# SMART-R cloud population packaged and repackaged

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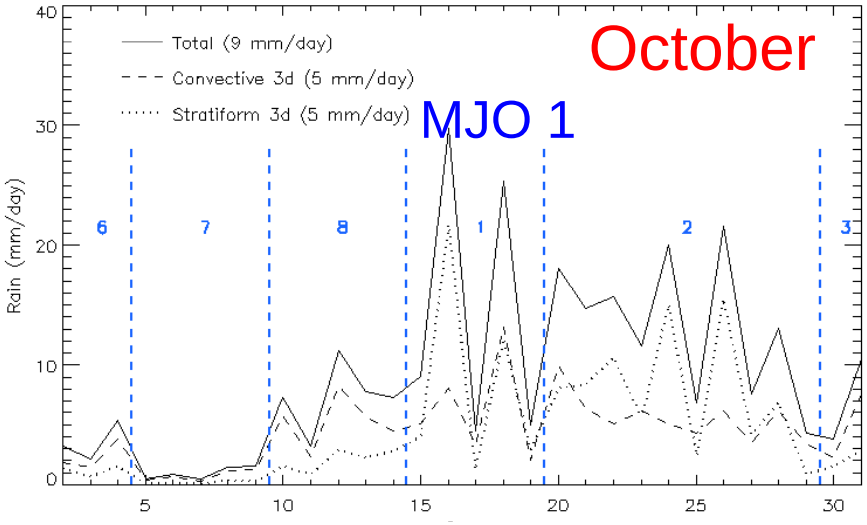
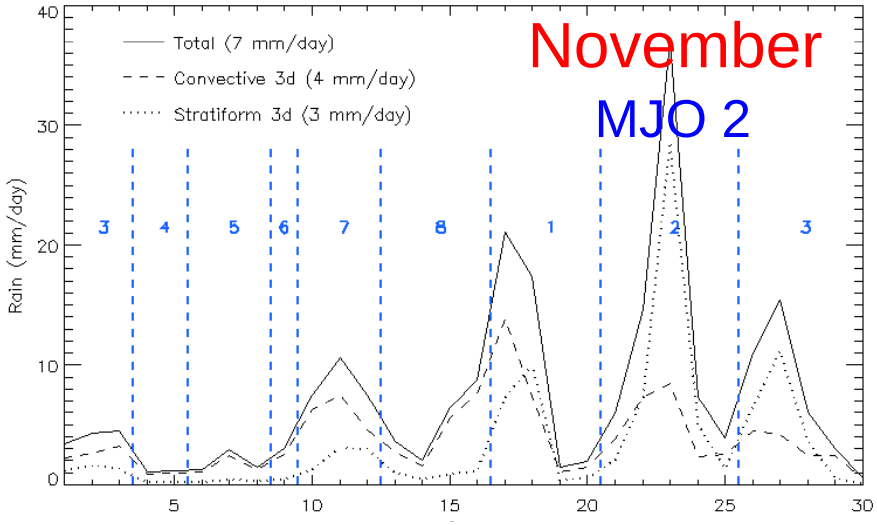
