

Solar Irradiance: Modes of Variation

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Solar Irradiance varies on multiple time scales. We identify the major modes of variability of the solar irradiance without making a prior assumption of any expected period of variation. We use the Empirical Mode Decomposition (EMD) method to accomplish this task. This method is based on adaptive filtering allowing the presentation of the data time series as a small number of non-linear and non-stationary modes. The method is well suited for describing the non-stationary nature of solar irradiance variability. We apply the EMD to the SORCE total and spectral irradiance data to identify the modes of variation on time scale shorter than the “11-year” cycle. For extracting modes and trends on longer time scales we use reconstructed irradiances.