

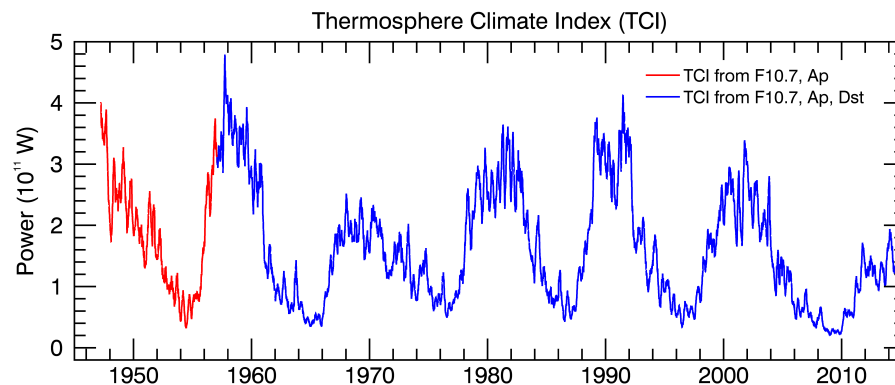
A combined solar and geomagnetic index for thermospheric climate

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&

The SABER Science Team

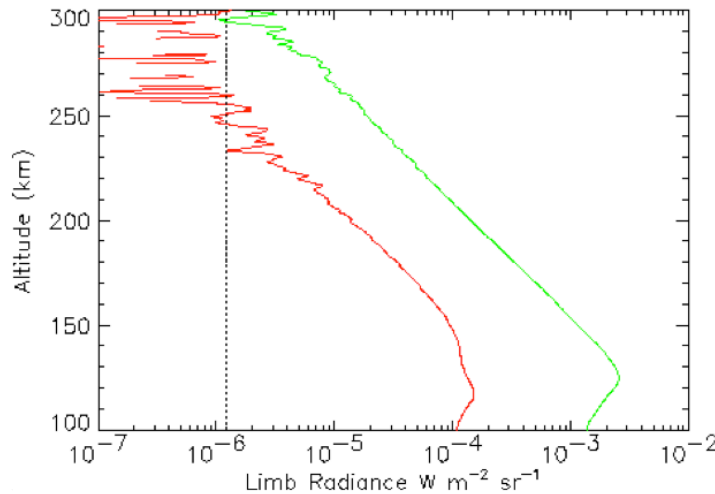


Outline

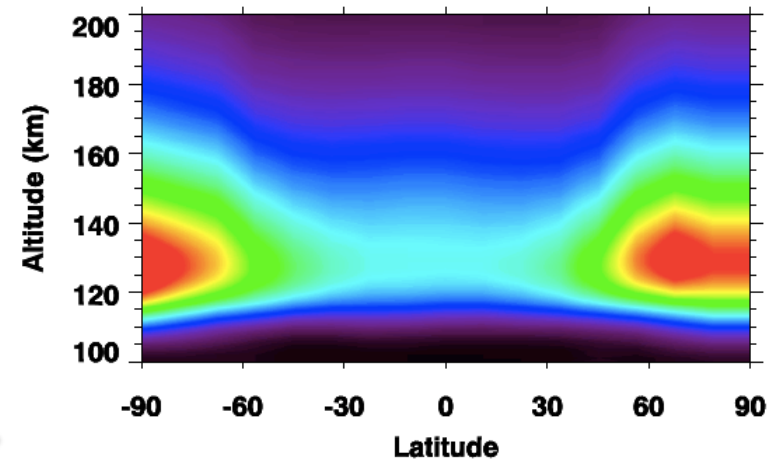
- SABER measurements of infrared radiance in the thermosphere
- Observed variability over the solar cycle, including maximum in SC24
- Development of a new index for thermosphere cooling

