High Resolution Irradiance Spectrum from 300 to 1000 nm

Robert L. Kurucz [rkurucz@cfa.harvard.edu], Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts.

The FTS scans that made up the Kitt Peak Solar Flux Atlas by Kurucz, Furenlid, Brault, and Testerman (1984) have been re-reduced. An approximate telluric atmospheric model was determined for each FTS scan. Large-scale features produced by O3 and O2 dimer were computed and divided out. The solar continuum level was found by fitting a smooth curve to high points in each scan. The scans were normalized to the fitted continuum to produce a residual flux spectrum for each FTS scan. The telluric line spectrum was computed using HITRAN and other line data for H2O, O2, and CO2. The line parameters were adjusted for an approximate match to the observed spectra. The scans were divided by the computed telluric spectra to produce residual irradiance spectra. Artifacts from wavelength mismatches, deep lines, etc, were removed by hand and replaced by linear interpolation. Overlapping scans were fitted together to make a continuous spectrum from 300 to 1000 nm. All the above steps were iterative. The monochromatic error varies from to 1.0 percent. The residual spectrum was calibrated two different ways – First by normalizing it to the continuum of theoretical solar model ASUN (Kurucz, 1992), and second, by degrading the spectrum to the resolution of the observed irradiance (Thuillier et al., 2004) to determine a normalization function that was then applied to the high resolution spectrum. This calibration has now been repeated with the current SIM spectrum. Future work in the ultraviolet, visible, and infrared is outlined.