

Inferences from CO₂ and CH₄ concentration profiles at the Zotino Tall Tower Observatory (ZOTTO) on regional summertime ecosystem fluxes

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The Figs. S1 to S6 show the average height-resolved diurnal cycles of ZOTTO summer data (June to Sept., 2009-2011).

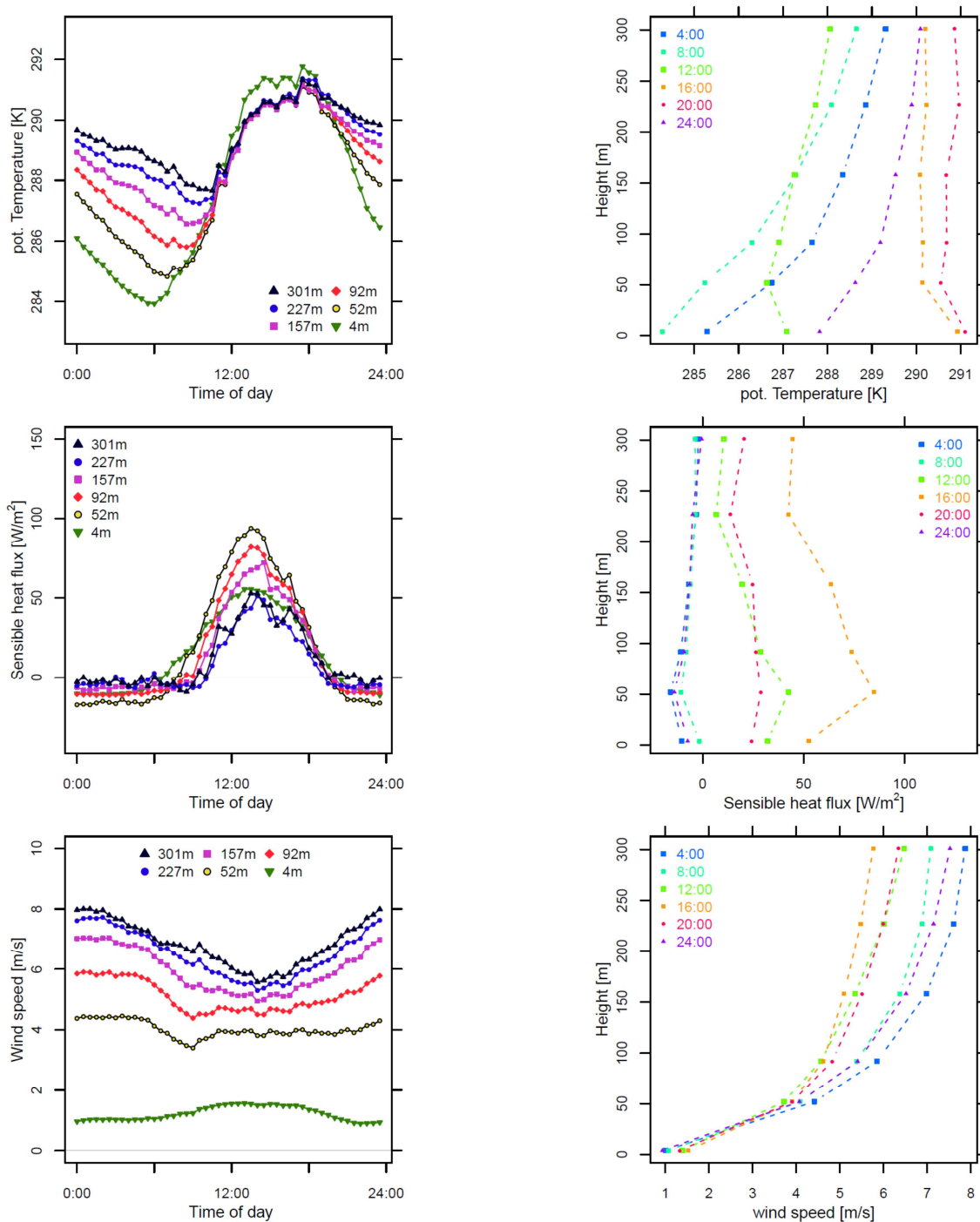


Fig. S1. *left:* Average diurnal cycle of potential temperature, sensible heat, and wind speed of all tower heights; *right:* average profile throughout the day

