

## ***Interactive comment on “Technical note: The Lagrangian particle dispersion model FLEXPART version 6.2” by A. Stohl et al.***

**A. Stohl et al.**

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We thank Christoph for his comment on our paper.

We agree that the ABL height is important for controlling source-receptor relationships in the lower atmosphere but exchange between the ABL and the free troposphere is similarly important. In hilly or mountainous regions, the ABL height at a fixed location could possibly be diagnosed correctly using standard definitions of the ABL. However, air transported over this mountain area would see very different ABL heights (especially with respect to height above sea level), which effectively leads to an exchange between the ABL and the free troposphere, thus reducing the concentrations at the surface if the source was at ground-level. In the model world, this exchange would be underestimated if the model does not resolve the variations in the topography - and

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surface concentrations would be overestimated. Our parameterization is meant to correct for such a bias, which was indeed seen in FLEXPART comparisons with tracer experiments, e.g., the Cross-Appalachian Tracer Experiment (CAPTEX). We do *not* claim that our "fix" yields more accurate ABL heights. However, it corrects for a bias in simulated tracer concentrations resulting from enhanced exchange between the ABL and the free troposphere where topography is not resolved.

The magnitude of the correction varies with variations in subgrid topography. Obviously, where topography does not vary, the correction is zero. Where topography varies strongly on the sub-grid scale, the correction can be significant. However, normally it is much smaller than  $h_{mix}$ , because convective ABL heights are typically larger than sub-grid-scale topography variations, and under stable conditions the correction is limited by  $cV/N$

Regarding the Froude number, there was indeed a mistake in our manuscript, as the length scale was missing from the definition (however, it must be divided rather than multiplied by  $N$ ). The corrected text can already be found in our response to reviewer 2.

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4739, 2005.

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