2012 Global Monitoring Annual Conference:

Observation of atmospheric CH_4 mixing ratios at the WMO/GAW stations in China

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May 15th, 2012, NOAA

1 Systems at our stations

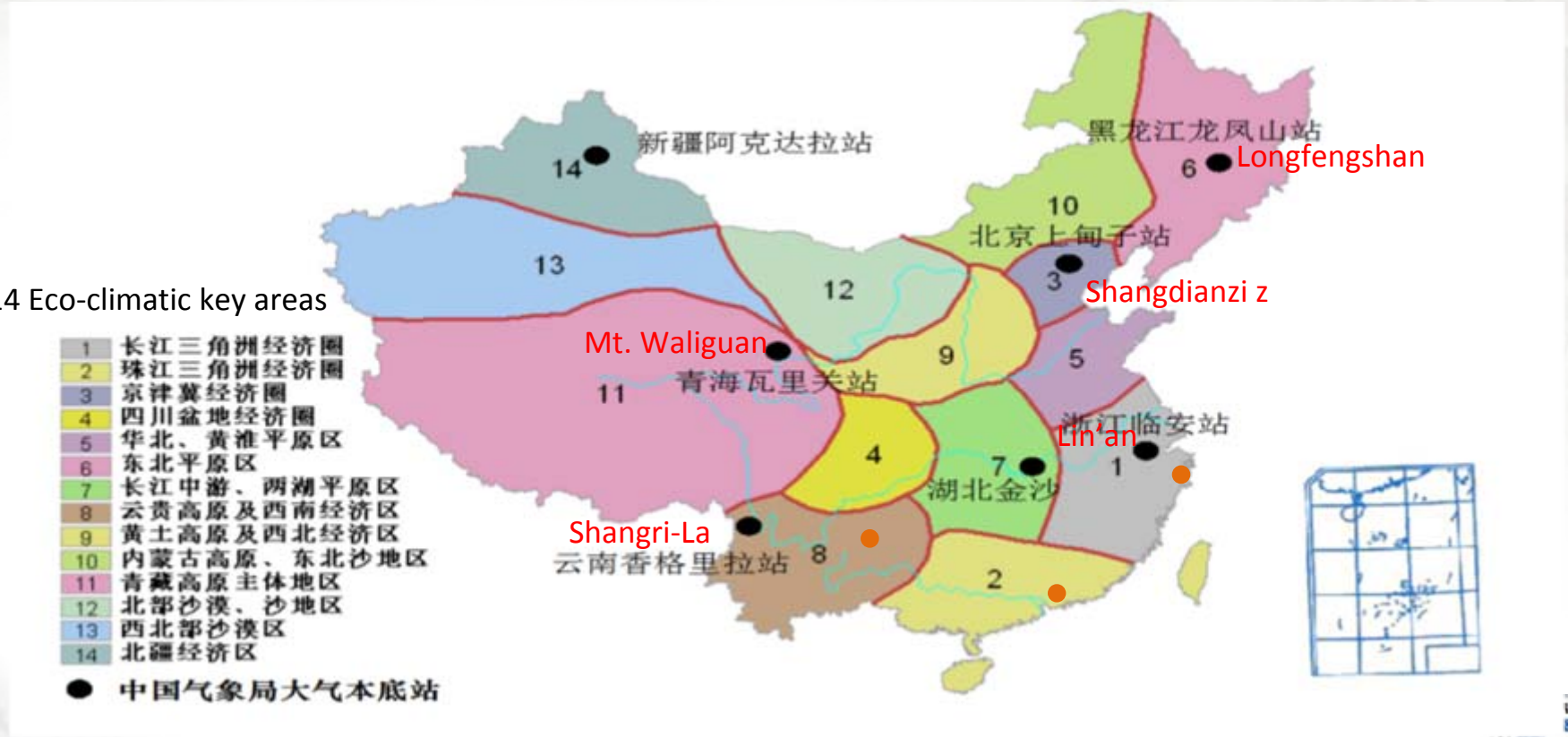
2 Preliminary results of Picarro system

3 Problems we are encountering

System at our stations

Location of our GHGs sampling/in-situ measurement stations

14 Eco-climatic key areas

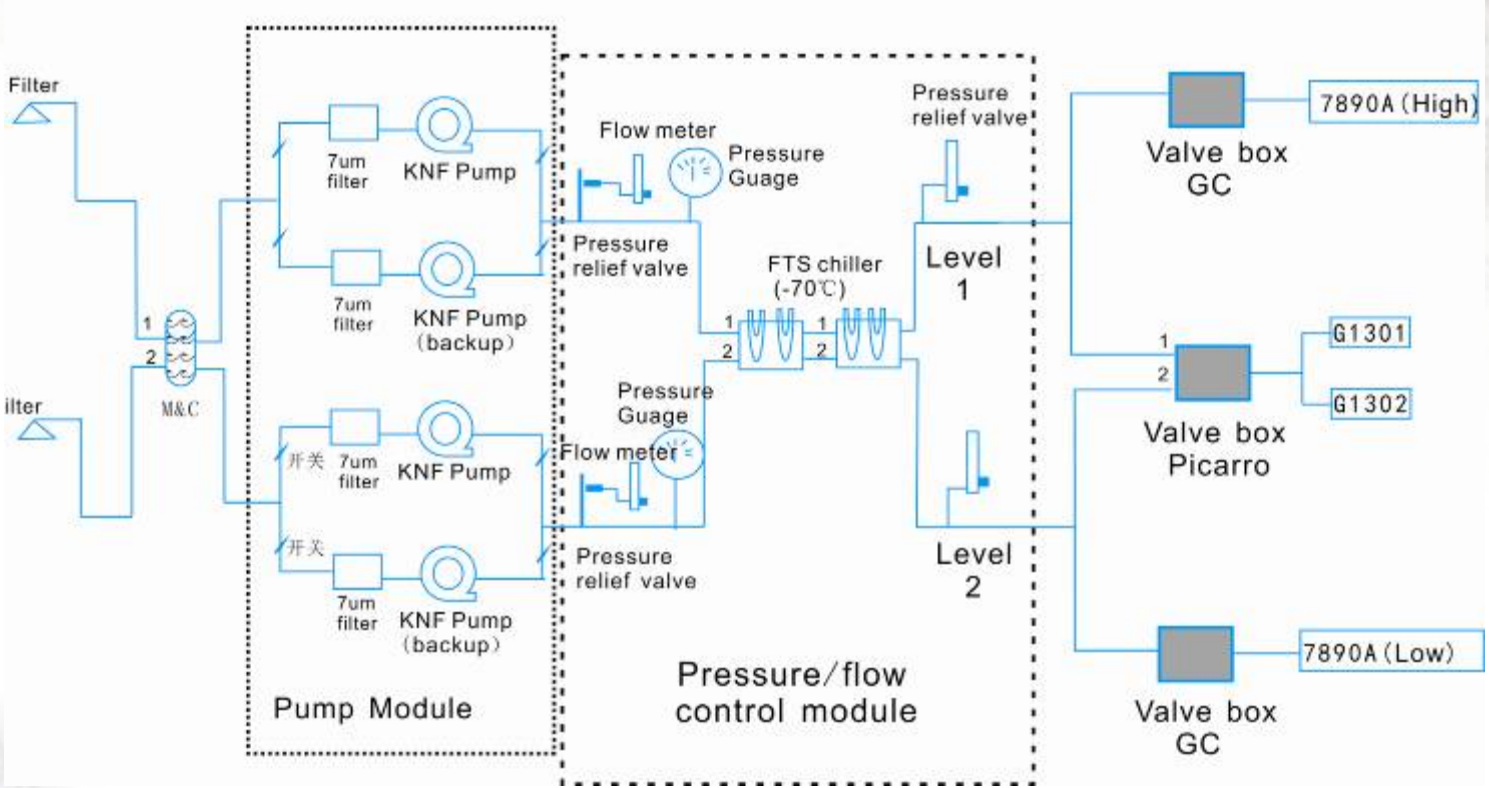


Information of the stations with in-situ system

Station	Station ID	Longitude	Latitude	Altitude (m)	Representation area	Vegetation canopy
Mt.Waliguan	WLG	100.06E	36.12N	3816	Northeastern of the Tibetan Plateau	Prairie, Sandbank
Longfengshan	LFS	127.6E	44.73N	330.5	Northeastern China Plain	Paddy, forest
Lin'an	LAN	119.73E	30.3N	138.6	Yangtze Delta Ecnomic Zone	Paddy, wheat field. Shrub
Shangdianzi	SDZ	117.07E	40.39N	293.3	North China plain	Corn field, forest
Shangri-La	XGL	99.44E	28.01N	3500	Southwest area	Forest

Picarro G1301/2
Agilent 7890 FID+ECD
M60/70 discrete flask
Canister (halocarbon)
Agilent 6890 GC (Halocarbon)
Medusa GC (Halocarbon)

Two level GHGs measurements at our stations (from 2010):



