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The latest TSI measurement results from CLARA on NorSat-1

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Continuous and precise Total Solar Irradiance (TSI) measurements are indispensable to evaluate the influence of short- and long-term solar radiative emission variations on the Earth's energy budget. The existence of potentially long-term trends in the Sun's activity and their effects on Earth climate is a societally-important field of research. The Compact Lightweight Absolute Radiometer (CLARA) is one of PMOD/WRC's future contributions to the almost seamless series of space-borne TSI measurements since 1978. CLARA was end-to-end calibrated against the SI-traceable cryogenic radiometer of the TSI Radiometer Facility (TRF) in Boulder (Colorado). The absolute measurement uncertainties for the three SI-traceable TSI detectors within CLARA are 567, 576 and 912 ppm (k = 1). CLARA is one of three payloads on the Norwegian micro-satellite NorSat-1, which was launched July 14th, 2017.

We present TSI observations of CLARA together with the latest lessons learned about the instrument behavior on NorSat-1 including: i) pointing accuracy of CLARA and pointing stability of the satellite platform, ii) degradation of the detector sensitivity, iii) instrument sensitivity to temperature variations, iv) CLARA's abilities for measuring TSI during solar eclipses for determining the Sun's radius, and v) comparison of the TSI results to other space radiometers. The comparison between the CLARA Channel A and B preliminary first light observations of 1359.53 W m-2 and 1360.93 W m-2 and VIRGO's new scale TSI observation (1360.14 W m-2) show that they are in agreement within the instrument uncertainties.