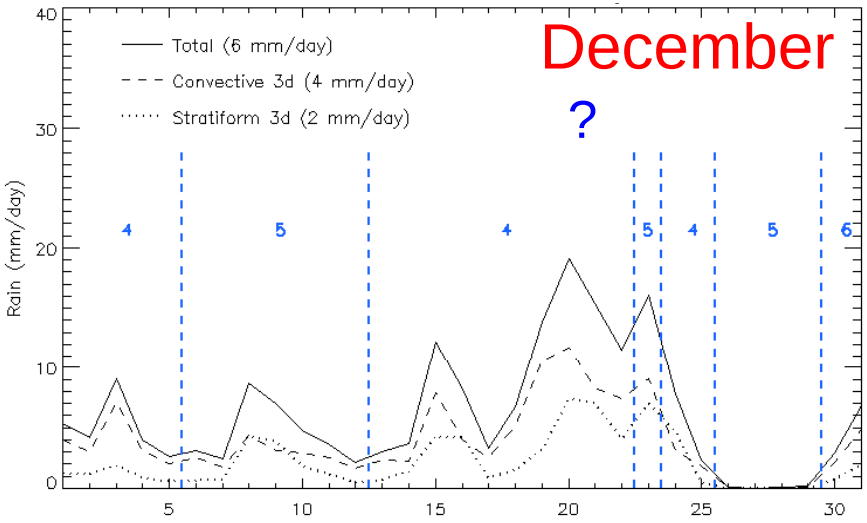
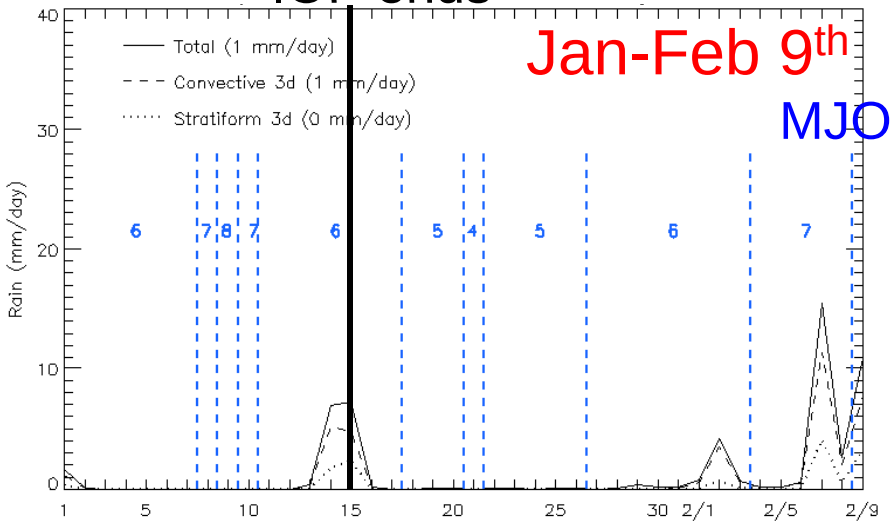
Special thanks to Jon Fliegel, Fiaz Ahmed, Amanda DePasquale and the rest of the SMART-R team

