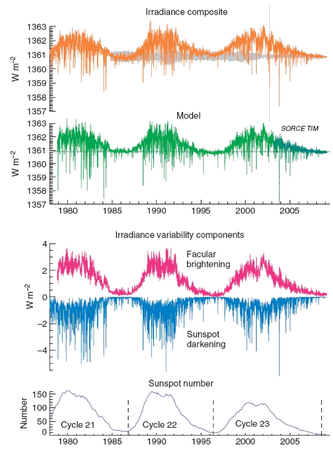
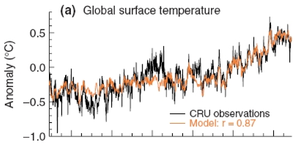
Cycles and trends in solar irradiance and climate

Judith Lean, a contributing author to IPCC's 4AR, has written an interesting paper (freely available at Wiley Interscience here). She says very clearly that the usual dismissal of Sun-Climate associations can not be accepted anymore (do you remember that this dismissal was sort of a mantra of the IPCC consensus?). She gives an interesting picture showing the different contribution to TSI from the bright faculaes (+) and the dark sunspots (-); the balance is (actually, but not known for historic data) a domination of the brightening effect in respect to the darkening:

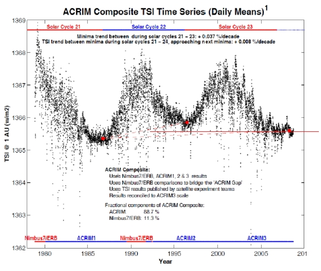


She presents a astonishing good model fitting the measured 2oth century temperature increase (as given from HADCrut) by a **linear** combination of the effects of TSI, volcanic activity, ENSO and anthropogenic warming.



This latter contribution is not a measured one, but a **calculated** forcing from emission of GHG's and CFC's, aerosol, land use and albedo changes. This implies that this influence might not give the same increase in forcing than predicted from the past (for instance, higher CO2 emissions might well have a diminishing effect). Nevertheless, her model follows nicely the CRU temperature curve, including the recent no-warming decade.

She limits the solar influence to 0.1°C (of the 0.6°C last century warming) and stresses that there is no trend in the TSI corresponding to the last 3 minima; this is in striking contrast to N. Scafetta (see next figure showing an increasing trend in minimum_ TSI, from a presentation of Scafetta (77MB)). Scafetta suggests a plausible 70% solar influence on the 20th century warming.



It should be noted that Lean does not include enhanced effects due to much higher UV variations during a solar cycle.

Lean makes an interesting comment on the influence of TSI variations in regions vulnerable to the hydrological cycle, which react strongly to these changes (as more drought in Western USA and Equatorial East Africa). If her model remains valid for the future, this implies that anthropogenic warming will negate a good part of the solar influence, for the good or for the worse.

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update 15 Mar 2010:

read this new booklet by N. Scafetta: "Climate change and its causes"

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One Response to "Cycles and trends in solar irradiance and climate"

Artesian Says:
March 13, 2010 at 14:00 | Reply

We have observed the solar cycle trump greenhouse effect, if there is any, and Pinatubo trump the solar cycle. Lean's research does not take into account sunspot peak frequency (Friis-Christensen and Lassen, Science 1991). She's probably too young to remember that seminal paper.

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