

# The sun could be having a 15% or 20% effect on climate change

July 18 2008

---

Global warming is mainly caused by greenhouse gas emissions resulting from human activities; however, current climatic variations may be affected “around 15% or 20%” by solar activity, according to the researcher Manuel Vázquez from the Canary Islands’ Astrophysics Institute (IAC) at the Sun and Climate Change conference, organised as part of the El Escorial summer courses by Madrid's Complutense University.

In the past, the sun was the main external agent affecting climate change on Earth, together with the effects of volcanic explosions and internal factors such as ocean currents.

“If man had never started burning fossil fuels, the sun might have been the only agent regulating the climate until the next glaciation. However, back in the 19th century we started an experiment which we are now beginning to suffer the consequences of”, explained the astrophysicist Manuel Vázquez to SINC.

During his masterly conference at the El Escorial summer courses, the researcher pointed out that the possibility of a relationship existing between the sun and climate on Earth is quite “plausible”, since it is the main source of energy of everything that occurs in the Earth's atmosphere, “but empirical tests need to be found that show that such a correlation exists, and over what timescale”. It is not the same trying to find a connection over billions of years, where changes in the sun's interior have an effect (the scientist commented), as looking for

variations over just a few thousand years, “where we think only fluctuations in the magnetic energy of stars can play any type of role”.

Vázquez explained that this type of energy is produced on surface structures of the sun linked to the magnetic field. The most well known are sunspots which have variation cycles of every 11 years and others over a longer timescale. The researcher added, “there is evidence to show that after the last glaciation, over the last 10,000 years and before industrial activity commenced, fluctuations in the sun's magnetic energy regulated most of the Earth's climate variations”.

As examples of this correlation, Vázquez said that there is “certain evidence” of a relatively warm period in the Middle Ages, “around about the 11th century” which coincided with a period of high solar activity; on the other hand, in the second half of the 17th century, there was a decrease in solar activity which coincided with a relatively cold period on Earth, “although it appears the effects of the sun might affect certain areas of the planet more than others”.

In any case, based on statistics “it is necessary to find a mechanism that explains that correlation, which is where the main battlefield of this research lies”, Vázquez acknowledged, because, although over the last 30 years it has been possible to measure the variation in the amount of energy that comes from the sun, with an 11 year cycle differences between maximums and minimums are so small that they would appear to have no direct effect on climate. To explain past variations, scientists believe there must be some type of mechanism that amplifies the solar signal, such as changes in the sun's ultraviolet radiation, in the flow of cosmic rays that reach the Earth or in the average electricity of the Earth's atmosphere.

The IAC astrophysicist explained that the sun's influence in climatic variations over the last few thousand years is clear: “When there is more

solar activity, there is more radiation from the sun, and any of the above-mentioned processes will intensify, causing warming”. All these signals are very evident in the upper layers of the atmosphere, as shown by data collected in recent years, “but the major problem is transferring such a clear correlation of solar activity observed in the upper layers of the atmosphere to the lower layers, where we measure climate”.

The role of the sun in the Earth’s climatic variations “is not inconsiderable”, but Vázquez pointed out that over the last 40 years solar activity has not increased, and has in fact remained constant or even diminished, which is why it is difficult to attribute a significant global warming effect to it, “the cause of which needs to be looked for in human activities”.

Source: Plataforma SINC

Citation: The sun could be having a 15% or 20% effect on climate change (2008, July 18) retrieved 20 April 2024 from <https://phys.org/news/2008-07-sun-effect-climate.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.