The Picarro systems at our sites (CH_4/CO_2/CO)-from 2009

Mt. Waliguan

Shangdianzi

Lin'an

Shangri-La

Longfengshan

The GC systems at our sites (CH_4/CO/N_2O/SF_6)-from 2010

Mt. Waliguan

Shangdianzi

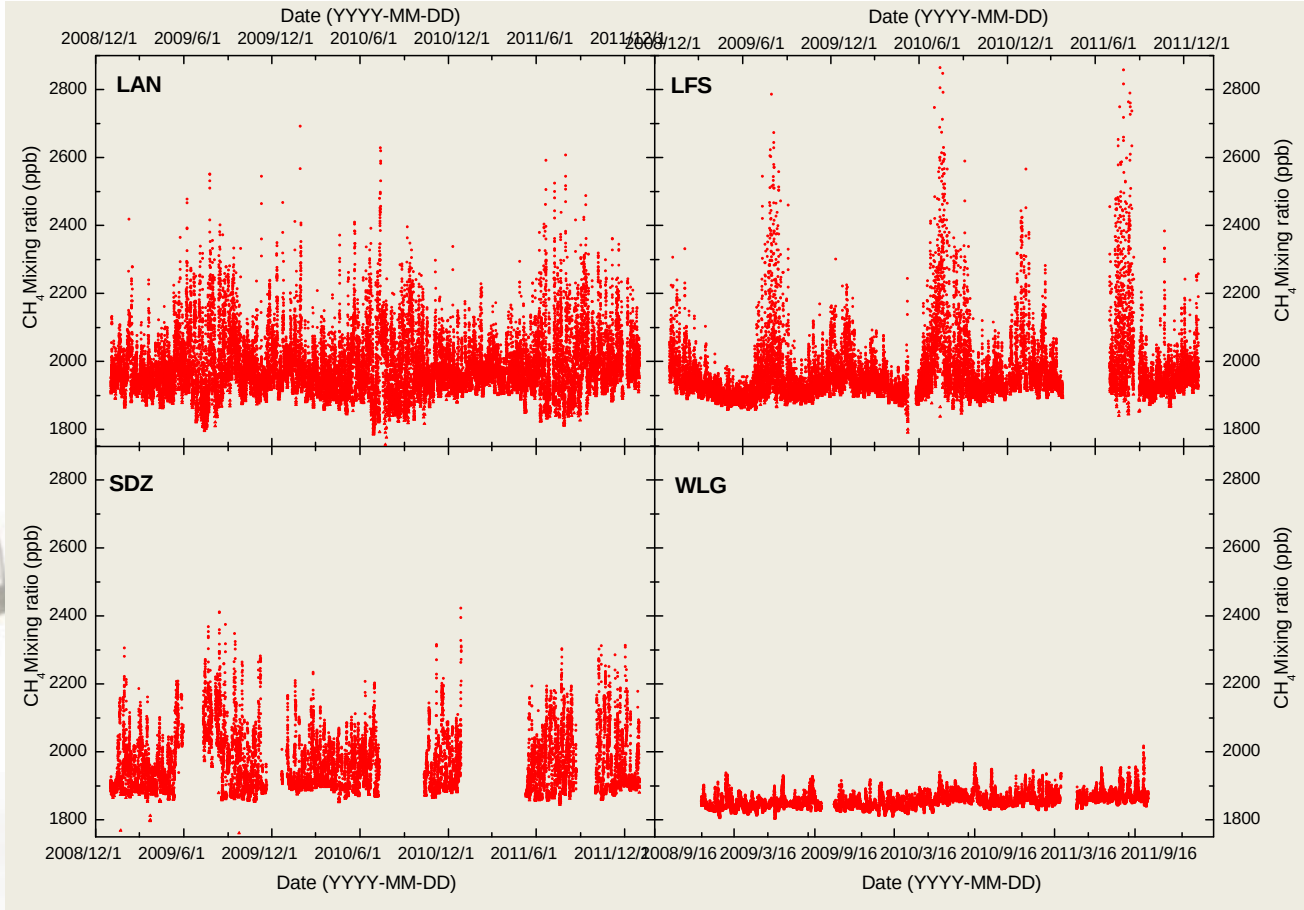
Lin'an

Shangeri-La

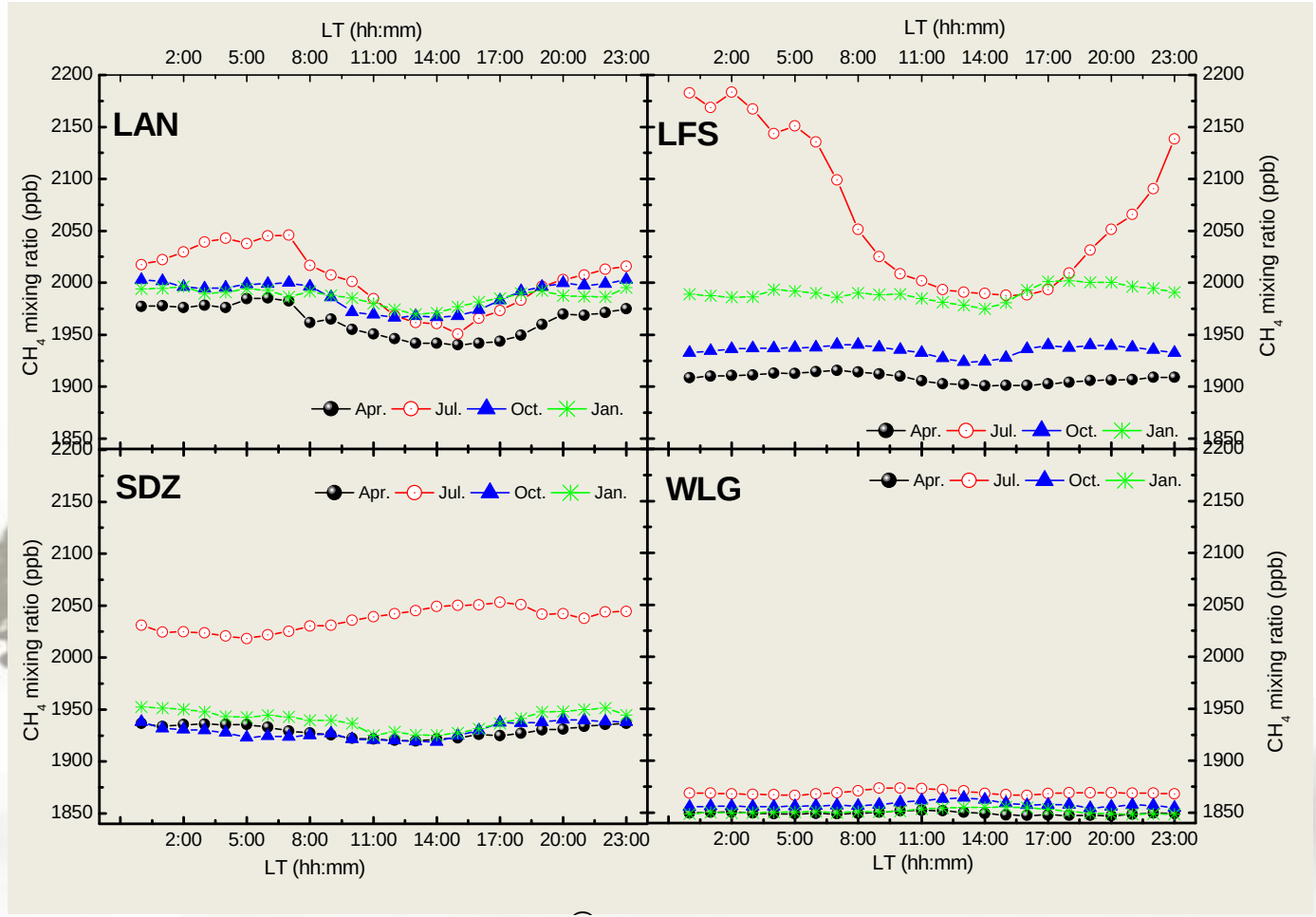
Longfengshan

Preliminary results of CH_4 by Picarro

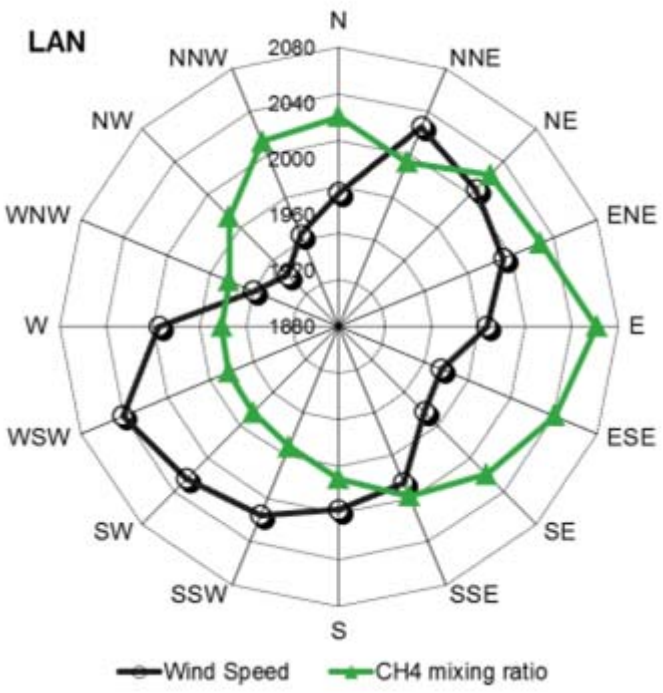
