Progress toward the Next Generation Solar Irradiance Variability Models

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Advances in specifying and modeling solar irradiance variability achieved by the NASA Solar Irradiance Science Team (SIST) during 2015-2018 (i.e. during the SIST-1 program) are being utilized in the construction of the next generation of solar irradiance variability models as part of the SIST-2 program. The next generation models will have enhanced community and operational utility and will ultimately be transitioned to a new version of the NOAA National Centers for Environmental Information Solar Irradiance Climate Data Record.

Enhanced operational utility and model reliability will be achieved through incorporating operational, GOES-16 Mg II index observations as the facular brightening model input and through improved calibration of the USAF/SOON sunspot area record used as the sunspot darkening model input. Operational utility and model reliability is also being enhanced with new spectral irradiance modeling capabilities that utilize model indices derived from the observed total solar irradiance record. Concurrently, a high spectral resolution model of 0.1 nm in the 115 nm to 500 nm spectral range is being developed to complement the current 1-nm resolution models spanning 115 to 100 µm. Higher spectral resolution models will have enhanced utility for the radiative transfer modeling and remote sensing science communities.

We present the progress of this SIST-2 team's efforts in constructing the next-generation solar irradiance variability models.