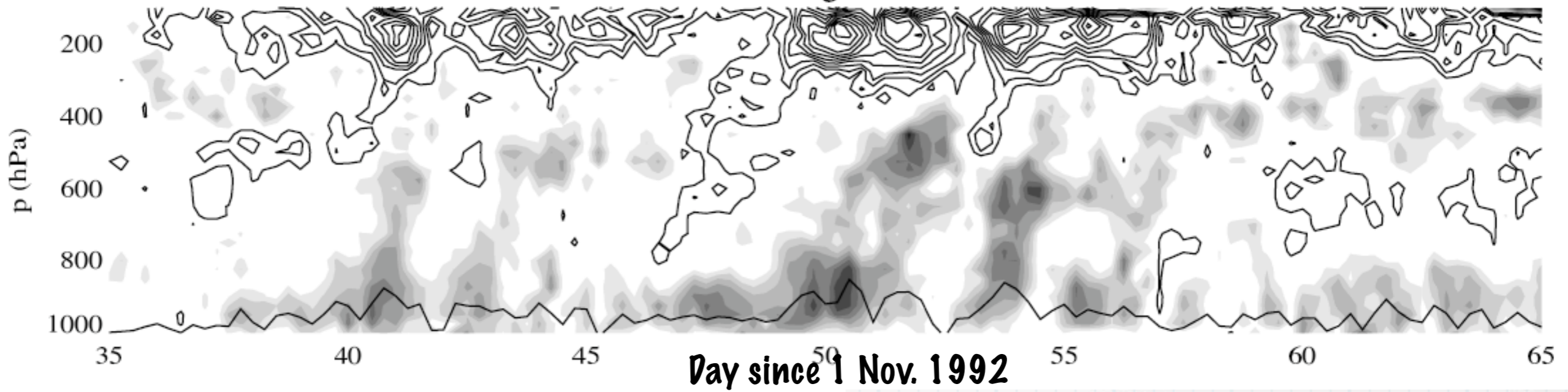
Connection to large-scale systems

MJO composite for December-January-February

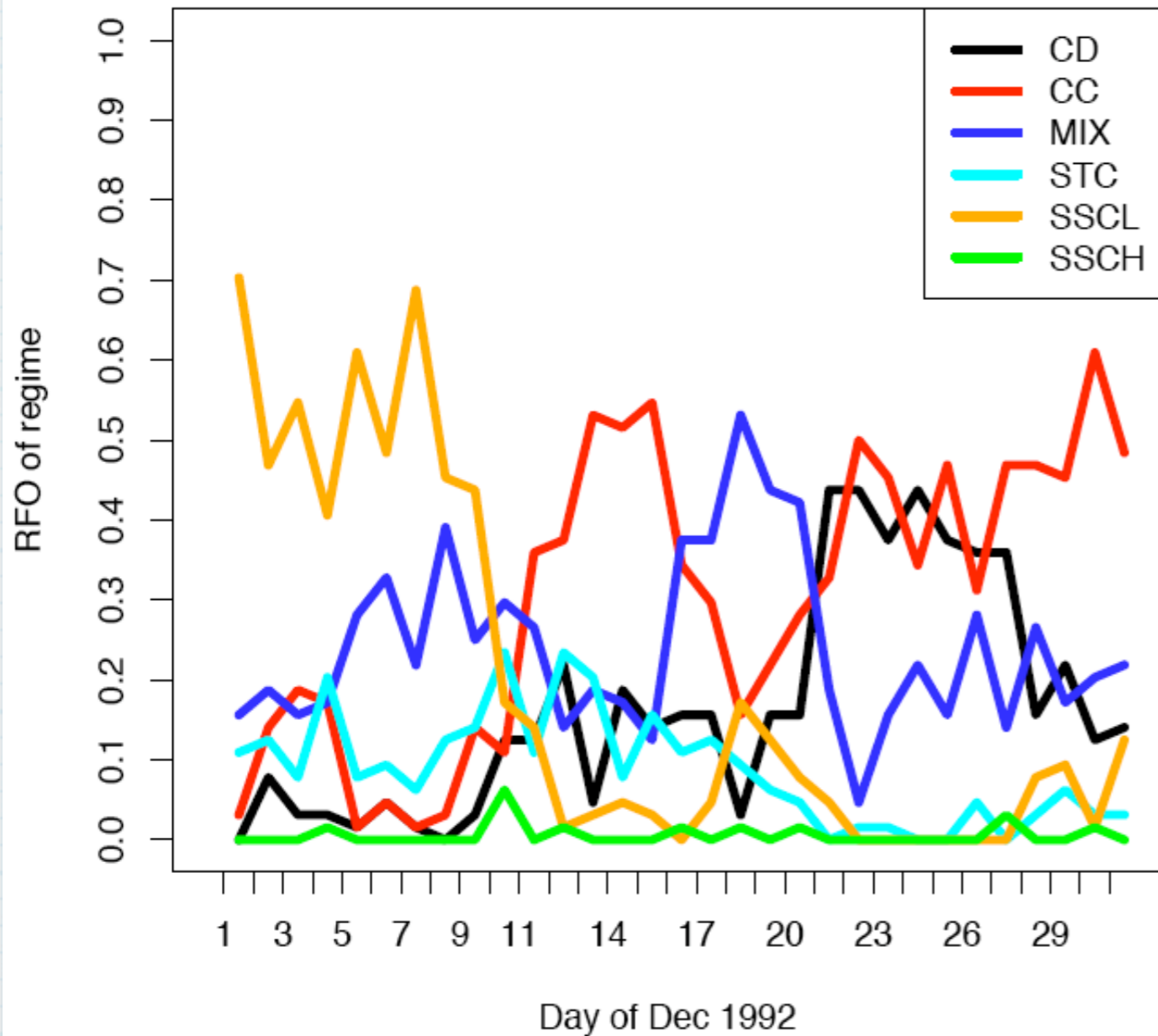


Hoeglund, 2005

divergence



Mapes et al., 2006



TOGA OSA divergence vs RFO of regimes

Conclusions

- * ISCCP-based cloud regimes provide a **useful framework** to study tropical convection
- * **Only one regime (CD)** exhibits significant stratiform heating
- * In the **TWP latent heating** is dominated by **two regimes (CD and MIX)** of very different occurrence and heating characteristics
- * There are **strong links** of the ISCCP regime occurrence to **other tropical phenomena.**
- * We are a step closer to describing the **links between circulation and diabatic heating** from **long-term (!)** observations.