Quality Management – AS network targeted tasks

Quality Management –targeted tasks

1) Entire check of proper functioning of the instrumentation (including instrumental validation and qualification phase at ATC test lab) and the intake system before a station becomes operational. AS PI must prepare a full description of the measurement system and protocols, which will be checked by ATC (check list provided by the ATC). ATC is currently studying the feasibility of an initial onsite station audit.

- **AS metadata to ATC**
- **Tested analyzer; in the transition phase AS may do tests to show compliance with ICOS performance specifications**
- **Water vapor test if measurements in wet mode**
- **Intake system test**

Quality Management –targeted tasks

2) High frequency instrument target gas (also called “Performance target gas”) measurements at the station to be able to quickly detect malfunctioning of the instrument, insertion point: selection valve. Concentration ranges for all species at the expected low end of the concentration range (background conditions) for the particular station.

- **Target gas by CAL**
- **Calibration and target gases for the test period?**

Quality Management –targeted tasks

3) Low frequency instrument target gas (also called “Archive target gas”) measurements to be able to quantify system stability over decades, insertion point: selection valve. Concentration ranges for all species above the expected high end of the concentration range for the particular station.

- Target gas by CAL

Quality Management –targeted tasks

4) Measurement systems, which have devices such as a sampling pump, drier, buffer volumes, in the inlet line upstream of the analyzer, has to be tested by a target gas measurement, which has an insertion point upstream of these devices. The test conditions (e.g. sample flow rate and pressure) have to be comparable to the conditions for the ambient sampling. The same target gas has to be measured at the selection valve insertion point as well. This test has to be done during maintenance visits at least twice per year. The concentrations of this target should be close to background conditions for the respective station.

- OK

Quality Management –targeted tasks

5) Calibration and target gas results from the first 6 months must be screened using the ATC-QC tools. In case of inconsistent results, parallel flask samples will be studied to further elaborate the cause of problems. In a case of Class 2 station, a set of flasks is shipped to the station for a shorter period of parallel measurements. Ultimately, the problem is studied by the travelling instrument visit.

- **OK**
- **During the test period AS has to be connected to ATC and provide data standard way**

Quality Management –targeted tasks

6) Regular (on weekly basis is highly recommended) data inspection by stations PIs using the quick looks and tools provided by ATC and participation in the annual Monitoring Station Assembly.

- OK

Quality Management –targeted tasks

7) Yearly intake system test, testing the entire sample intake line (all heights). Intake system test may be done by inserting gas of known concentration to the inlet, or comparing ambient air concentrations swapping between sample inlet and spare line or as a leak test.

- OK

Quality Management –targeted tasks

8) Regular flask – in-situ measurement comparison for Class 1 stations on a weekly basis from the highest sampling height.

- **OK**
- **ATC tools to do comparison**

Quality Management –targeted tasks

9) Travelling cylinders (so-called Round Robins), which are high-pressure cylinders whose concentrations are unknown for the AS PI, to externally check the instruments and the calibration scales (these should be calibrated by WMO-CCL). This should be carried out as a blind test every 2 years. Funding has to be sought for this exercise.

- **ATC-Fi tries to arrange this**
- **Cylinder shipment costs and measurement by AS**

Quality Management –targeted tasks

10) The ATC travelling instrument serving as a diagnostic tool particularly for stations where systematic biases in the flask vs. in-situ comparison occur. During a travelling instrument visit a system and performance audit will be conducted.

- Task of ATC-Fi

Quality Management –targeted tasks

Not mandatory, but highly recommended task is to measure blank (e.g. synthetic air or N2 grade: 5.0) and laboratory air on a weekly basis.

