SOHO/CELIAS/SEM 26-34 nm Absolute Irradiance Time Series from 1996 to 2014: A revised calibration and comparison with solar indices

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We present a new version of the SOHO/Solar EUV Monitor (SEM) 26-34 nm calibrated irradiance data obtained from measurements which span a time interval from the beginning of SEM operation in 1996 until now. It has recently been demonstrated that for the period of overlap between the SOHO and SDO missions, processing the SEM data using time-dependent reference spectra and updated SEM channel response functions results in SEM absolute irradiances that are in good agreement with those from the SDO/EVE. In the present work, we apply this approach to the entire SEM data set and additionally incorporate a revised degradation model that incorporates calibration under-flight measurements from 12 sounding rockets between 1996 and 2012. We discuss the formulation of the degradation model, verify it based on comparisons with concurrent measurements from SDO/EVE for recent dates, and present long-term comparisons of the new version of the SEM time series with the F10.7 and Mg-II core to wing ratio solar activity indices.