Geophysical Research Abstracts
Vol. 17, EGU2015-12545, 2015
EGU General Assembly 2015

In-situ monitoring of the isotopic composition of atmospheric CH4 at Cabauw - comparison of different instruments

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In order to measure CH4 carbon and hydrogen isotope ratios continuously at monitoring locations, we developed a robust, fully automated extraction system for in situ IRMS measurements, which does not depend on liquid nitrogen. Two IRMS instruments measure δ13C and δD of the extracted CH4.
The system is used in a fieldwork comparison of several CH4 isotope analyzers, held from October 2014 - February 2015 at the Cabauw tower, Netherlands, as part of the InGOS WP16: Innovation in isotope measurement techniques.
We compare our IRMS measurements to a laser instrument from EMPA, that also requires a preconcentration step and also measures both δ13C and δD, and two Picarro analyzers that measure continuously CH4 mixing ratio and δ13C, amongst other variables.
During two periods a series of bag samples is taken for off-line analysis using laboratory systems.
We observed frequent nocturnal elevations of the CH4 mixing ratio, which usually show a depletion in isotopic composition.