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Cosmic Rays, Ozone Depletion and Climate Change

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Deadline for manuscript submissions:
closed (30 April 2024)

Message from the Guest Editor

Cosmic rays (CRs) are energetic charged particles originating from deep space. Atmospheric ionization caused by primary CRs leads to the formation of numerous lower-energy secondary particles, which may affect various atmospheric processes: (1) charge-dependent formation of aerosol particles and clouds, (2) charge-induced adsorption on aerosol or cloud particle surfaces, (3) charge-induced chemical reactions, and (4) changes in the global electric circuit. Several intriguing connections between CR flux variations and atmospheric processes have been observed, and physical mechanisms for the impacts of CRs have been proposed. However, they need to be investigated further to understand the CR effects on Earth's atmosphere, environment and climate on a global scale, likely through co-interactions with anthropogenic drivers.

This Special Issue invites original or review papers on the state-of-the-art knowledge in different aspects of impact of CRs and low-energy secondary charged particles on the atmospheric ozone layer, global climate, space weather and atmospheric electricity. Results from laboratory measurements, observations, and modelling studies are welcome.

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Message from the Editor-in-Chief

Continued developments in instrumentation and modeling have driven atmospheric science to become increasingly more complex with a deeper understanding of concepts, mechanisms, and interactions. This is the field that innovation built and it has led to a better appreciation for the complexity with atmosphere. Human life is intertwined in this complexity as we strive to better understand our atmosphere. Climate change is constantly stretching the limits of our thinking and forcing new ideas and concepts to be played out. Welcome to the Anthropocene!

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