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Modeling of Atmospheric Boundary Layers at Turbulence-Resolving Grid Spacings

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Deadline for manuscript submissions:
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Message from the Guest Editors

Dear Colleagues,

Advances in computing technologies have recently begun to enable a more routine application of atmospheric models at turbulence-resolving grid spacings. There are, however, different approaches depending on the model's grid spacing. Beyond the mesoscale limit, traditional weather prediction models are being exercised at fine grid spacings. This range of grid spacings requires scale-aware parameterizations that account for the nature of partially resolved turbulence and horizontal heterogeneity. On the high wavenumber end of the energy spectrum, large-eddy simulation (LES) models ($\Delta < 10$ m) are used to explicitly represent production and part of the inertial range scales of three-dimensional turbulence. In this context, the application of the LES technique is experiencing a progressive transition toward large domain extents under heterogeneous forcing conditions that encompass part of the sub-meso and mesoscale spectrum. As a result, these methods are enabling unprecedented insight into complex ABL phenomena, yet imposing new modeling challenges. Articles on all aspects concerning turbulence-resolving modeling of ABLs 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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