# Daily rain accumulations



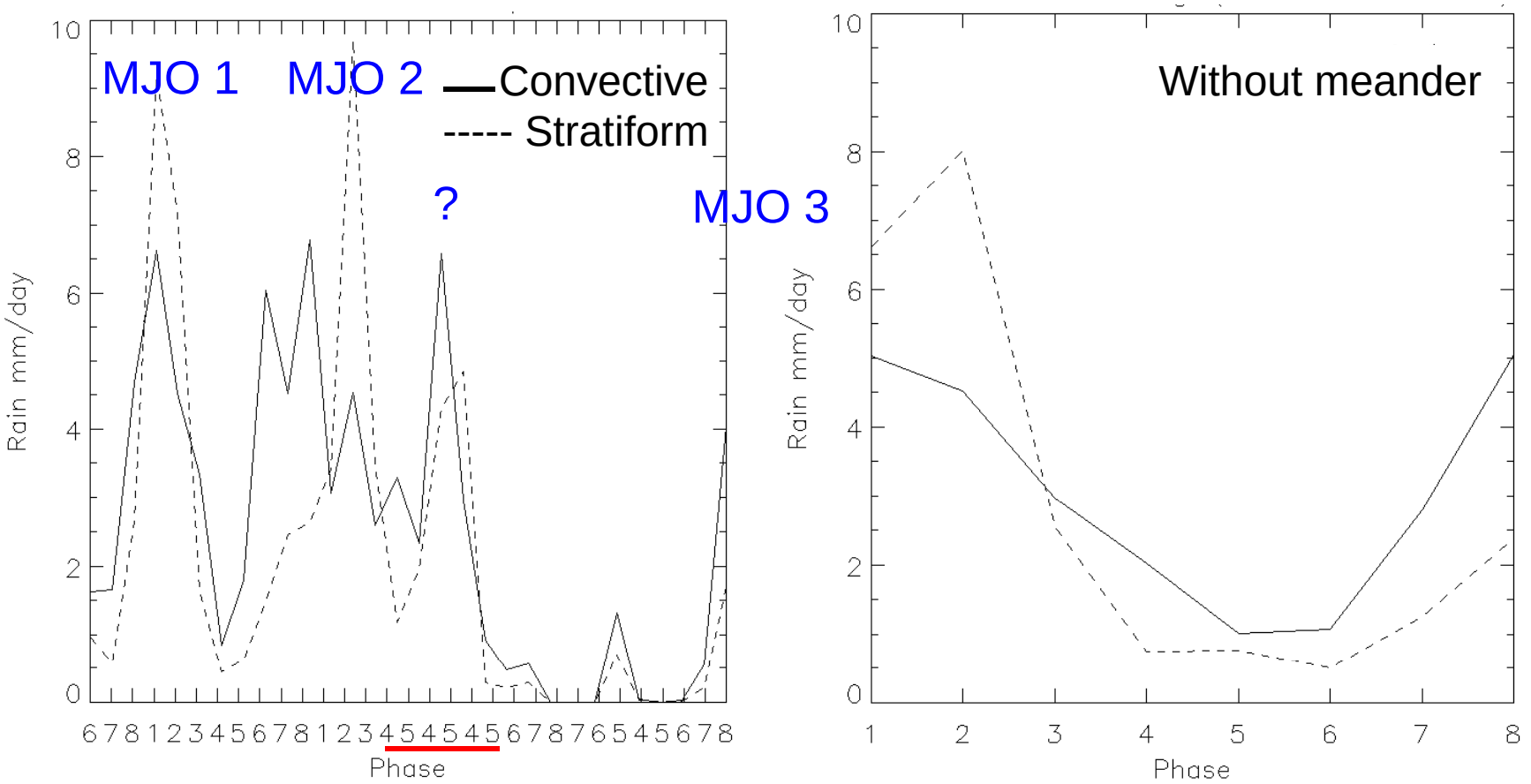




MJO 1: 2-day signal, phase 8 buildup; MJO 2: 4-6 day signal, phase 7 buildup; ?: 4-6 day signal, phase 4-5 oscillation; MJO 3: phase 7 buildup

