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Editorial

Solar and heliospheric influences on the Earth's weather and climate

This special issue on 'Solar and heliospheric influences on the Earth's weather and climate' explores the physical mechanisms which causally link space weather and space climate to the Earth's weather and climate and tackles their mutual coupling through top–down/bottom–up pathways in a broadly holistic and interdisciplinary way.

The first section of this special issue is concerned with energetic charged particles precipitating into the Earth's atmosphere, where the particles ionise molecules, with distinct effects on the global atmospheric electric circuit and the microphysical properties of aerosols, clouds, and the most important greenhouse gas: water vapour. The second part emphasises the tropospheric response upon solar variability, which may be amplified by non-linear processes in the climate system, and the electromagnetic connection between the troposphere and interplanetary space through sprites and man-made electromagnetic pollution of the near Earth space environment.

The papers collected in this special issue were presented during a session denoted 'Solar and heliospheric influences on the Earth's weather and climate' at the 1st General Assembly of the European Geosciences Union in Nice, France, 25–30 April 2004. This session grew out of the activities of the scientific network SPECIAL (Space Processes and Electrical Changes Influencing Atmospheric Layers), initiated by Michael J. Rycroft and supported by the European Science Foundation (ESF), which attracted a large number of contributions from the atmospheric and space science community.

The management of the resulting special issue was based on the particularly strong commitment of the authors, reviewers, the publisher, and the Editorial team, all of which worked very hard towards a fast production of this booklet.

The Editorial team is particularly indebted to the very timely and thoughtful responses of the reviewers, who made substantial contributions to improve the original outline of the submitted manuscripts.

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