Spectral Radiative Transfer Model for Radiative Closure Studies in Mixed-Phase Clouds

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ICEPRO Session
ASR PI Meeting 2014 Potomac, MD
DISORT-Based Band Model

• MODTRAN limited to single-phase clouds
  – Too clumsy to configure with microphysical simulation output
• Configure 179-band Exponential Sum Fitting of Transmissions (ESFT) model with DISORT
  – 100 bands from 280 – 2200 nm
  – Adequately covers spectral variation in cloud properties
• Fast enough to run with microphysical simulation output.
  – 12 seconds per run for fluxes on MacBook Pro
  – 2 minutes for 16-stream radiances
Radiances for SAS-Ze Analysis

Cloud Optical Depths
- $\tau = 0$
- $\tau = 2$
- $\tau = 5$
- $\tau = 20$

liquid water cloud over snow surface
solar zenith angle 66 degrees