Thermosphere Power Derivation from SABER

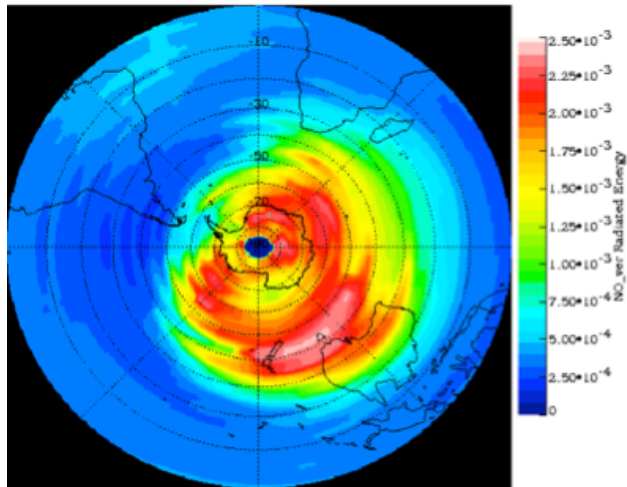
Radiance



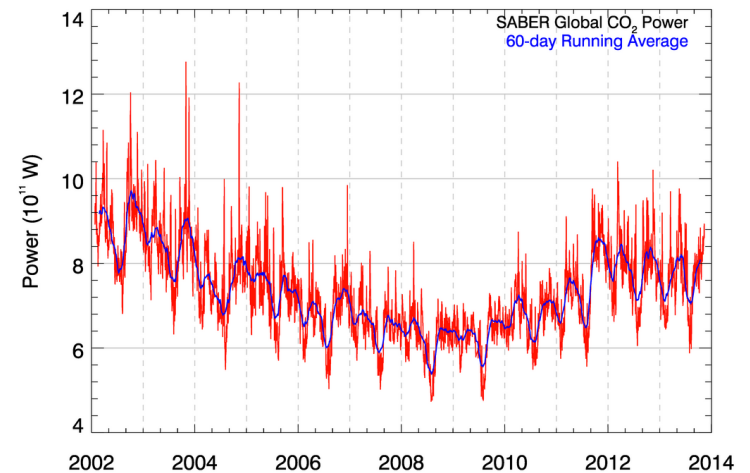
