



Supplement of

Eddy covariance with slow-response greenhouse gas analysers on tall towers: bridging atmospheric and ecosystem greenhouse gas networks

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Figure S 1. Power spectra for CO₂, CH₄, CO and sonic Temperature. Predicted values fit observed values to the T spectra.



5 Figure S 2. Concentration by wind direction. Values are difference from the monthly median (black line is 0). Extreme values in the left and right 0.1% tails were removed. Note that January have a different scale



10 Figure S 3. Comparison of CO₂ flux using IR (LI-7200) and CRDS (PICARRO G2401) per stability condition. Dots are observations, red line is true linear relation and grey line is 1:1 line. The correlation coefficient (R²), the mean error (ME, μmolm⁻²s⁻¹), the mean absolute error (MAE, μmolm⁻²s⁻¹) and the linear fit.



Figure S 4. Turbulent fluxes by wind direction. Values are difference from the monthly media, 0.1% extreme values dropped. Note that January have a different scale.



Figure S 5. Monthly averaged enhanced vegetation index (EVI) 10x10 km grid centred in Saclay tower (red star). Pixels with no data are represented in white. EVI was calculated from Sentinel 2 imagery hosted in Google Earth Engine platform using a tool available at https://doi.org/10.5281/zenodo.13838888. The index follows the equation EVI=G (NIR-Red)/(NIR+C_1 Red-C_2 Blue+L), where NIR, Red, and Blue are surface reflectances centred in the 842, 665 and 490 nm wavelengths, band B8, B4 and B2 in Sentinel2,

corrected for transfer through the atmosphere; L is the canopy background adjustment set to 1, C1 and C2 are coefficients set to 6 and 7.5 respectively, G is a gain factor set to 2.5. Values used follow the MODIS-EVI algorithm. For all reflectance bands, we removed clouds using the Sentinel-2 Cloud Masking, *s2cloudless*. Pixels were classified as clouds if the cloud probability was above 60 % and as cloud shadows if at maximum distance of 1 km from cloud edges and on a threshold of 0.15 for near infrared. We also removed 50 m around the mask assuming these pixels may still be affected by the cloud shadowing.

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Figure S 6. Daily storage fluxes of CO2, CH4 and CO using measurements of a single CRDS (PICARRO G2401) gas analyser at 3 levels (15, 60, 100 m). Daily storage flux should be zero in ideal conditions since stocking and destocking should compensate each other.

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Figure S 7. Comparison for turbulent and storage fluxes between FR-Sac for data with Western wind and a nearbyforest site (FR-Fon). Combined flux here refers to the sum of turbulent and storage fluxes. Data available at ICOS Data Portal

(https://meta.icos-cp.eu/objects/lCyv5rk_qnaaexfXx1skb2mV).



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Figure S 8. Evolution of vertical velocity (w) with stability.



Figure S 9. Monthly diel mean for CO₂, CH₄ and CO turbulent, storage and vertical advection fluxes. Values for the CRDS (PICARRO G2401). Band shows interquartile (25th - 75th percentiles).