Hourly CH_4 mixing ratios from 2009 to 2011
(WLG: 80m above the ground, the others: 10m)



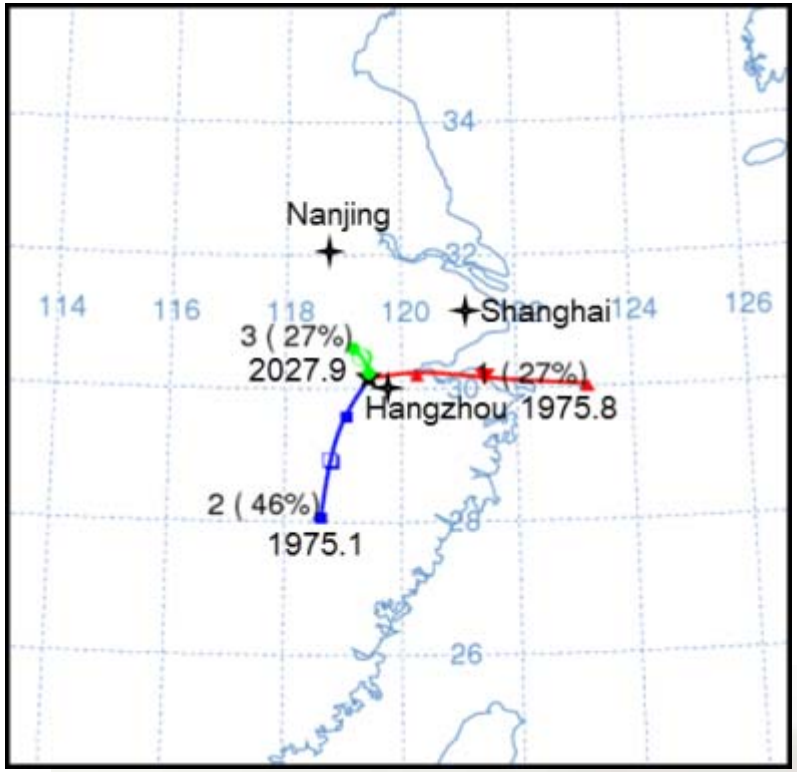
Mean diurnal CH_4 variations (2009- 2011)



