Methodology for Creating a TSI Composite

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The production of accurate total and solar spectral irradiance records for long-term Earth-climate or solar-variability studies heavily relies on our ability to merge disparate observations into one single composite. To accomplish this, we have recently developed a new methodology for creating composites that has several advantages over previous methods. Our approach is probabilistic and statistically driven. First, we derive time- and scale-dependent uncertainties from the individual observations. Next, we use weighted contributions from all available data sets at any one time rather than a binary selection, with the weighting determined by those statistically-driven, scale-dependent uncertainties. We are presently using this approach to create the new TSI composite. In this presentation we shall explain its different steps, show what new insight it gives into the uncertainty on long-term variations, and reveal how easily it can be generalized to other solar datasets.