Geophysical Research Abstracts
Vol. 16, EGU2014-13765, 2014
EGU General Assembly 2014

The ICOS Ecosystem protocol for gas concentration measurements

Marc Aubinet (1), Dario Papale (2), and the ICOS Ecosystem IRGA Protocol Team

(1) University of Liège, Gembloux Agro-Bio Tech, Biosystem Physics, Gembloux, Belgium (marc.aubinet@ulg.ac.be), (2) University of Tuscia, DIBAF, Viterbo, Italy

This research was initiated in the frame of the ICOS Ecosystem Thematic Center. The aim of ICOS is to provide long term high precision observations required to understand the present state and to predict future behavior of the global carbon cycle and greenhouse gas emissions. Observations will be made through high precision network of stations measuring greenhouse gas fluxes from ecosystems and oceans and greenhouse gas concentrations in the atmosphere.

In a long term monitoring infrastructure like the ICOS Ecosystem network, it is crucial to ensure maximum comparability between sites and, for this reason, it is strongly suggested to highly standardize methods and sensors where the knowledge about systematic and random differences between different approaches is not yet fully known, in particular in the medium-long term time range.

Long term measurements of trace gas fluxes exchanged by ecosystem require the use of the eddy covariance technique for which gas analyzers are, similarly to sonic anemometers, key elements. However, neither an international standard nor a list of requisites for sensors does exist yet.

This presentation focuses thus on the protocol for high frequency gas concentration using infrared gas analyzers. It results from discussions that were brought among the Working group on Eddy covariance fluxes and Storage measurements established by the ICOS Ecosystem Thematic Center and implied about 70 scientists and field workers.

The protocol includes a definition of the variable and of the measurement method (infrared gas analyzer), instructions concerning the system conditioning (gas sampling system description including pump, tube, filter dimensioning), sensor calibration and maintenance and finally required data format.