Cooling Rate W m⁻³



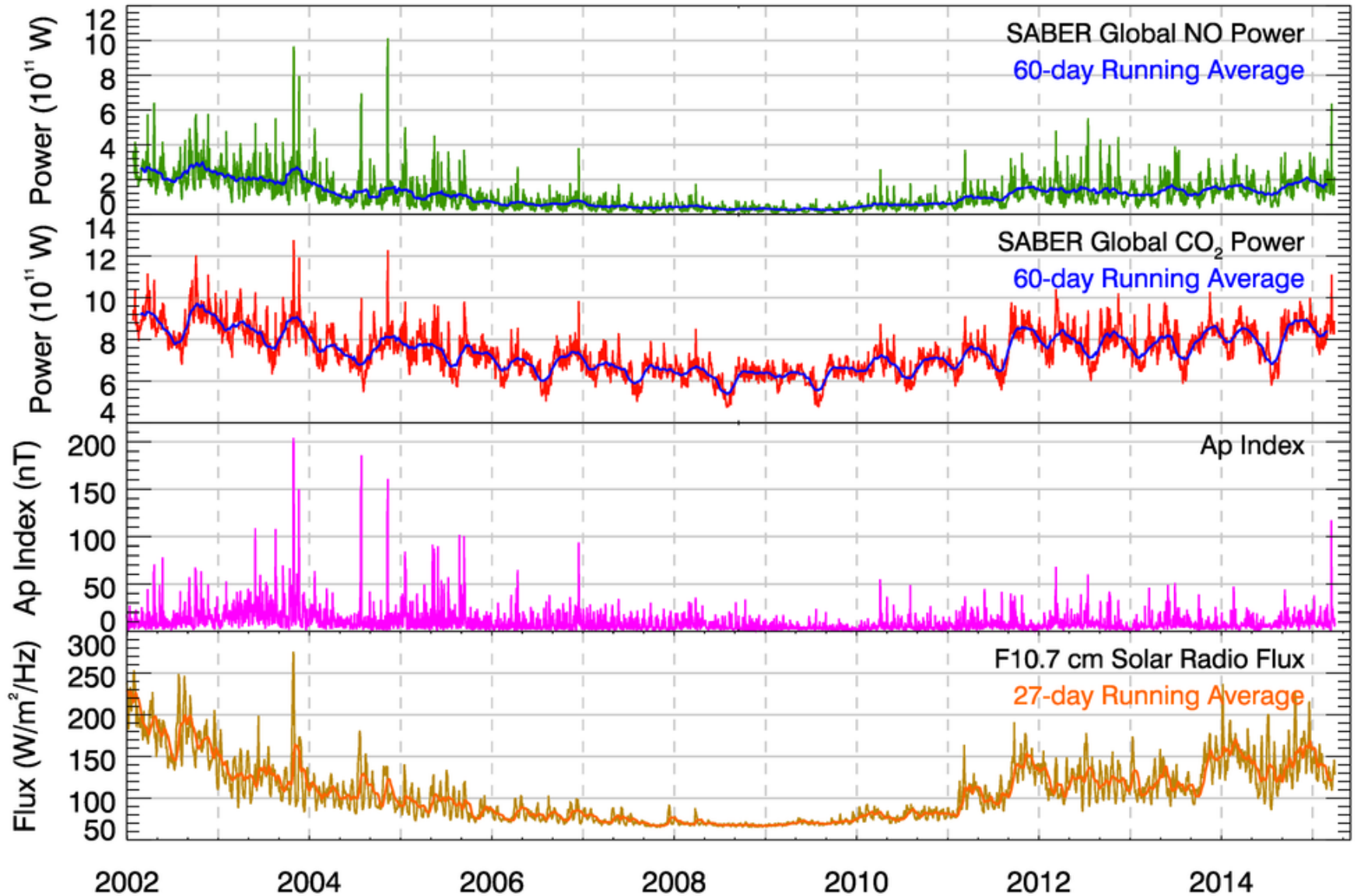
Radiated Flux W m⁻²



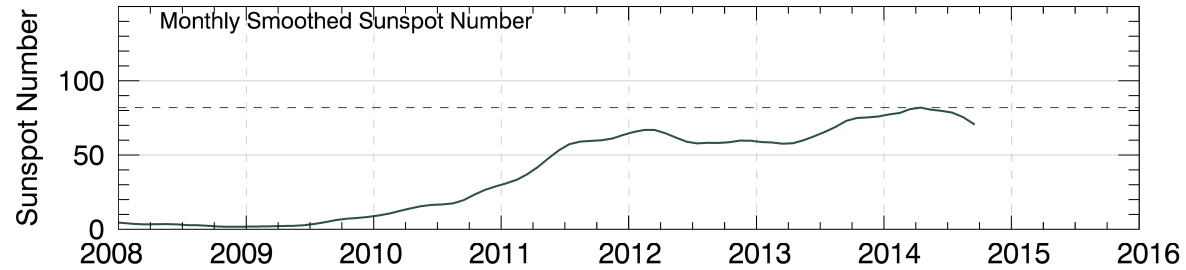
Daily Radiated Power (W)



