Effect of Solar Irradiance Fluctuations on S-NPP Reflective Band Calibration
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I. Total Solar Irradiance (TSI) Fluctuations
- Long term (~11 years)
- Short term (days/weeks)
- Multiple data sources (from SORCE, VIRGO and ACRIM3) show good agreement

II. Fluctuations in VIIRS F-Factor
- VIIRS F-Factor is a radiometric calibration coefficient
- Frequency-domain analysis revealed similar frequency content for TSI and F-Factor fluctuations

III. Solar Spectral Irradiance (SSI) Fluctuations
- Two sources of SSI data considered: SORCE SIM and VIRGO SPM (used here)
- Plot below shows region of good agreement for VIRGO SPM’s three (blue, green, red) spectral bands
- Table below shows good correlation between SSI components and TSI data over region of interest

IV. Correlation of TSI and SSI with F-Factor Fluctuations
- TSI data generally correlates with F-Factor better than does SSI data
- Correlation is best at short wavelengths
- Time-domain plots below show strong local correlation (6-wk sliding window) for TSI data (around 0.8 or greater)

V. Summary
- Based on strong correlation of observed F-Factor fluctuations with solar irradiance fluctuations (especially for shorter wavelength VIIRS bands), solar variability is a significant source of radiometric fluctuations
- SSI data does not show significantly better correlation with F-Factor than TSI data does