InGOS

Final Meeting

21.September 2015

Utrecht, The Netherlands

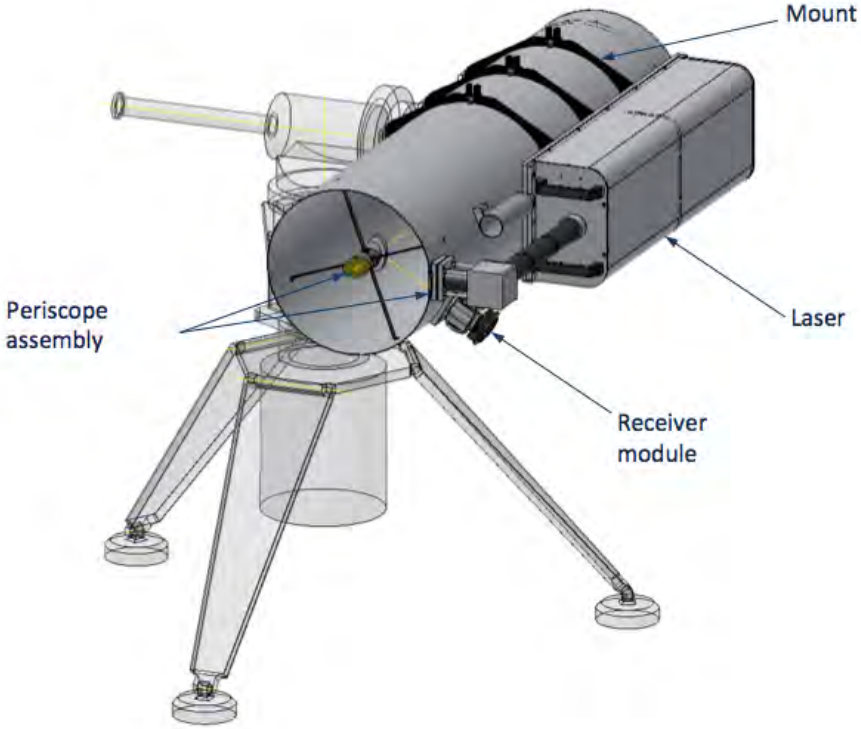
Alex Vermeulen

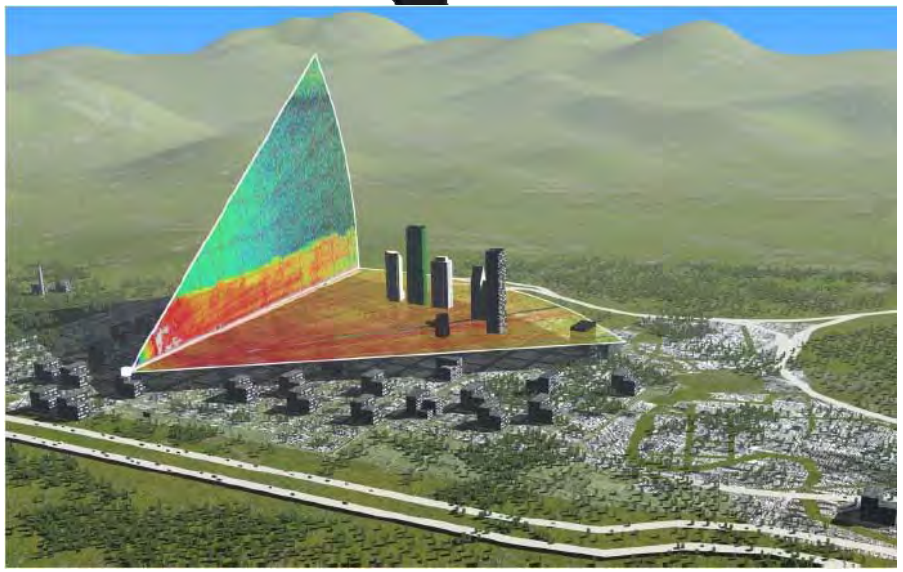
WP13/ JRA1

Carbon telescope (UEDIN)

DIAL achieves range-resolved concentrations of CO_2 and CH_4 up to 7 km in range from the laser.

