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COMPARING NIGHT CO2 STORAGE AND ADVECTION AT FIVE FORESTED SITES

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The estimation of carbon sequestration by forests requires accurate flux measurements of CO2 exchange during both day and night. The eddy covariance method allows such measurements and is now widely spread. However, results from many sites show that during stable nights the fluxes measured by this method differ from the expected biotic flux. A likely explanation of these differences is that some of the carbon dioxide produced by respiration is stored in the air below the measurement system or lost by advection. The relative importance of these processes varies largely from site to site.

In this presentation, results from different measurement campaigns held at five european forested sites will be shown. The site comparison notably shows that the importance of the storage flux depends on both turbulence and advective conditions. Criteria to determine the potential storage importance at each site are proposed.

A comparison between the advection characteristics at the different sites will also be presented. The advection importance and the balance between vertical and horizontal advection will be shown to depend on meteorological conditions but also to vary greatly from site to site according to their topographic (slope, distance from the ridge) and vegetative (leaf area density distribution, source heterogeneity) characteristics.

Finally, some methodological points are underlined and recommendations for future measurements are given.