Cloud Properties and Radiative Forcing in Southeast Asia

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Goals:
• Use A-Train data to document cloud properties in Southeast Asia [55-25N, 80-120E] during the monsoon season (Aug-Sep 2007-2008), with a particular focus on cirrus.
• Investigate how these clouds impact the radiation budget.
• Compare findings with other observations and models

Methodology:
• Use a multiplatform algorithm suite (CloudSat radar, CALIPSO lidar, MODIS optical depth) to derive the cloud microphysical and radiative properties (Mace, 2010)
• A two-stream radiative transfer model is used to obtain the radiative fluxes (Toon et al., 1989)

For comparison to another tropical location, we show the heating rates derived from the Manus ARM site (Mather et al., 2007) on the overall heating rate plots.

For comparison, we show the idealized tropical deep convection and stratiform heating rates derived from TRMM (Schumacher et al., 2004)

The overall net heating rate shows that clouds in this region produce heating throughout the atmosphere.
• Peak heating above 9km is due to SW heating from thick clouds with high tops.
• The heating below 9km is due to LW heating from thick clouds with high tops.