### AVHRR Solar Channel Calibration Fundamental CDR Using Multiple Methods

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**CDR Images**
- Many Satellites in Varying Orbits
- Well Characterized Stable References
- Small Uncertainties for Each Satellite Relative to Merged Curve

**Example of CDR Applications**
- Determining Trends in Cloud Properties
- Estimating Shortwave Broadband Albedo

**CDR Description**

**Calibration FCDR Specifications**
- Gains produced monthly using 5 methods
  - Desert, Polar snow invariant targets (IT)
  - Deep convective clouds (DCC)
  - Simultaneous Nadir Overpass (SNO) w/ Aqua MODIS
  - Merged DCC & IT results
- Monthly mean gains, \( g \), 1978-2012
- Polynomial fits to monthly means, fn(dsl)
  - \( m = m_o + m_1 dsl + m_2 dsl^2 \)

**Inputs to Calibration FCDR**
- Re-navigated Advanced Very High Resolution Radiometer (AVHRR) 0.63, 0.86, and 1.6-\(\mu\)m brightness counts, \( C \)
- Observational geometric conditions, date
- Invariant site reflectance models, SBAFs
- DCC BRDF models
- Spectral solar constant, launch date, \( C_o \)

**Future Improvements and Anticipated Applications**

**Development & Improvements**
- Perform AVHRR AM/PM SNO calibration to validate merged calibration between AM/PM satellites
- Test sensor and band specific polynomial fits with varying number of orders to more accurately describe the calibration drift not captured in simple quadratic fit
- Improve strategy of combining Greenland summit (NH) and Dome-C (SH) observations
- Increase DCC calibration accuracy by ensuring a stable cross-sensor 205 K BT using AVHRR AM/PM SNOS
- Improve DCC BRDF accuracy for 52A greater than 60° by using selective viewing angles
- Use 0.86-\(\mu\)m DCC BRDFs: need for band specific DCC BRDFs demonstrated by PARASOL data
- Monitor cross-sensor global mean optical depth retrievals: allows all Earth observed reflected radiances to be evaluated as a whole
- Determine & correct source of cloud optical depth difference between AVHRR/2 and 3 sensors

**Potential Applications**
- Aerosol Optical Thickness & Type
- Surface Albedo
- Radiation Budget
- Solar Energy
- Vegetation Index
- Ocean Properties / Wind Speed (sunglint area)
- Snowpack
- Flood Monitoring
- Land Use/Cover Type (i.e. burn areas)
- Calibration Transfer to Other Satellites

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