Active instrument, 24/7, 365 days per year.





Carbon telescope 2

- Major challenges
- Ruggedisation
- Extra costs 1.2 M€ from additional national funding
- Field test at Angus foreseen for this year
- Major campaign March 2016 Dunbar landfill
- Final report November 2015

Task 13.3 N2O Instrument evaluation (CEA)

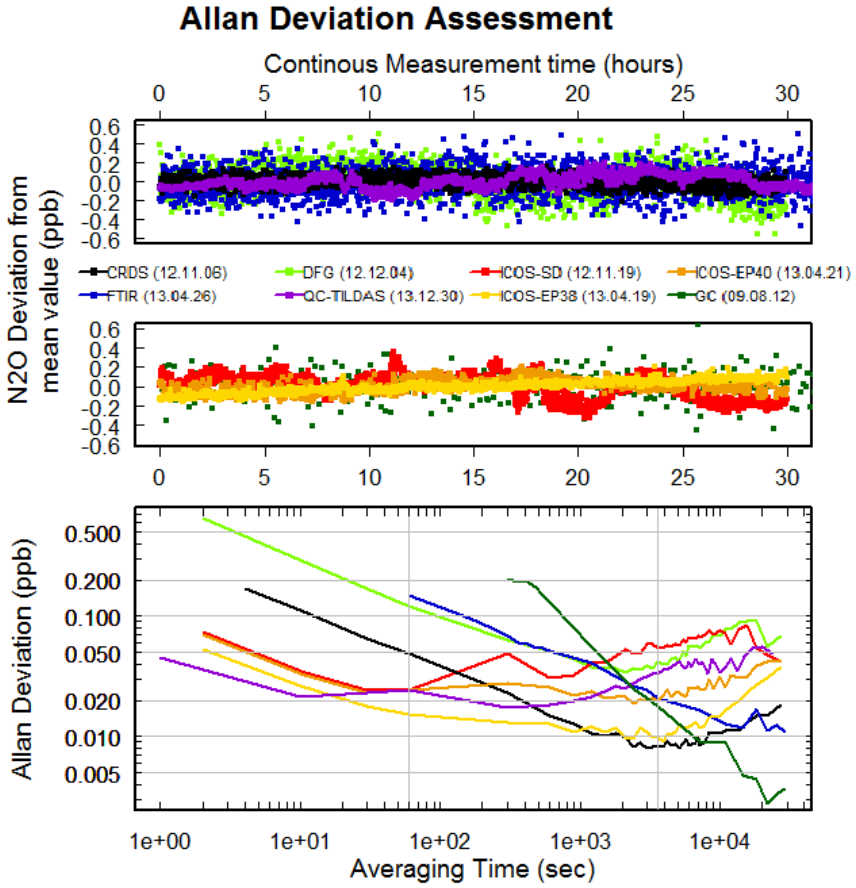
- ICOS recommend only for instruments for CO2, CH4 and CO, as concentrations of these gases are core parameters for the ICOS atmospheric stations.
- Newly announced optical instruments, like a CRDS CO/N2O analyzer and a photo-acoustic N2O sensor, are very promising developments.
- Need to be tested for use within ICOS, both for concentration and flux measurements.
- Several other manufacturers have or will soon introduce new optical analyzers that will have to be tested for their performance in measurements of CH4, N2O and possibly other trace and GHGs.
- D13.9) Report on the performance of new optical system for concentration and flux measurements: Report on the data available as PDF on the web site. [month 44] Submitted to AMTD:

Title: Comparison of nitrous oxide (N2O) analyzers for high-precision measurements of atmospheric mole fractions.