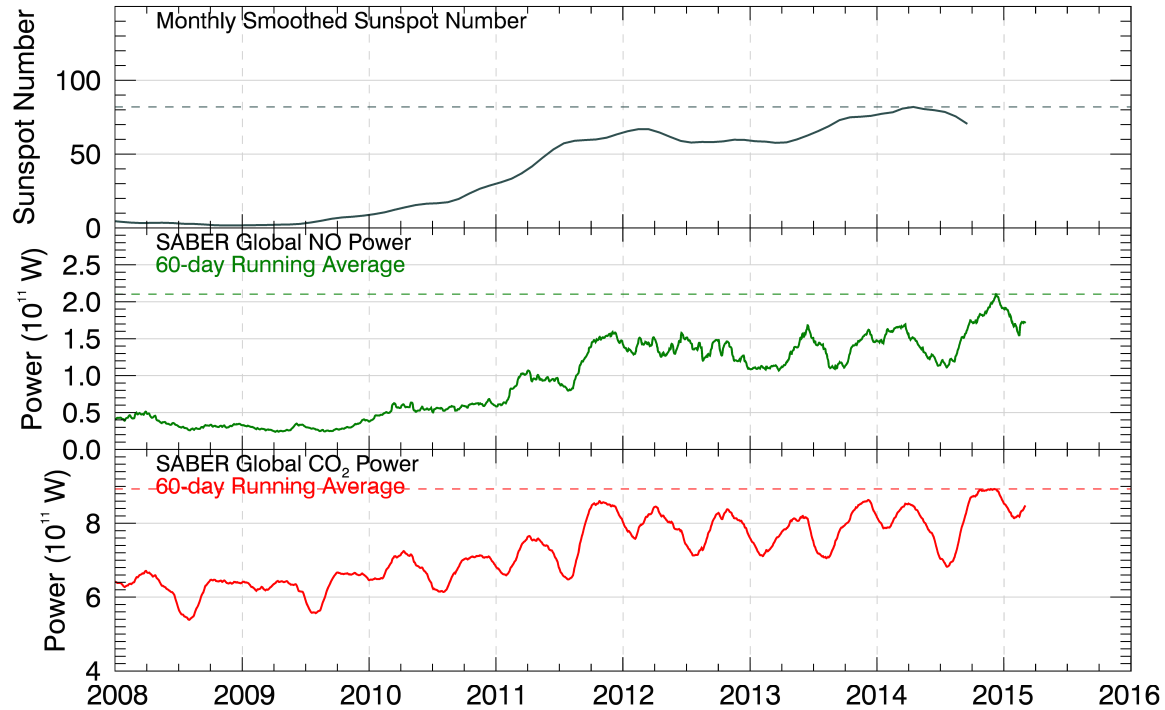
Observed Variability



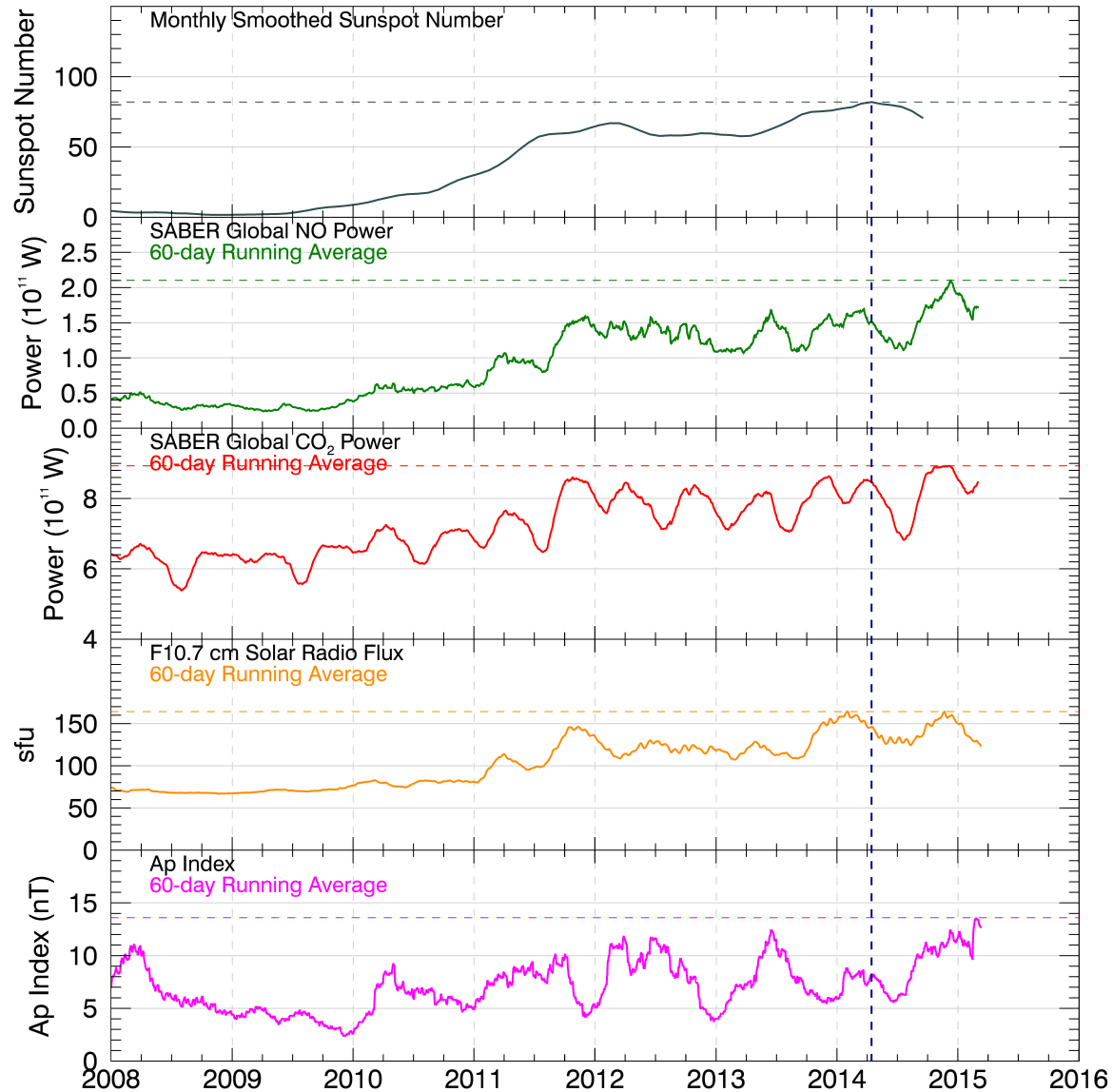
Solar Cycle 24 Max



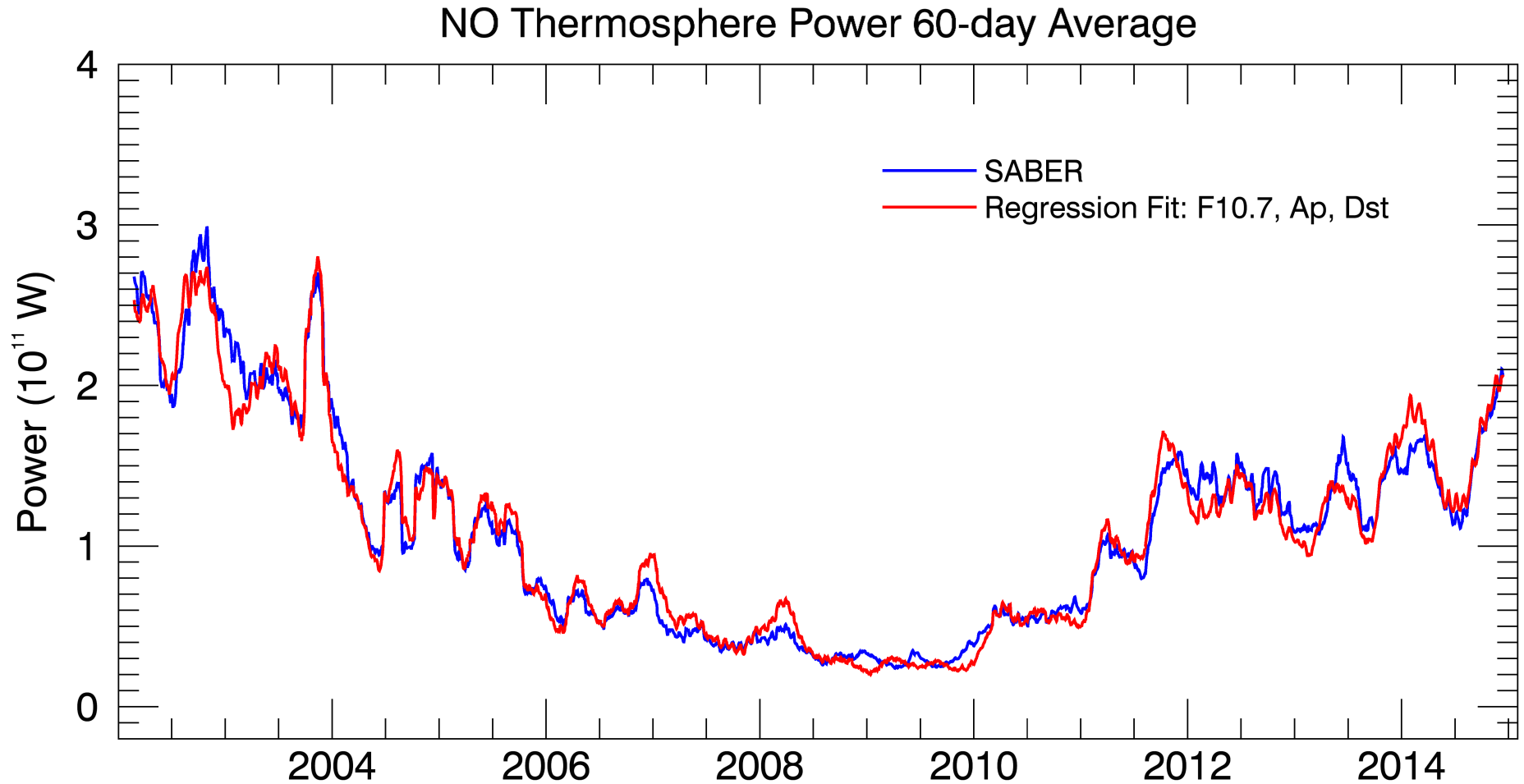
Solar Cycle 24 Max



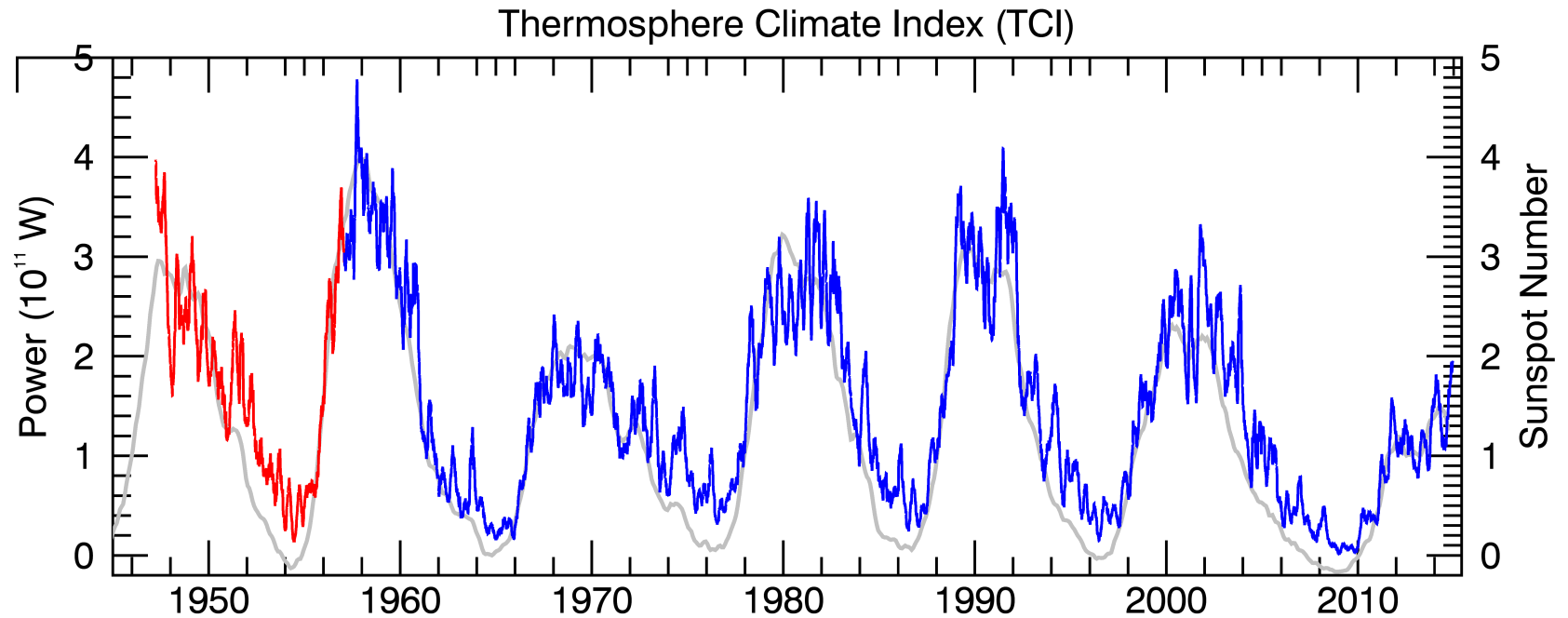
