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EDITORIAL

50th Anniversary Issue of *Boundary-Layer Meteorology*

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This is my final Editorial—on December 31, 2020 I retire after 25 years as Editor and Co-Editor of *Boundary-Layer Meteorology*, a period in which we have published about 2500 articles in 300 issues of the journal. I have copy-edited most of these articles and have corrected around 2500 Editor's proofs. I have received compliments from many authors, come to blows with a few, and even been told that I did "one of the worst editing jobs ever"! Phew—I need to get back to some research or write my childhood memoirs. Maybe play even more Bridge, though in the foreseeable future it is online only, given that the Covid-19 pandemic still rages.

Evgeni Fedorovich and Richard Foreman now hold the reins. I wish them well, and hopefully I will continue with the journal in a minor role. Two or so years ago Evgeni and I decided to celebrate 50 years of the journal through a special issue. A number of scientists prominent as authors and reviewers of *Boundary-Layer Meteorology* were approached, and many have obliged by writing reviews on a range of topics relevant to the planetary boundary layer (PBL). Before previewing the contents, I would like to thank our past and present publishers—originally D. Reidel, then Kluwer, now Springer, for their support throughout the period, and in particular thank all members of the Editorial Board, past and present, who have devoted their time to the journal.

I have in front of me Ted Munn's Editorial in the first issue (March 1970), and Robert Ratcliffe's review from *Agricultural Meteorology* in 1971. Both predicted a bright future for the journal, and I think it is fair to say that these early expectations have been realized. Ratcliffe's review makes for interesting reading; here are a few extracts:

> The boundary layer has assumed greater importance recently for a variety of reasons… including a growing concern over pollution, the necessity for wider knowledge of urban meteorology, and of, for example, wind effects on tall buildings… Probably the most important single reason for [a focus] on the boundary layer is in connection with numerical modelling for weather forecasting.

> Whether it can succeed in welding together the biological, agricultural, and engineering sides with the meteorologists remains to be seen. This first issue makes a laudable attempt. The journal is well produced with clear print and diagrams, although the price is high.

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The references to urban meteorology and the wind effects on tall buildings (let us transpose this to turbines and wind farms) are so pertinent, given the huge increase in articles dealing with these topics in the last 20 years. However, I was struck by how this contrasts with a topic that has permeated the pages of *Boundary-Layer Meteorology* for all 50 years, and is a major theme in the reviews that follow. I refer to the Monin–Obukhov similarity theory—it is educational to return to an article published in the second volume of *Boundary-Layer Meteorology* (1971) and introduced by Businger and Yaglom, who start with "*In 1943 at the age of 25, AM Obukhov finished the remarkable paper that follows this brief introduction… it is a truly classical contribution and every serious student of the atmospheric boundary layer should… study it.*" So, even 50 years on the reader should return to Obukhov's paper—I suspect that many have long since forgotten this classic.

Now back to the present. This special anniversary issue comprises, (i) two extended commentaries the first summarizing the work of four of our most productive authors and the second summarizing 11 of our most cited articles; (ii) a number of reviews, several of them extensive in their breadth of material; (iii) one research article.

The reviews that follow broadly break down into three groups. The first group comprises four articles that focus on the PBL under time- and space-varying conditions. Mahrt and Bou-Zeid cover properties of the non-stationary PBL, whilst Angevine et al. present aspects of the diurnally-varying PBL over land during the sunrise and sunset transition periods. Then, Bou-Zeid et al. cover properties of the PBL above a heterogeneous land surface, considering space scales typically 1 m to 10 km. Finnigan et al.'s overview of flow over complex, but gentle, terrain is monumental and will serve, I am sure, as a reference for years to come. One of the excellent features of this review is that it deals with both flow over hills and gravity-driven flow under one title. It embraces all aspects of the topic, from observations and experiments to the wide variety of models that have been developed to understand and simulate turbulent flow over topography.

The second group comprises four articles too, mainly dealing with the micrometeorology of PBL flow, theory, and measurement. Brunet's review is another monumental effort, dealing with, inter alia, flow within and above plant canopies, and the breakdown of similarity theory close to the surface. This is a comprehensive review of the development of canopy-flow theory, measurement, and modelling, pivoting around the period from the mid 1970s to the mid 1990s, during which our understanding of this field was transformed.

The history of turbulent flux measurements and their interpretation and pitfalls is covered by Hicks and Baldocchi, whilst perspectives on the surface energy budget at the land surface are provided by Mauder et al. and by Cuxart and Boone on a major term in the budget equation, the evapotranspiration. Hicks and Baldocchi (I have the senior author in mind here) attempt to redress a clear bias in the literature when scientists cite early work on eddy-flux measurement and the related flux–gradient relations. Thus, attention is paid to early Australian research in the 1950s and 1960s, both in the development of techniques and in the analysis of field data that form the basis of the Businger–Dyer stability functions. The discussion by Mauder et al. reflects the gradual realization over the past two decades of the roles of a number of factors that influence the energy budget and the attempt to quantify their relative contributions to non-closure of the budget equation.

Finally, the third group comprises four articles focused on analytical and numerical models, and both the models and observations that provide a means of validating PBL representation in models. Firstly, Cassiani et al. deal with the behaviour of concentration fluctuations arising from localized releases of dynamically passive and non-reactive scalars. Both experimental field and laboratory work, as well as modelling approaches, are reviewed extensively, covering both point and line sources, and including analytical, semi-analytical, and numerical methods.

The representation of PBL processes in weather and climate models is treated by Edwards et al., while the application of large-eddy simulation to PBL problems is covered by Stoll et al. Finally, Bosveld et al. describe the history of observations from the Cabauw tower in the Netherlands. It is worth noting that the construction of this 213-m tall tower was underway in 1970, finished in 1972, and indeed in the first issue of *Boundary-Layer Meteorology* there is an article that describes the predecessor to Cabauw, the 80-m Vlaardingen tower—so there is a 50-year history here too.

The issue is completed with a single research article, included by permission of the Chief Editor, Evgeni Fedorovich. Its long gestation period of nearly 50 years is evident from its Introduction, and it precedes an article in preparation that describes the influence of diffuse shortwave irradiance on the CO_2 flux and canopy transpiration.

My scientific career is almost at an end, and whilst reflecting on this a number of highlights come to mind. Two in particular I wish to note here: my textbook *The Atmospheric Boundary Layer* published in 1992; and my last 38 years with *Boundary-Layer Meteorology* (I joined the Editorial Board in 1982) helping to steer the journal through occasionally choppy waters.