Author(s): B. Lebegue, M. Schmidt, M. Ramonet, B. Wastine, C. Yver-Kwok, O. Laurent, S. Belviso, A. Guemri, C. Philippon, J. Smith, S. Conil, H. J. Jost, and C. W. Rella
MS No.: amt-2015-267

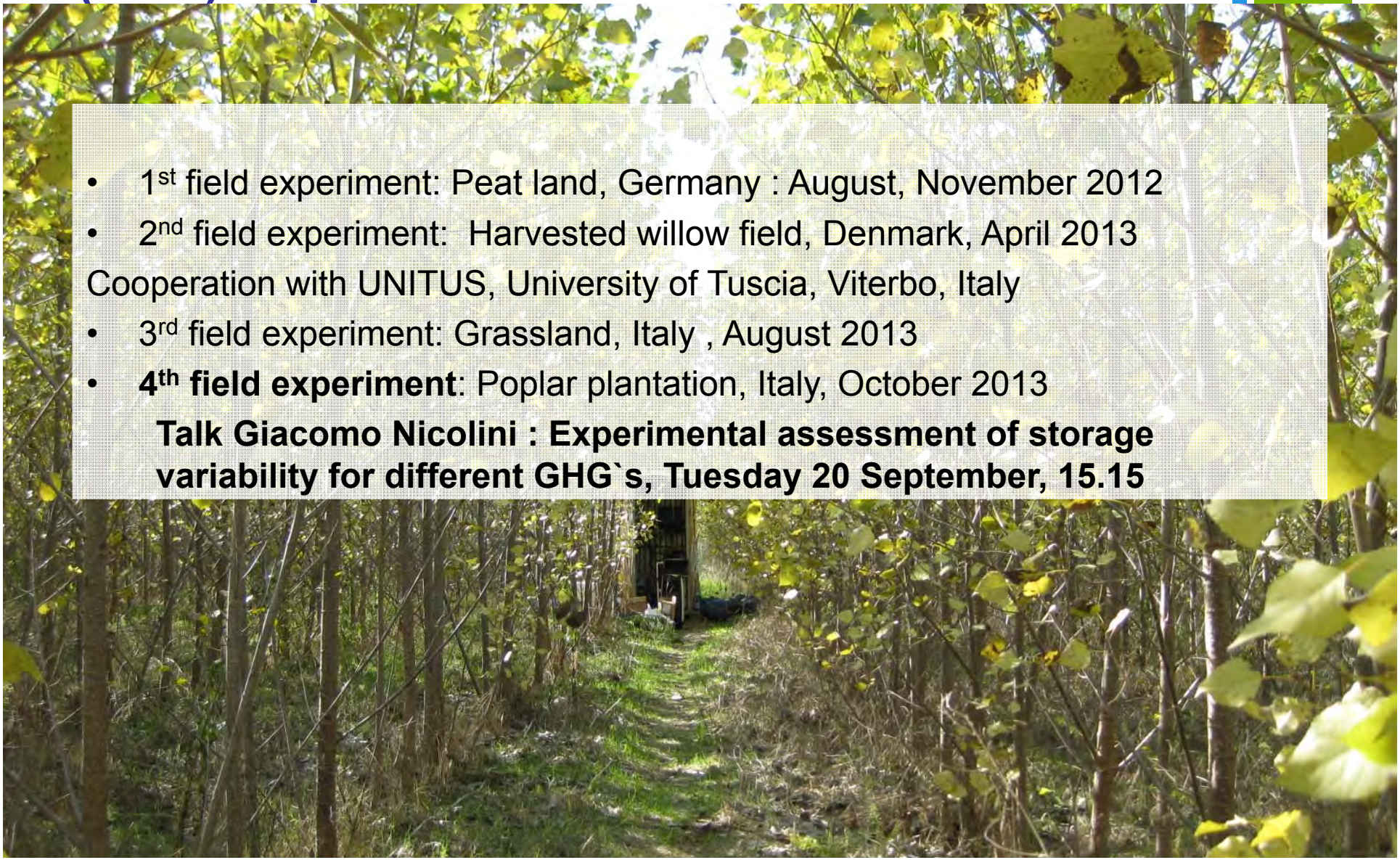
N2O Instrument evaluation (CEA)

Instrument	Test period	Company
FTIR	Oct 2012 – Jan 2014	Ecotec
CRDS	Nov 2012 – Dec 2012	Picarro
DFG	Nov 2012 – Dec 2012	Thermo
ICOS-SD	Nov 2012 – Dec 2012	LGR
ICOS-EP38	May 2013 – Jun 2013	LGR
ICOS- EP40	May 2013 – Jun 2013	LGR
QC-TILDAS	Dec 2013 – Jan 2014	Aerodyne



- seven analyzers from five different companies and compared the results GC + FTIR
- instruments were characterized during a eight weeks.
- short-term and long-term repeatability,
- drift, temperature dependence,
- linearity and sensitivity to water vapor
- ambient air compared under field conditions at the Gif-sur-Yvette station.

