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## Response of atmospheric ground level temperatures to changes in the total solar irradiance

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The attribution of part of 'global warming' to changes in the total solar irradiance (TSI) is an important topic which is not, yet, fully understood. Here, we examine the TSI induced temperature (T) changes on a variety of time scales, from one day to centuries and beyond, using a variety of assumptions. Also considered is the latitude variation of the T-TSI correlations, where it appears that over most of the globe there is a small increase in the sensitivity of temperature to TSI in time. It is found that the mean global sensitivity  $\alpha$  measured in  $K(Wm^{-2})^{-1}$  varies from about 0.003 for 1 day, via 0.05 for 11-years to  $\sim 0.2$  for decades to centuries. We conclude that mean global temperature changes related to TSI are not significant from 1975 onwards.

Before 1975, when anthropogenic gases were less important, many of the temperature changes can be attributed to TSI variations. Over much longer periods of time, from Kyear to Myear, the TSI changes are more efficient still,  $\alpha$  increasing to about 0.5. Since 1975 the changes in mean global temperature are not due to TSI changes, but rather to the increasing atmospheric CO<sub>2</sub> content.

### Collaboration

– not specified –

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