Average CH_4 concentration and surface wind speed on 16 directions



Cluster analysis of 72 hrs backward trajectories

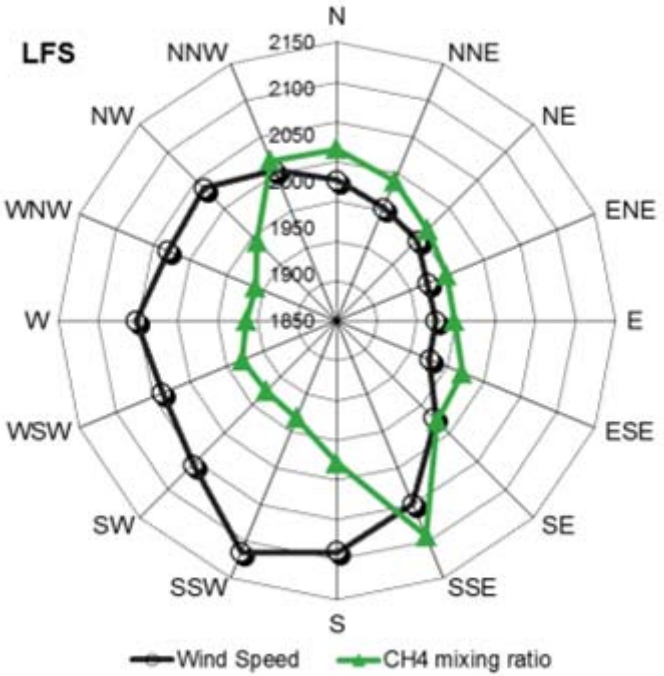


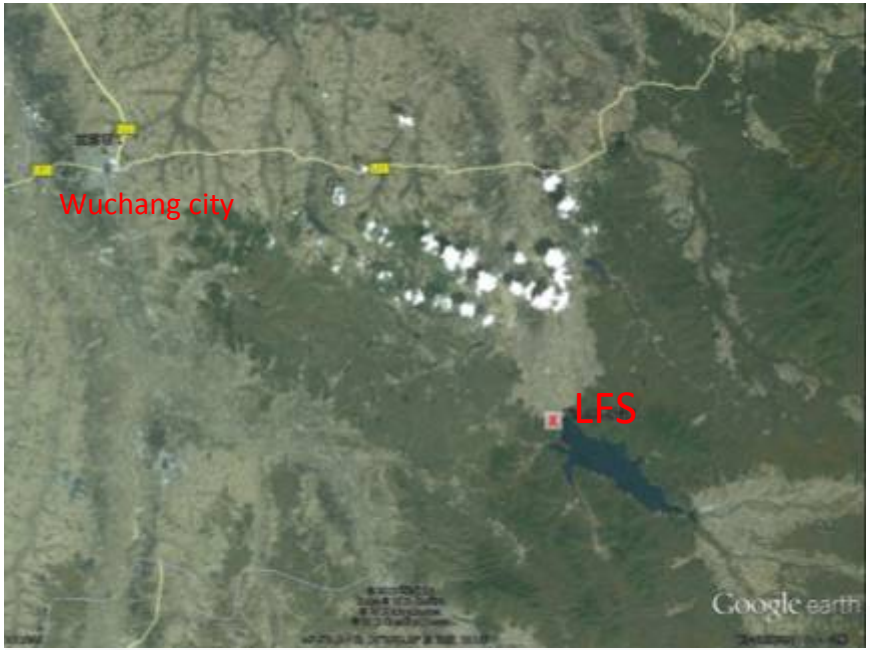
The higher mixing ratio on the E sector might be due to the local surface transport

The Cluster 3 moved slowly and the CH_4 accumulated in the local area.

