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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: A new coupled system for global-to-regional downscaling of CO_2 concentration estimation" *by* K. Trusilova et al.

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Although I appreciate your efforts in improving the modelling skills for CO2 by introducing nesting options in both time and in space, in your study only the relatively easy daytime period has been selected for model evaluation. It appears to me that this selection seems kind of common practice in the CO2 modelling community. Apparently inclusion of the nocturnal period remains a challenge. Could the authors please clarify which scientific knowledge or innovations are needed to be able to include the nocturnal episode as well. Is the knowledge of the stable boundary layer really so poor? The night covers the period from 17 LT to 10 LT the next morning, which is a substan-

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tial episode, which deserves attention. My background is in boundary layer modelling and in my opinion nocturnal boundary layers are well behaved for a geostrophic wind speed larger than 6 m/s (as already mentioned in Van Ulden and Wieringa, 1996). Especially for the so called strongly stable boundary layers for geostrophic wind speeds < 6 m/s, the problems start due to break down of similarity theory, meandering flow, gravity waves etc. However, CO2 modelling for the weakly stable boundary layer could be kind of a low hanging fruit? Could you comment on this, or share your opinion on this ?

Ref: Van Ulden, A. P. and Wieringa, J: 1996, 'Atmospheric boundary layer research at Cabauw', Boundary-Layer Meteorol. 78, 39-69.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 23187, 2009.