FTIR-spectrometry for flux measurements (UoB): Experiments



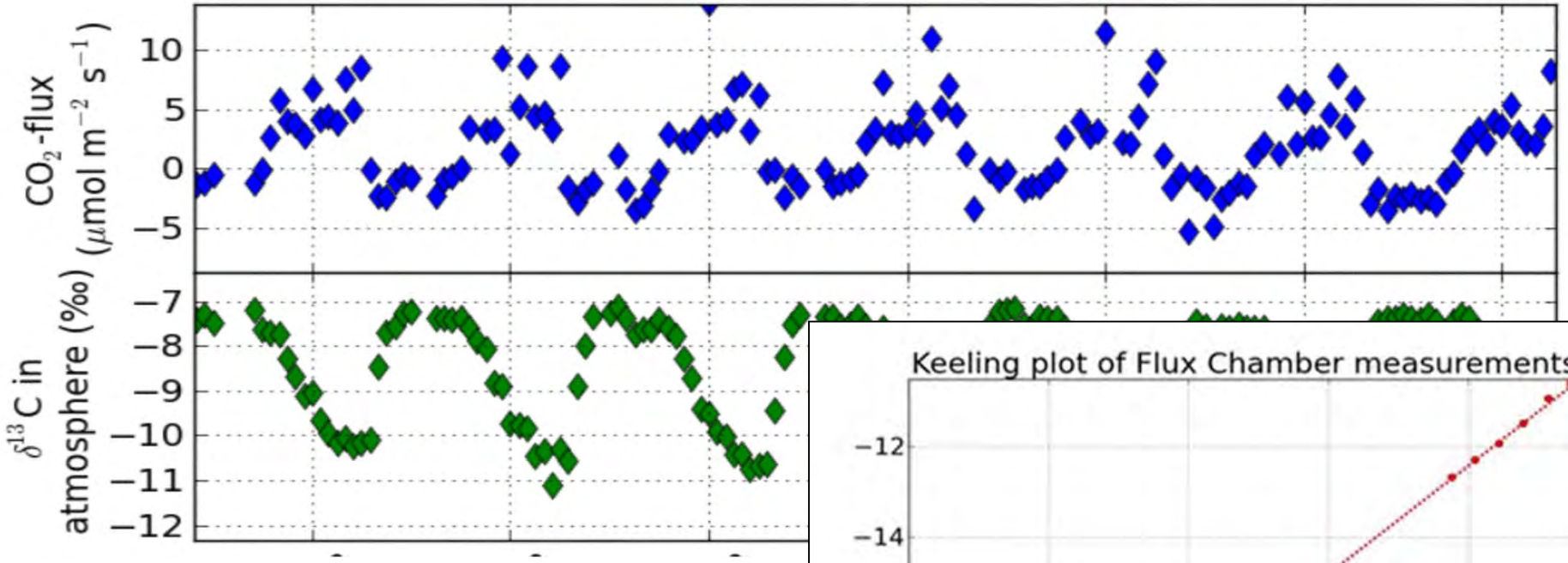
- 1st field experiment: Peat land, Germany : August, November 2012
- 2nd field experiment: Harvested willow field, Denmark, April 2013

