Coordinated by: Jean Lilensten, Thierry Dudok de Wit, Katja Matthes

Earth's climate response to a changing Sun

Editors:

Thierry Dudok de Wit, Ilaria Ermolli, Margit Haberreiter, Harry Kambezidis, Mai Mai Lam, Jean Lilensten, Katja Matthes, Irina Mironova, Hauke Schmidt, Annika Seppälä, Eija Tanskanen, Kleareti Tourpali, Yoav Yair





This is science in action, and new facts may come up tomorrow...



This handbook is organised as a mosaic of short chapters, each of which addresses a specific aspect, and can be read independently. As the global picture progressively unfolds, the reader will learn about the assumptions, the data, the models, and the unknowns behind each mechanism by which solar variability may impact climate variability.

The degree to which these changes affect climate depends on their magnitude, their persistence, and the relative effect of competing climate drivers, such as greenhouse gases. So far, we found that none of the known solar-driven mechanisms can adequately explain global warming observed since the 1950s. However, several of them do impact climate variability, in particular on a regional level.



This is science in action, and new facts may come up tomorrow. However, real progress in the understanding of solar contribution can be made only if new claims are supported by explanations that are open to scrutiny. We thereby challenge the reader to sharpen his/her critical thinking in a debate that is frequently distorted by unfounded claims.

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Communication on the topic of climate change has been repeatedly challenged by the complexity of our climate system. In the raging debate on the causes of recent climate change, some have pointed to the Sun as the main culprit. In contrast, the IPCC, in its 5th assessment report, concludes that less than 5% of the warming observed since the 1950s can be ascribed to solar variability. In recent decades, this topic has taken on a new importance, as we urgently need to understand the different causes of current global warming in order to foresee and adapt to its consequences.

Challenged by this, over 80 scientists representing 20 European countries – and a wide spectrum of disciplines – gathered as a group to work on a 4-year project. Their prime objective was to clarify the global picture of the impact of solar variability on climate. This handbook is the main outcome of that project, providing a complete and accessible panorama of our present understanding of the Sun-climate connection. The texts are aimed at a very wide readership of the scientifically curious, from undergraduate students to policy makers.

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