- OK

Quality Management –targeted tasks

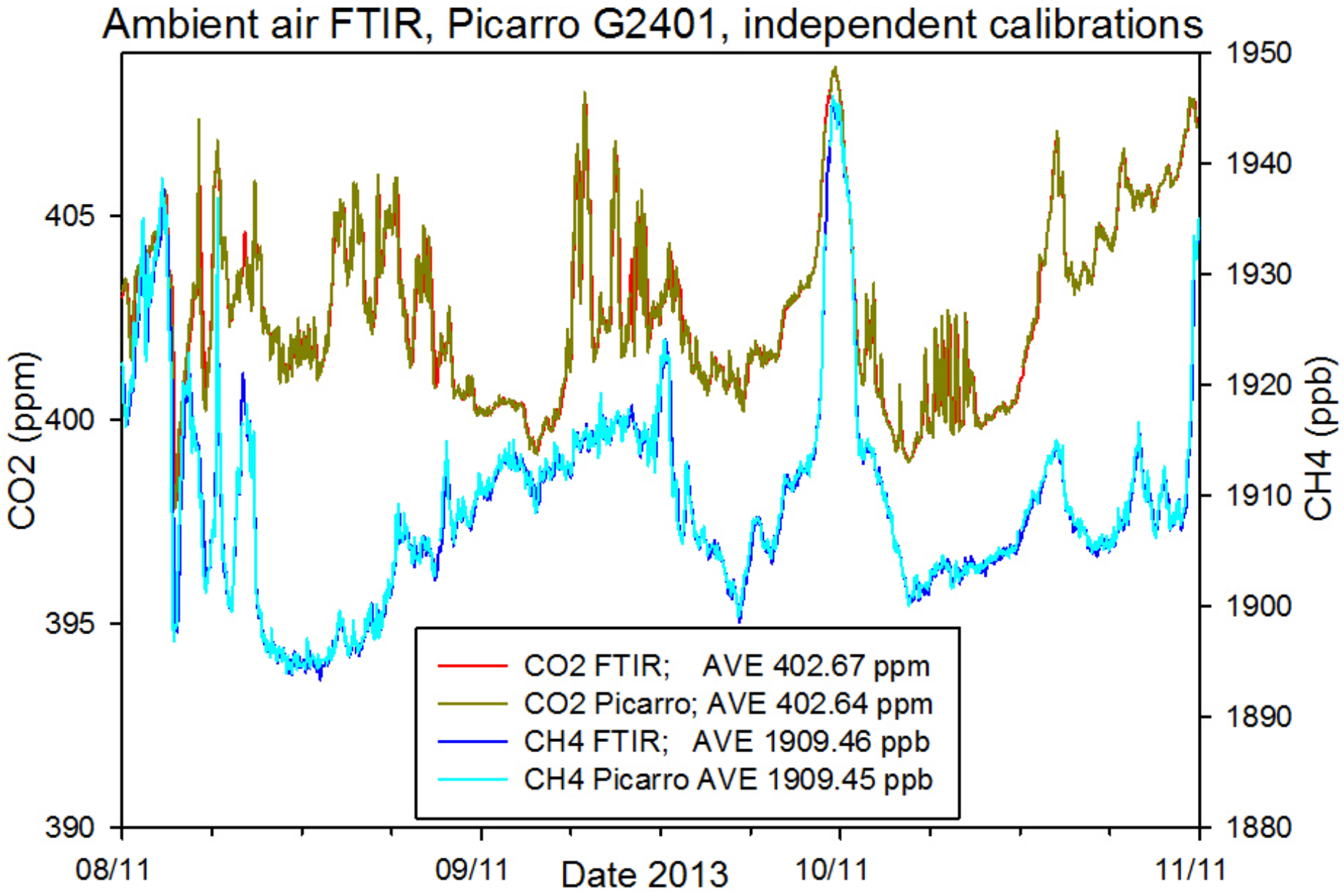
Annual – twice a year Water vapor test if measurements are conducted in wet mode?

Mobile Lab Instruments

- Picarro G2401
- FTIR by Ectotech
- CO-N2O by Los Gatos

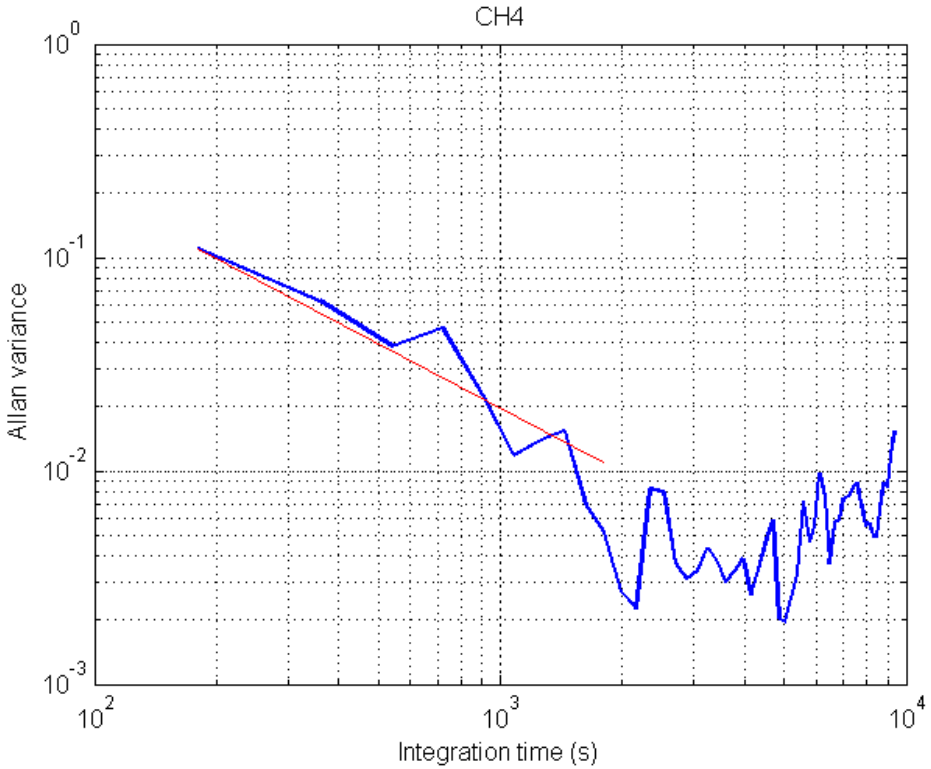
Ambient air parallel measurements at FMI in FMI - Helsinki monitoring site