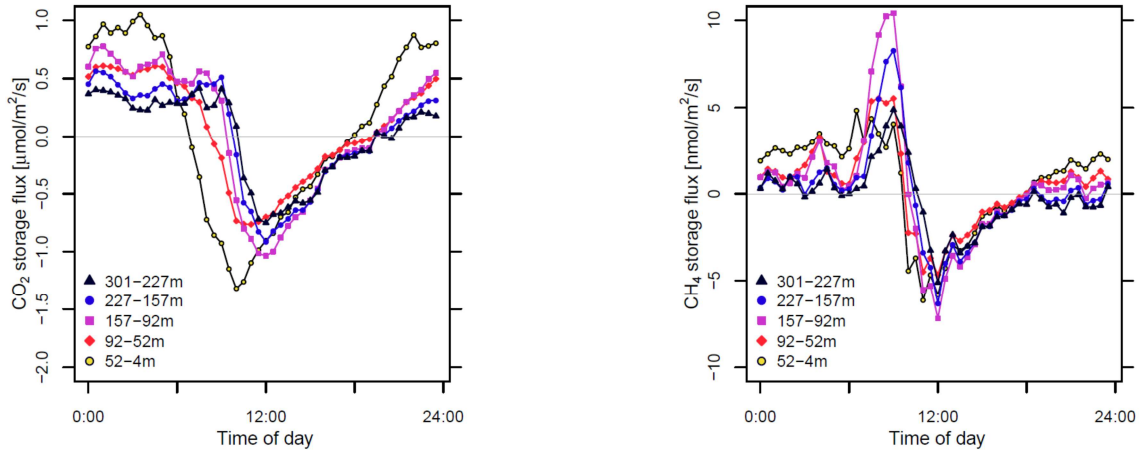


Fig. S2. Average diurnal cycle of the storage flux term between all tower levels for CO₂ (left) and CH₄ (right)

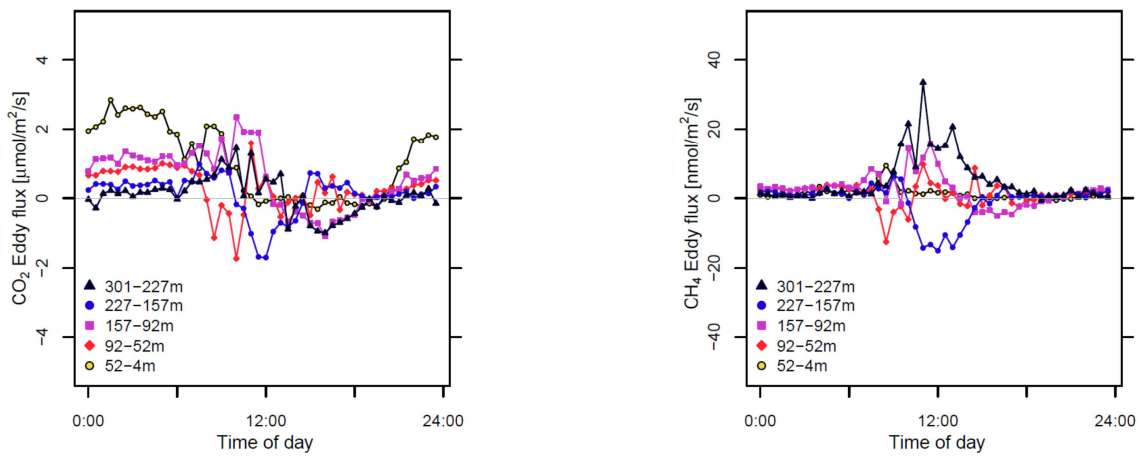


Fig. S3. Average diurnal cycle of the eddy flux term between all tower levels for CO₂ (left) and CH₄ (right)

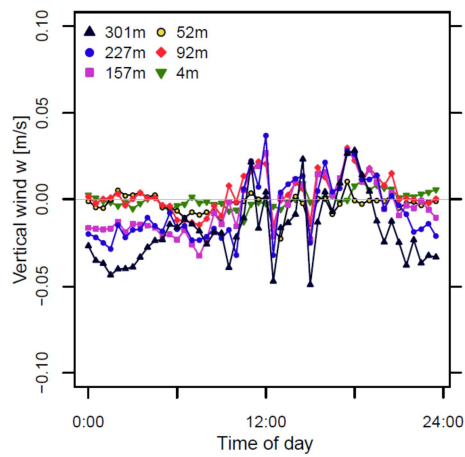


Fig. S4. Average diurnal cycle of the vertical wind on all tower levels

Formula for the vertical advection flux (Winderlich, 2012):

$$F_{vAdv} = \overline{w}(z_r) \left(\overline{c}(z_r) - \frac{1}{z_r} \int_0^{z_r} \overline{c}(z) dz \right) = \overline{w}_r (c_r - \langle c \rangle)$$

