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Flow Dynamics in the Stable Planetary Boundary Layer

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Message from the Guest Editors

Dear Colleagues,

Understanding and predicting the dynamic of the stable boundary layer is of paramount importance for the PBL community.
The stable boundary layer is an intricate pattern of turbulent and non-turbulent motions on different scales. The balance of the turbulent kinetic energy production and buoyancy destruction drive the transition between turbulent and non-turbulent states in which a wide range of phenomena, known as the submeso motions, interact, giving rise to intermittent turbulent episodes. In cases of very stable stratification, pollutants are trapped near the ground, strongly affecting air quality. Further, the very stable boundary layer is always associated with low-wind speed episodes, which are important for wind power assessment. Unfortunately, our understanding is still limited, and atmospheric and dispersion models poorly perform in the VSBL because submeso motions are not correctly resolved. The vertical decoupling of the boundary layer complicates the parameterization of the turbulent fluxes with the Monin–Obukhov similarity theory.

Dr. Luca Mortarini
Dr. Daniela Cava
Guest Editor

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Special Issue

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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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