

Long-Term Solar/Geophysical Data Sets: Utility, Reliability, and Improvability

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Total Solar Irradiance seems to vary with solar activity. The effects of solar activity on geospace are themselves important as space facilities become increasingly relevant for society. As solar activity varies on decadal and longer time scales, we need to know the past as far back as possible to assess the potential range of future variation. The sunspot numbers form a 400-year base series. Proxies, such as radionuclides, extend the series back further, but with greater uncertainties. Geomagnetic disturbances caused by solar activity provide the basis for proxies extending back more than two hundred years. As we try to interpret the past in terms of the present, the question arises about the long-term stability of the calibration of the data. We already have examples of possible problems with the long-term robustness of the data: the Group sunspot numbers seem to be smaller than the classical Wolf numbers before ca. 1870; and the geomagnetic aa-index seems to be too low before 1957. In this talk, we shall explore the various time series, their calibration, and what might be done to improve their calibration.