

Measured Total Solar Irradiance Cycle Variability: Status at the End of Cycle 23

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The Total Solar Irradiance (TSI) is measured from space since 29 years, covering 2.6 11 year solar cycles. Over the last 2 solar cycles, 3 TSI composites are available showing a common 11 year cyclic TSI variation, but disagreeing on possible long term variations of the solar minimum TSI over the solar cycles. We review the new results of the 3 TSI composites over the currently ending cycle 23.

The only instruments that measured the TSI variation over the full cycle 23 – since 12 years – are the VIRGO radiometers DIARAD and PMO on the SOHO satellite. We present the ageing correction of DIARAD and PMO by the DIARAD team, and discuss the differences with the versions available from the PMO team. In addition to the normal exposure dependent ageing corrections applied by both the DIARAD and PMO teams, the PMO team applies additional ‘exposure independent corrections’ or ‘sensitivity changes’ which create an artificial downward trend of about 0.4 W/m² for both DIARAD and PMO.

We compare all available TSI measurements over cycle 23 from DIARAD, PMO, ACRIM2, ACRIM3, ERBS and TIM. They all show the same relative variations except ACRIM3 which shows a faster decline at the end of the cycle. We find that there is no variation of the solar minimum TSI over cycle 23 with an uncertainty of +/- 0.14 W/m².