# Convective-stratiform rain by MJO phase



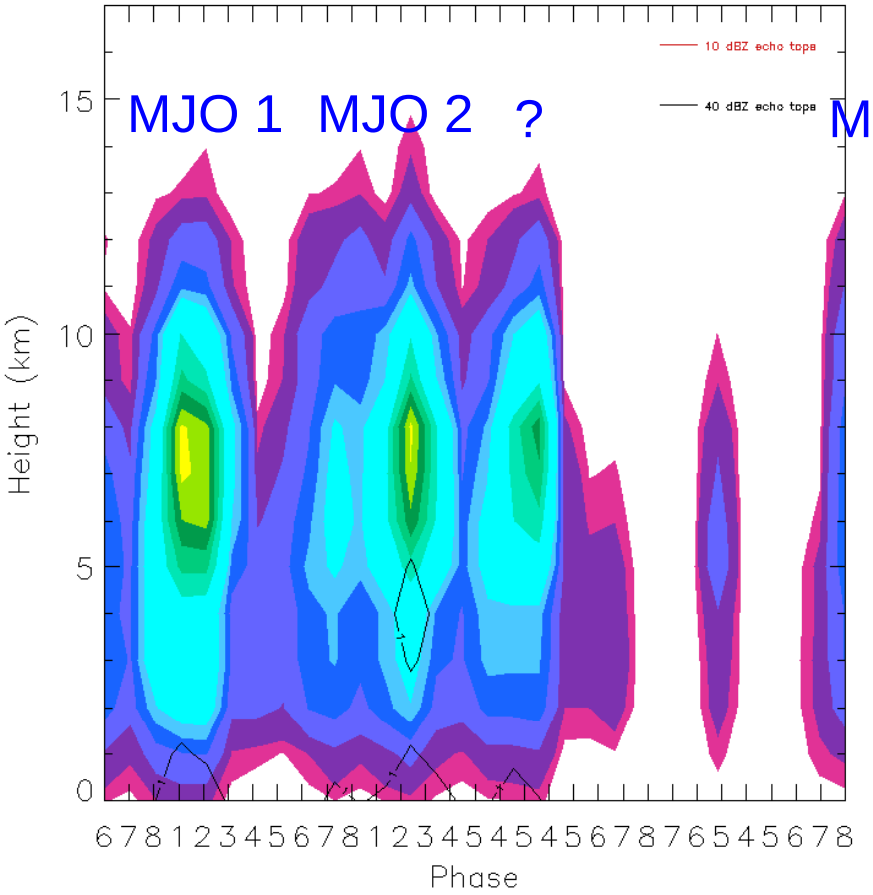

MJO1: Slightly lagged convective and stratiform rain evolution

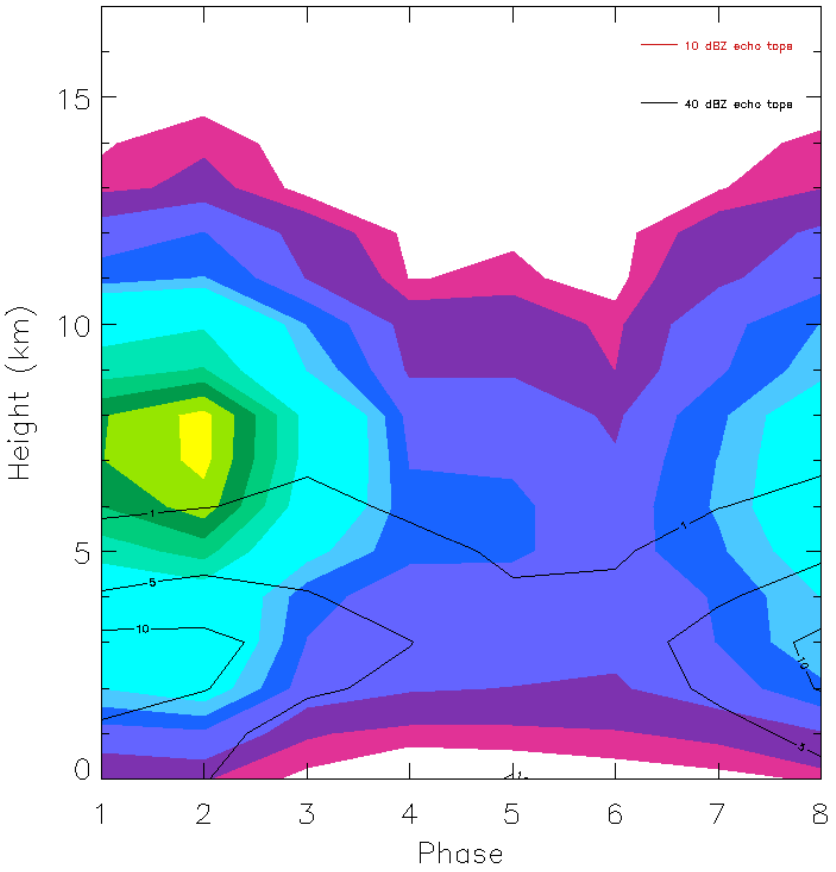
MJO2: Convective rain peaks many phases before stratiform

