Modeling of the Current TSI and SSI and its Reconstruction to the Past
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We have developed and published the COde for Solar Irradiance (COSI) which provides the physical modeling of the entire solar spectrum composed of quiet Sun and active regions. This code allows us to reach good agreement between the calculated and observed solar spectrum as measured by SOLSTICE and SIM onboard the SORCE satellite and ATLAS 3 mission operated from the Space Shuttle. We find that NLTE effects are very important for the modeling of the solar spectrum even in the visual part of the spectrum and for its variability over the entire solar spectrum.

We employ the assumption that the quiet Sun consists of two components. The first corresponds to the average quiet network and it is responsible for all magnetic activity of the quiet Sun. The second represents the Sun that is basically free from any magnetic activity. We use the reconstructed open magnetic flux data as well as the TSI and SSI observed by SORCE during this peculiar solar minimum to find the filling factors of these components. We use the sunspot numbers to reconstruct the filling factors of the solar active components. This approach allows us to obtain an annually averaged TSI and SSI reconstruction back to the Maunder Minimum.