

# ***Interactive comment on “Similarity analysis of turbulent transport and dissipation for momentum, temperature, moisture, and CO<sub>2</sub> during BLLAST” by João A. Hackerott et al.***

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I fully agree with you that the parameterization of similarity functions for carbon dioxide is highly important for climate modelling and I also agree that there are only a very limited number of investigations – not only for carbon dioxide but also for water vapour. But the reason is neither a lack of interest from researchers nor missing data sets (mainly for water vapour), but rather the limitations of our methods or the structure of the atmospheric turbulence in showing any significant difference to the heat exchange. An important development at the end of the last century was that it became possible to reduce the scatter of the von-Kármán-constant and the turbulent Prandtl number (Högström 1996; Foken 2006). But there was no result available such that the turbu-

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turbulent Schmidt number (relevant for the water vapour exchange, but also for other trace gases) has values that are different to the turbulent Prandtl number. The same was the case for the similarity relationships. There has recently been general agreement to use the turbulent Prandtl number, the universal function for heat, etc., for the water vapour and trace gas exchange as well (Foken 2008). If you want to make a significant contribution to our knowledge, you must show that the turbulent Schmidt number for carbon dioxide and the similarity relationships are different to the normally-used turbulent Prandtl number and similarity relationships within their typical errors (Högström 1988; Högström 1996). The simple presentation of similarity relationships without a discussion of their relevance is less helpful.

References: Foken T (2006) 50 years of the Monin-Obukhov similarity theory. *Boundary-Layer Meteorol.* 119:431-447. Foken T (2008) *Micrometeorology*. Springer, Berlin, Heidelberg, 308 pp. Högström U (1988) Non-dimensional wind and temperature profiles in the atmospheric surface layer: A re-evaluation. *Boundary-Layer Meteorol.* 42:55-78. Högström U (1996) Review of some basic characteristics of the atmospheric surface layer. *Boundary-Layer Meteorol.* 78:215-246.

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