Geophysical Research Abstracts
Vol. 15, EGU2013-2579, 2013
EGU General Assembly 2013

How uncertainties of measurements impact the observed global dimming and brightening?

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Surface incident solar radiation has been widely observed since the late 1950s. Such observations have suggested a widespread decrease between the 1950s and 1980s ("global dimming") and a reverse brightening afterward. This study will address the issues on how uncertainties of measurements impact the observed global dimming and brightening. This is a synthesis of our published and ongoing studies and it will cover following aspects: (1) Whether the measurement method (global solar radiation v.s. direct plus diffuse radiation) impacted long-term trend of surface incident solar radiation? (2) Did the replacement of measuring instruments introduce data inhomogeneity? (3) Did density of measurements impact the observed global brightening? (4) Can we obtain accurate estimate of long-term trend of surface incident solar radiation at regional or global?