New set of NOAA calibration gases has been ordered

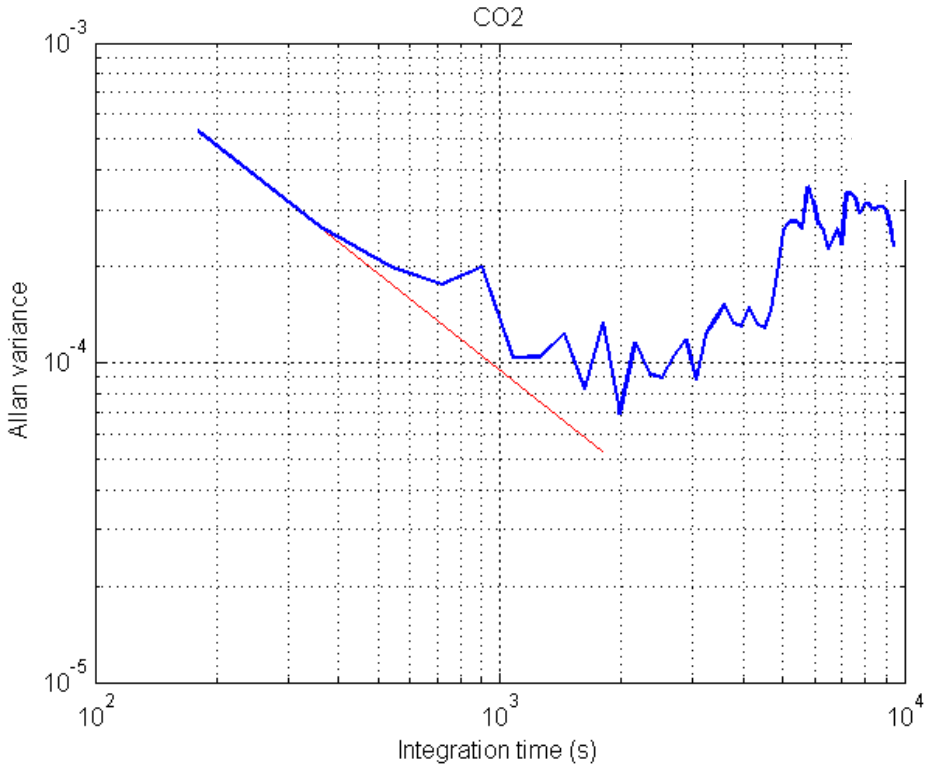

Ambient air FTIR, Picarro G2401, independent calibrations
CO2 (ppm)
CH4 (ppb)
Date 2013
08/11
09/11
10/11
11/11
390
395
400
405
1880
1890
1900
1910
1920
1930
1940
1950
CO2 FTIR; AVE 402.67 ppm
CO2 Picarro; AVE 402.64 ppm
CH4 FTIR; AVE 1909.46 ppb
CH4 Picarro AVE 1909.45 ppb

FTIR Allan variances

CH4



CO2



Mobile lab – Visit

Before a visit, communication with AS personnel, agree on date, check AS Metadata, and monitoring data.

Before the visit, a set of travelling standard cylinders will be send to AS

During the site visits, inspection of

- infrastructure
- instruments
- maintenance protocols
- calibration gases

AS will measure the travelling standards

Mobile Lab will conduct parallel measurements from the highest level (6-8 weeks), using independent sampling line

Sampling line test

Prepare material for the evaluation report.

After the visit, production of the audit report with recommendations, communication with the AS PI and submission of the report to ATC data base.


PhD Hermanni Aaltonen started in summer
PhD Karri Saarnio will start very soon
Planned time table:
Dec 2013 - March 2014 Hyytiälä
April – June 2014 OPE
July – September 2014 TBD