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On the Variability of Atmospheric Transparency: Key Players, Geographic Specificities and Implications for Daytime Radiative Cooling

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Deadline for manuscript submissions:
closed (2 July 2021)

Message from the Guest Editors

To limit the environmental impact of increasing cooling demand, passive and sustainable cooling systems are urgently needed. Daytime radiative cooling exploits the atmospheric transparency to reject heat directly into the outer space. However, any loss of atmospheric transparency causes the downwelling longwave radiation to increase and the net radiative cooling to diminish or even disappear.

This Special Issue aims at publishing high-quality papers targeting the following goals:

- Collecting criteria and methods to quantify the atmospheric transparency loss as a function of the local atmospheric conditions, climate, geography and air quality
- Establishing innovative monitoring systems to measure the atmospheric transparency and capture the key variables involved in the interaction between radiative cooler and atmosphere
- Correlating the atmospheric transparency loss with observables at surface level and/or with the radiative cooling power impairment
- Interpreting historical data to predict the potential loss of atmospheric transparency at local and global scale in future scenarios
- Investigating methods to minimize the radiative cooling sensitivity to atmospheric transparency

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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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