Observations of atmospheric CO2 gradients and surface flux measurements in France: 2014-2015 highlights

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Résumé

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As part of the implementation of the ICOS infrastructure (Integrated Carbon Observation System), France is developing a long-term observation network of the carbon cycle. It consists of a network of flux towers covering different ecosystems from the forests to large crops and pastures, and an atmospheric network covering the national territory. It aims to provide data sets to detect changes in greenhouse gas fluxes at national and regional scales, and the impact of extreme weather events. The space-time variations of trace gases in the atmosphere reflect the distribution of surface emissions, mixed by horizontal and vertical atmospheric transport. Any change in the meteorology affects the atmospheric observations both by modifying the mixing, and by changing the biosphere net fluxes we want to quantify. The eddy flux towers provide a direct measurement of surface fluxes at local scale. This study aims to analyze the measurements obtained in 2014-2015, and the relationship of the observed signals with the meteorology. The summer 2015 was very warm and dry compared to the normal. In 2014 the winter was affected by relatively strong westerlies bringing warm and wet air masses over France. We will evaluate the impact of such meteorological highlights by using the observations, and an atmospheric transport model to analyze the role of the atmospheric mixing in the observed signals.