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Predictability of Solar Forcing

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Paleorecords of solar activity derived from cosmogenic radionuclides such as 10Be in polar ice and 14C in tree rings reveal considerable variability for the past 10,000 years. This variability is characterised by relatively short (60-100 y) periods of low solar activity, so called grand solar minima, superimposed on long-term changes. “Calibration” of this record with the total solar irradiance measured by satellite based radiometers for the past 30 years provides a good estimate of the past solar forcing especially in relative terms. Spectral analysis of this record shows clear evidence for solar cycles considerably longer than the well-known 11-year Schwabe cycle. Additional statistical analysis confirms the existence of a deterministic component in the solar variability which can be used to make some predictions about future solar forcing.