DC^3 Radiation Measurements

Cloud, aerosol, and surface albedo retrievals

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Instruments/People

SSFR: Shortwave Spectral Flux Radiometer,
350 nm – 2150 nm Irradiance (DC-8)
Schmidt, Gore, Pilewskie, Kindel, Song

HARP: HIAPER Atmospheric Radiation Package
350 nm – 2150 nm Irradiance (GV)
Hall, Ullmann

SWS: Shortwave Spectrometer
350 nm – 2150 nm Radiance (SGP ARM)
Flynn, McBride

SSFR:
350 nm – 1600 nm Radiance (Boulder, CO)
LeBlanc, Pilewskie, Kittelman, Gore

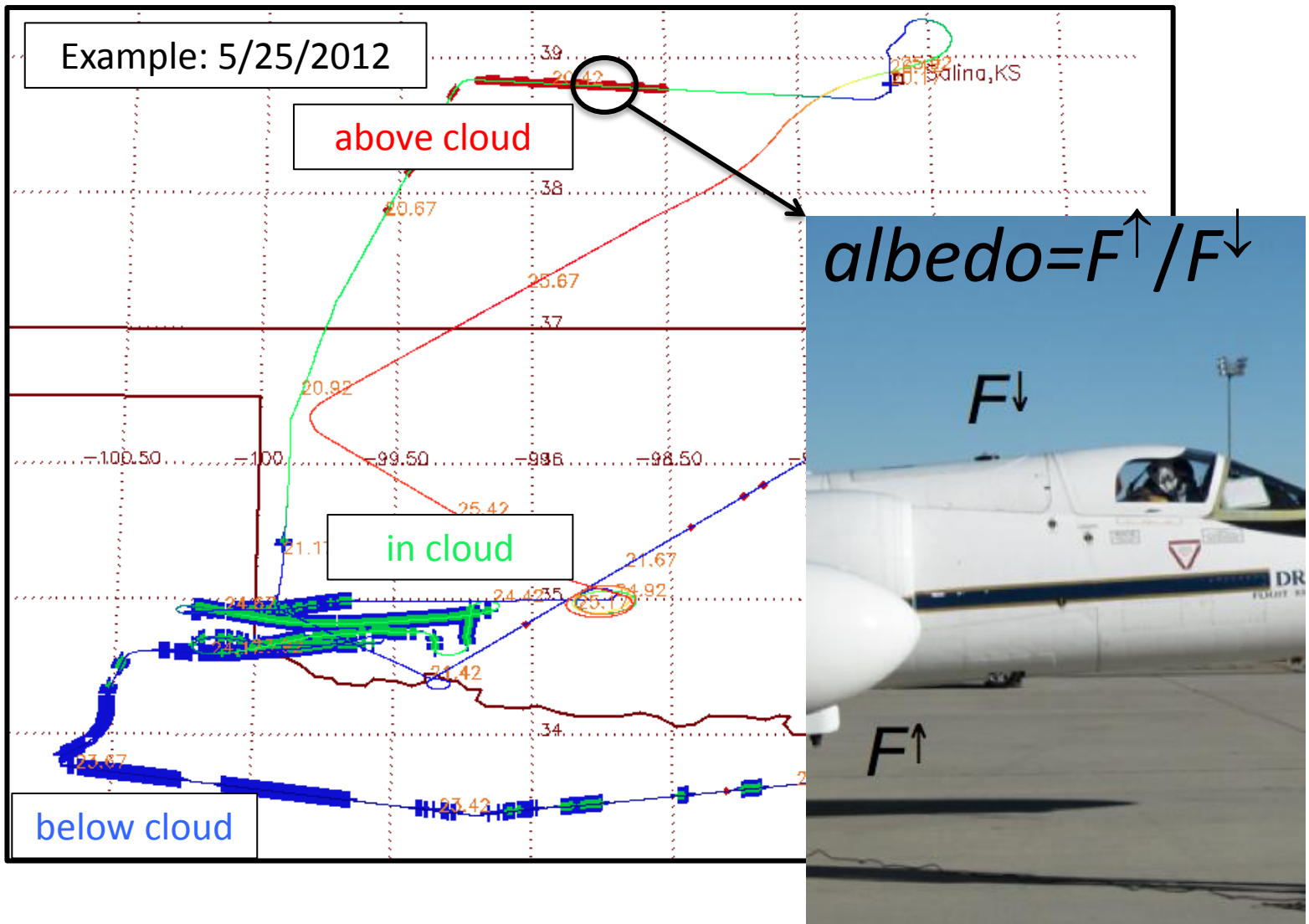
Science

Aircraft and ground-based cloud/aerosol retrievals show the "little details" that are overlooked in satellite retrievals:

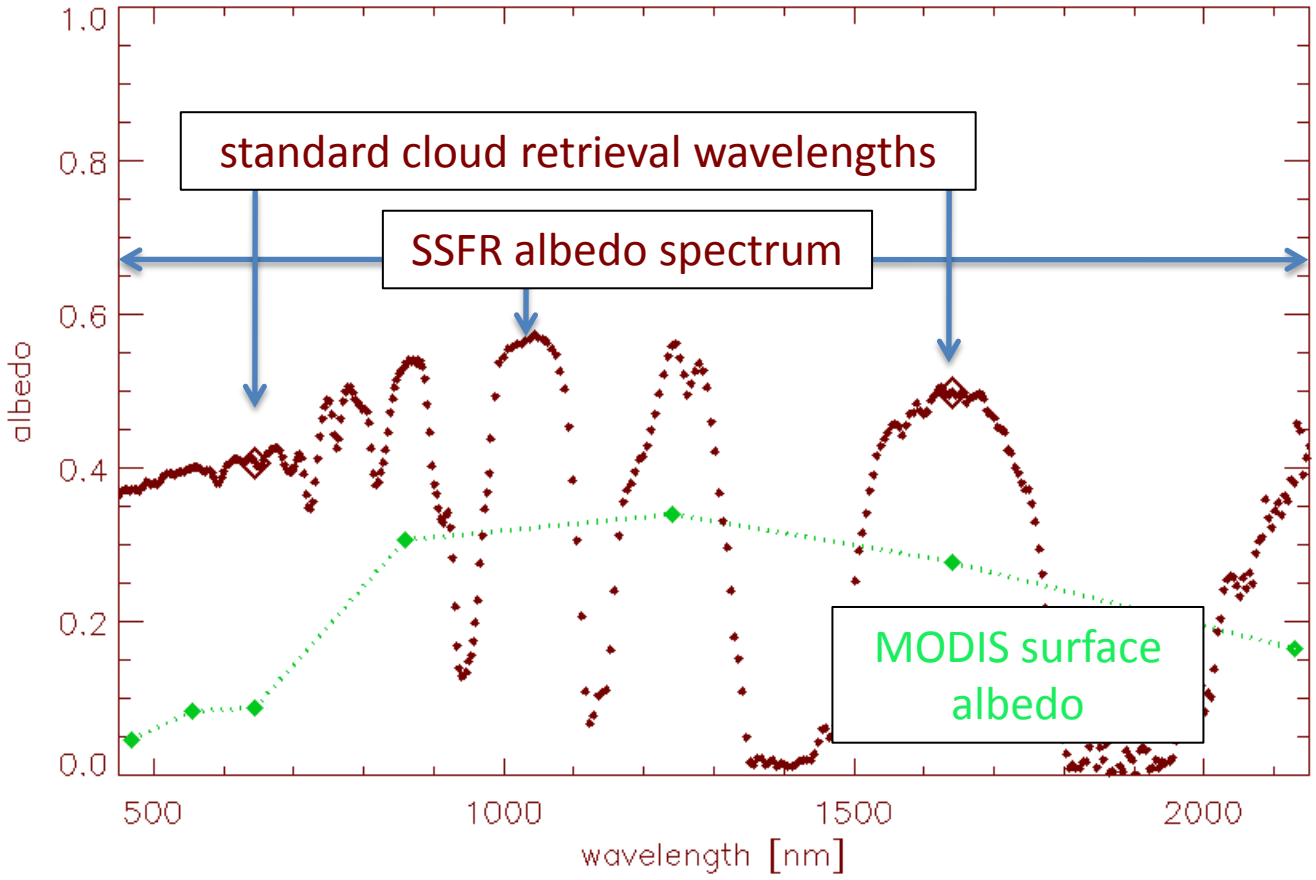
- surface albedo variability
- small scale cloud structure
- water vapor effects on total absorption
- aerosols between / above clouds
- surface cloud radiative forcing vs. TOA forcing
- spectral effects / 3D effects