Solar Cycle 24 Max



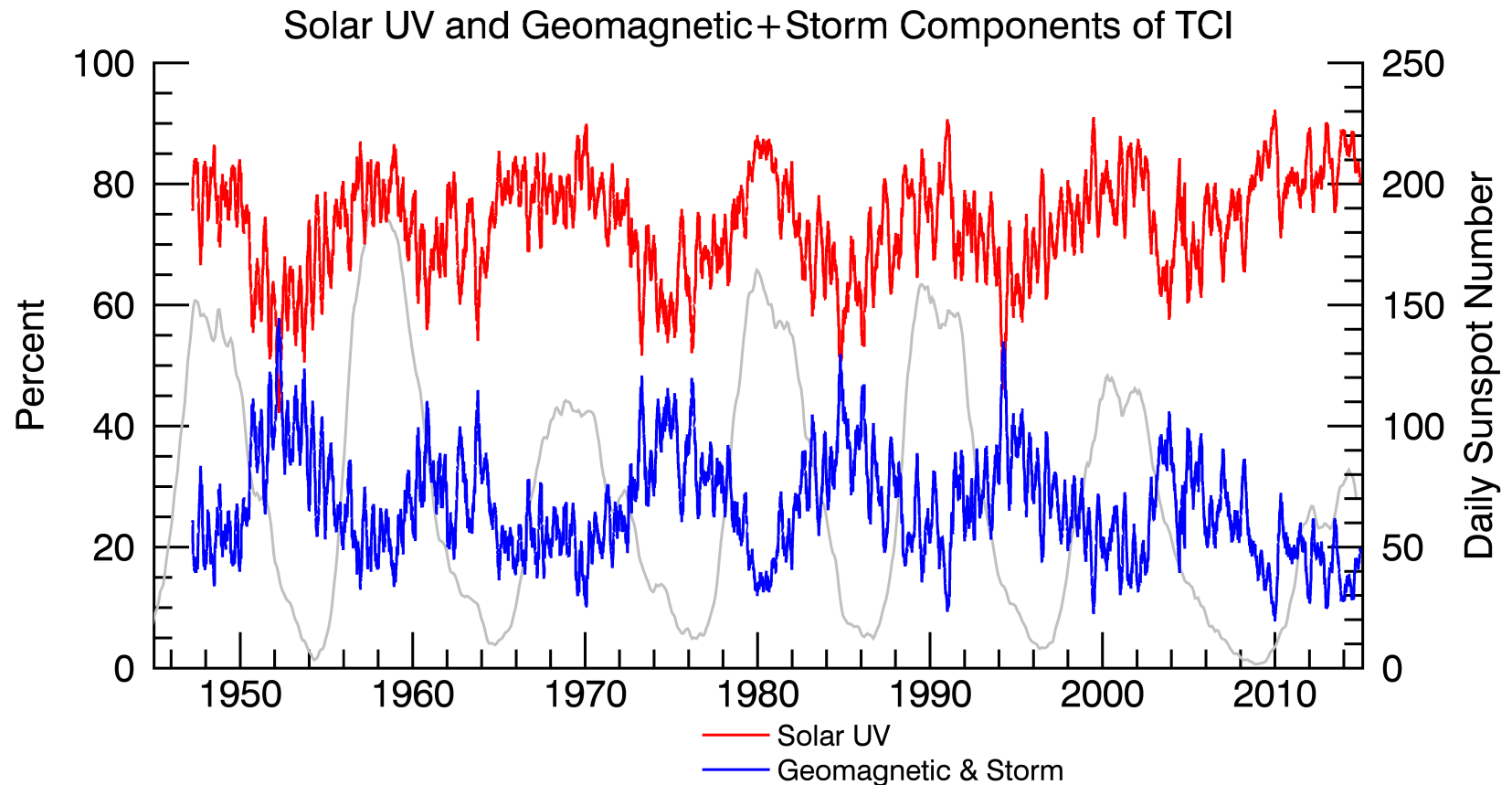
Regression Fit of SABER NO Power



Reconstructed NO Time Series



Relative Contribution of TCI Components



Summary

- Global NO and CO₂ radiated thermosphere power are highest in SC 24 in late 2014.
- The time series of NO global infrared radiate power can be fitted quite accurately with three solar and geomagnetic indices: F10.7 solar radio flux, the Ap index, and Dst.
- The NO power time series can then be reconstructed back to 1947
 - Enables tests of upper atmosphere models over six solar cycles
 - Allows relative roles of solar and geomagnetic process to be determined

Two articles on these topics
have been submitted to GRL

Backup Slides

NO Periodicity