$\langle c \rangle$... average gas concentration within the observed air volume below height z_r

c_r ... concentration of overlaying air in height z_r

\overline{w}_r ... mean vertical wind velocity

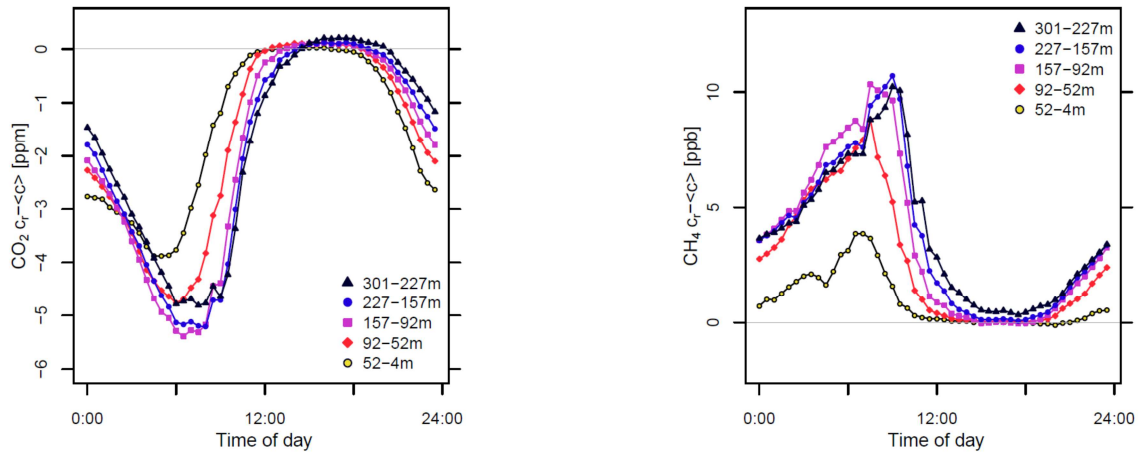


Fig. S5. Average diurnal cycle of the advection term ($c_r - \langle c \rangle$) between all tower levels for CO₂ (left) and CH₄ (right)

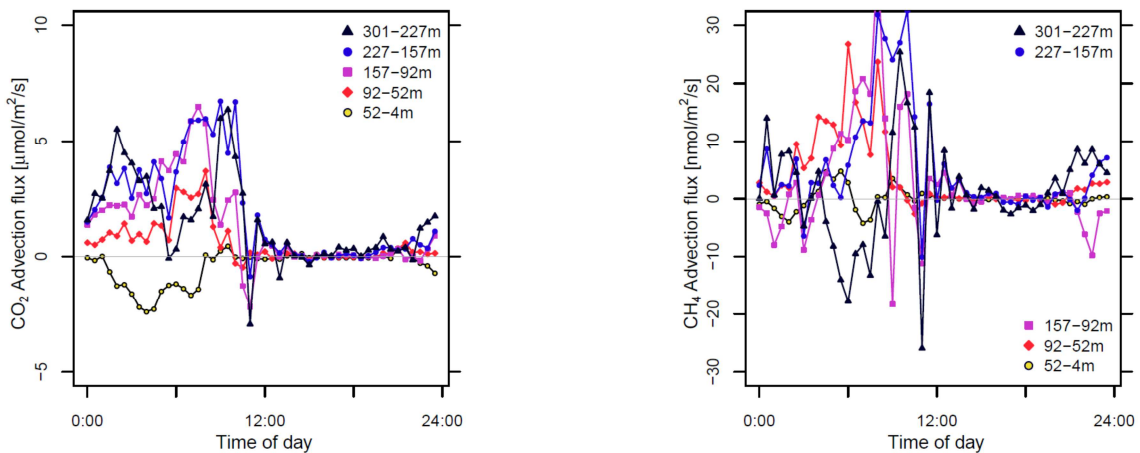


Fig. S6. Average diurnal cycle of the advection flux between all tower levels for CO₂ (left) and CH₄ (right)

The ZOTTO data set is available through the ZOTTO consortium.
Please, find the up-to-date contacts on www.zottoproject.org.

References

Winderlich, J.: Setup of a CO₂ and CH₄ measurement system in Central Siberia and modeling of its results, Technical Report Vol. 26, ISSN 1615-7400, Max-Planck-Institut für Biogeochemie, Jena, 2012.