Use DC^3 to get spectral surface albedo collection in central US, and to validate GOES-derived cloud properties and TOA/SUR radiative forcing

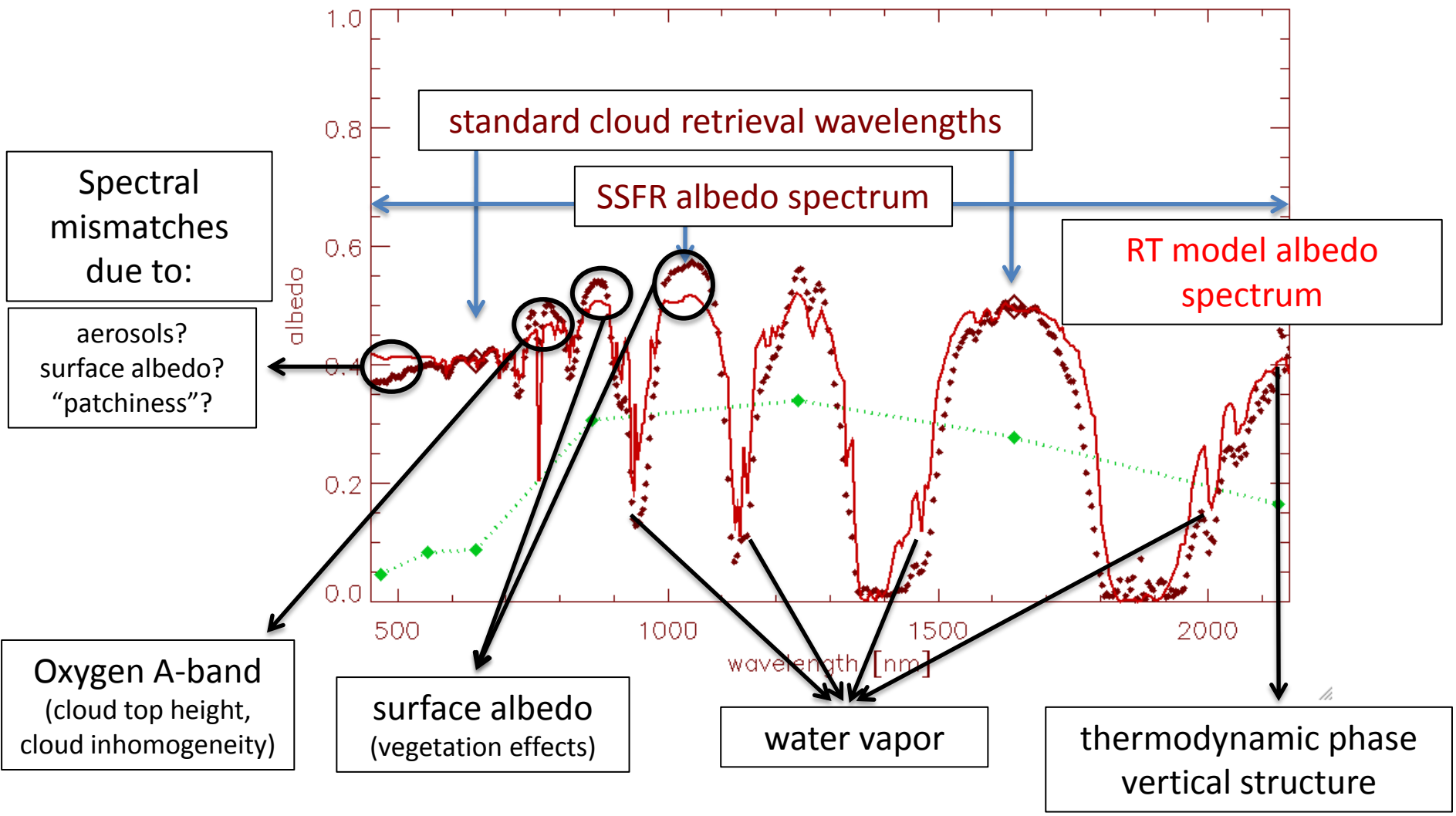
DC^3 Semi-Operational Cloud Mask



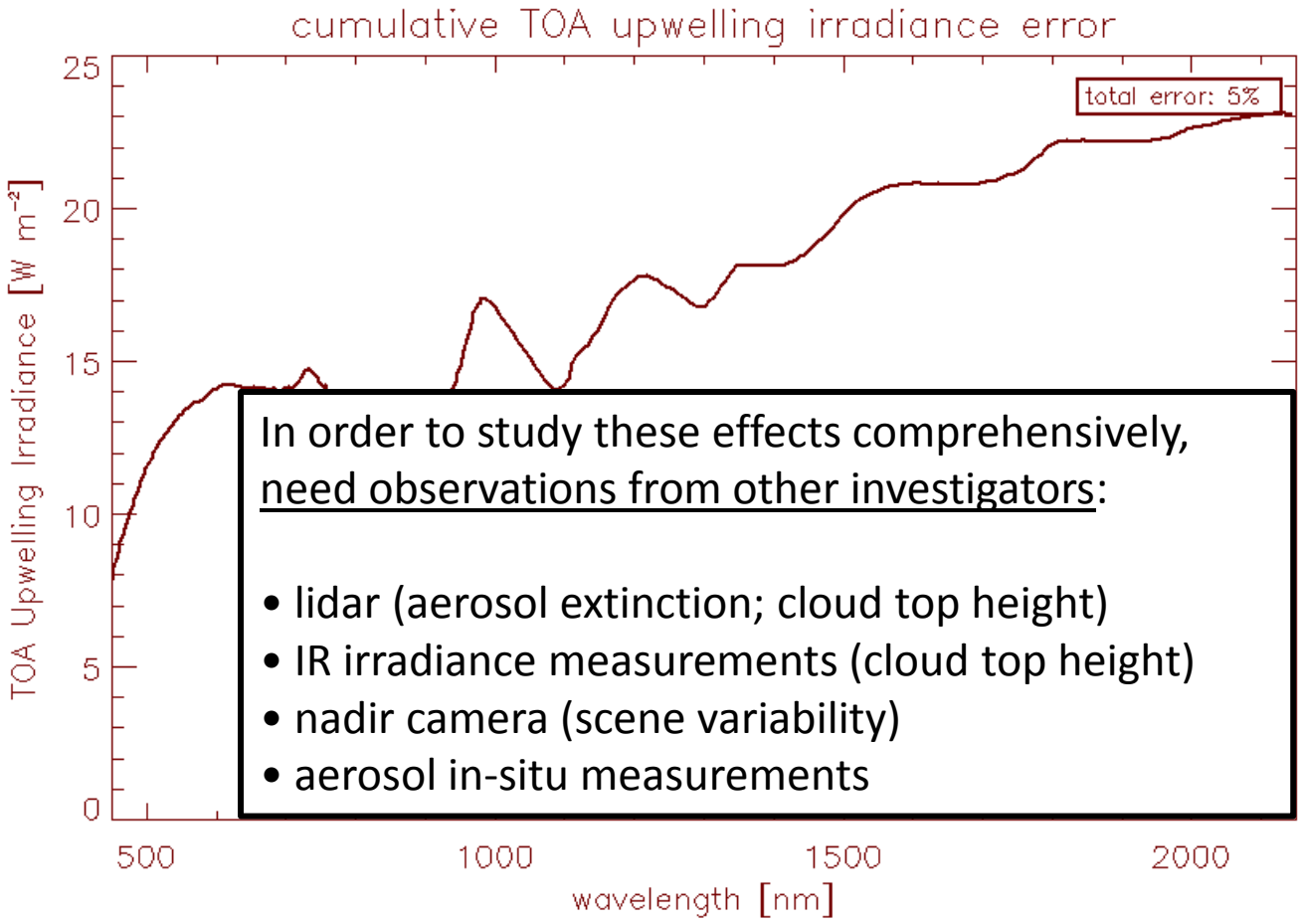
Cloud Retrieval (Albedo)



Cloud Retrieval Spectral Consistency



Cumulative cloud radiative forcing error



In order to study these effects comprehensively, need observations from other investigators:

- lidar (aerosol extinction; cloud top height)
- IR irradiance measurements (cloud top height)
- nadir camera (scene variability)
- aerosol in-situ measurements