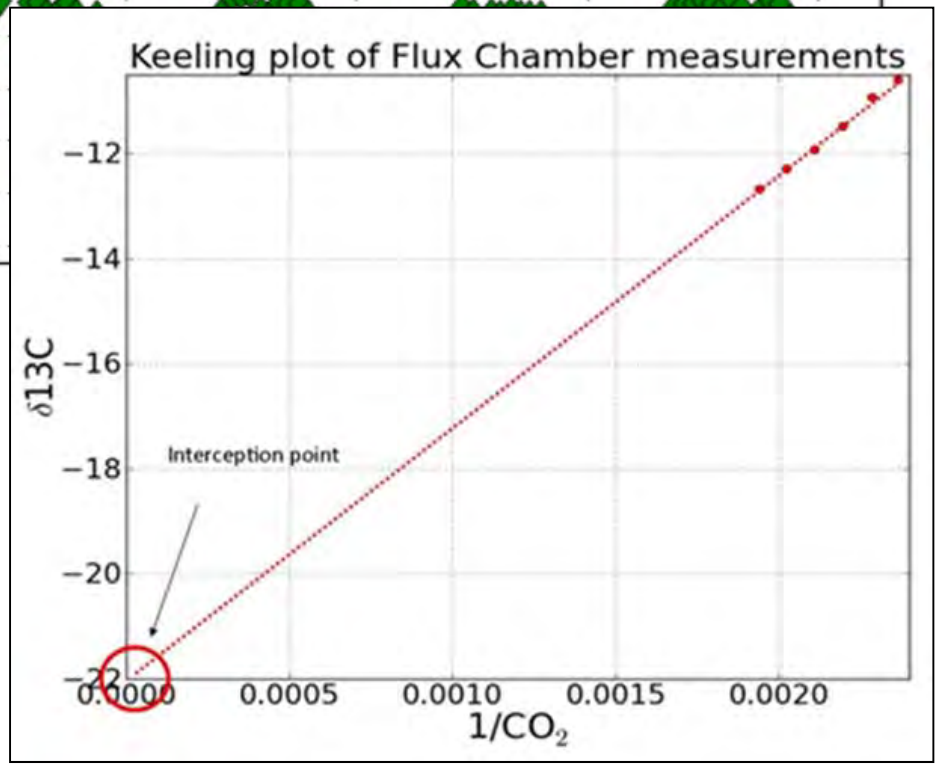
Cooperation with UNITUS, University of Tuscia, Viterbo, Italy

- 3rd field experiment: Grassland, Italy , August 2013
- **4th field experiment**: Poplar plantation, Italy, October 2013

Talk Giacomo Nicolini : Experimental assessment of storage variability for different GHG`s, Tuesday 20 September, 15.15

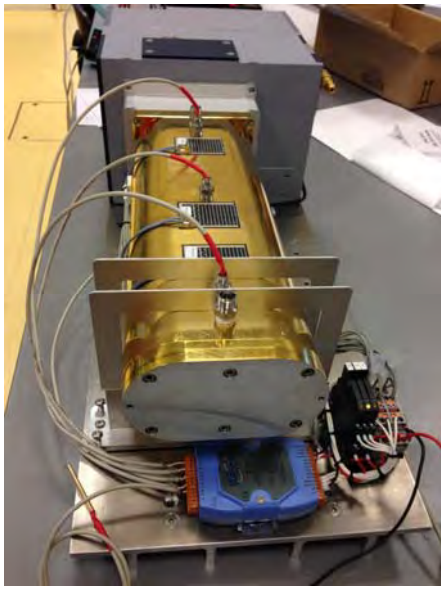
Respiratory isotopic measurements





EcoTech FTIR instrument for tall tower deployment (ECN)

98% data coverage since Jan 2015, robust and precise



Spectronus metal cell, increased temp control

Species	Allan Var				Precision	Drift	Unit
	flow 1 min	flow 5 min	static 1 min	static 5 min	stdev 3 days	per day	
CO2	0.018	0.007	0.018	0.014	0.031	0.021	ppm
13CO2	0.08	0.04	0.03	0.02	0.07	0.03	permille
CH4	0.18	0.10	0.20	0.10	0.18	0.11	ppb
N2O	0.15	0.07	0.12	0.05	0.08	0.009	ppb
CO	0.25	0.12	0.20	0.07	0.14	0.04	ppb