?: Less overall rain, convective > stratiform rain

MJO3: Moderate phase 7 convective development

# Convective 10-dBz echo tops by MJO phase



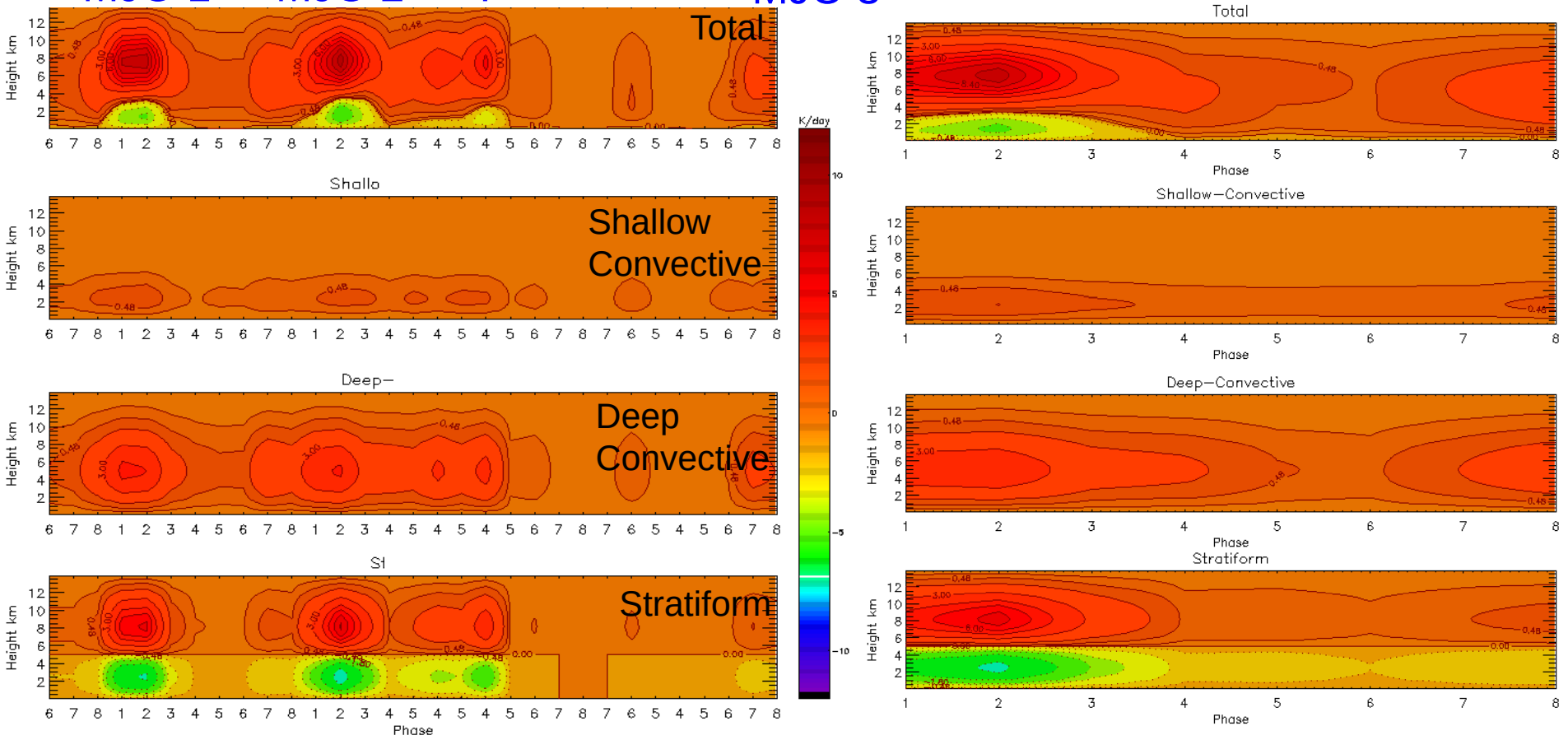

MJO1: Continuous shallow to deep echo-top evolution

MJO2: Episodic echo-top evolution

?: Continuous echo top evolution, but less dramatic than MJO 1

MJO3: Notable low-level signal in phase 6-7

# Latent heating by MJO phase




MJO1: Most steep heating tilt

MJO2: Moderate heating tilt

?: Least steep heating tilt

MJO3: Precursor LL heating isolated from previous convection

# Summary

- Composited SMART-R observations show:
  - Phase 5-6 [**INACTIVE**]: total rain ~2 mm/day, echo tops 6-11 km, weak LH
  - Phase 7-8 [**ONSET**]: convective rain increases to 2-5 mm/day, echo tops 7-13 km, 1.5 K/day LH
  - Phase 1-2 [**ACTIVE**]: stratiform rain increases to 7-8 mm/day, echo tops 8-14 km, 10 K/day LH at upper levels and cooling at lower levels
  - Phase 3-4 [**DEMISE**]: rapid decline in rain, echo tops, and LH
- However, variations exist from event to event!