In the summer, the local sources might be the main factor affecting CH_4 mixing ratios on the ground

Average CH_4 concentration and surface wind speed in the summer





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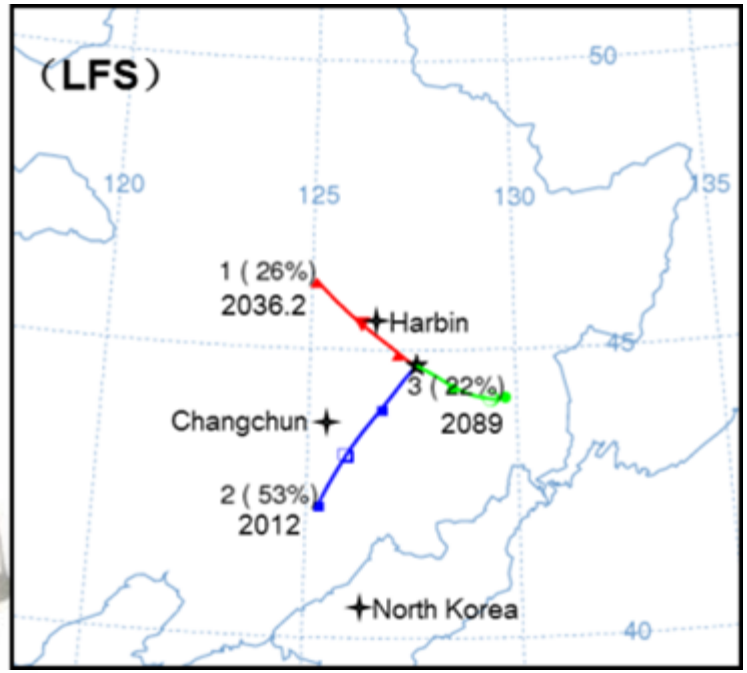
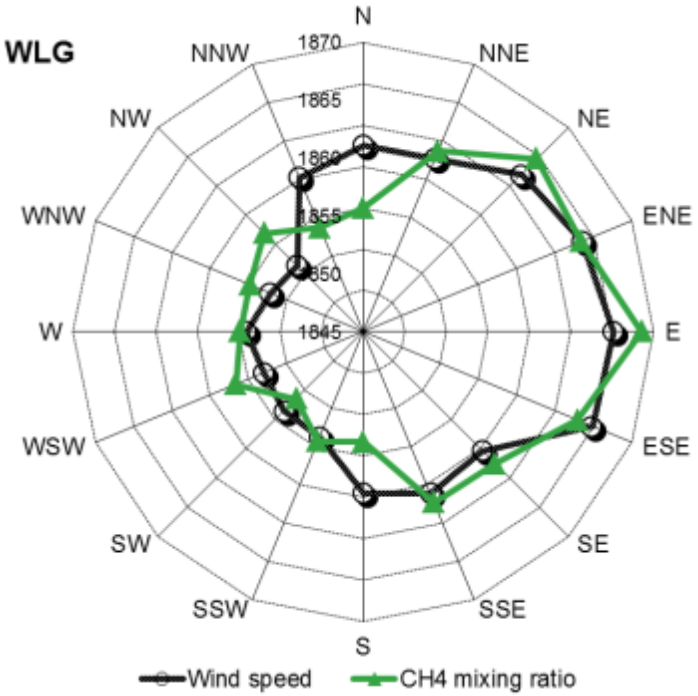
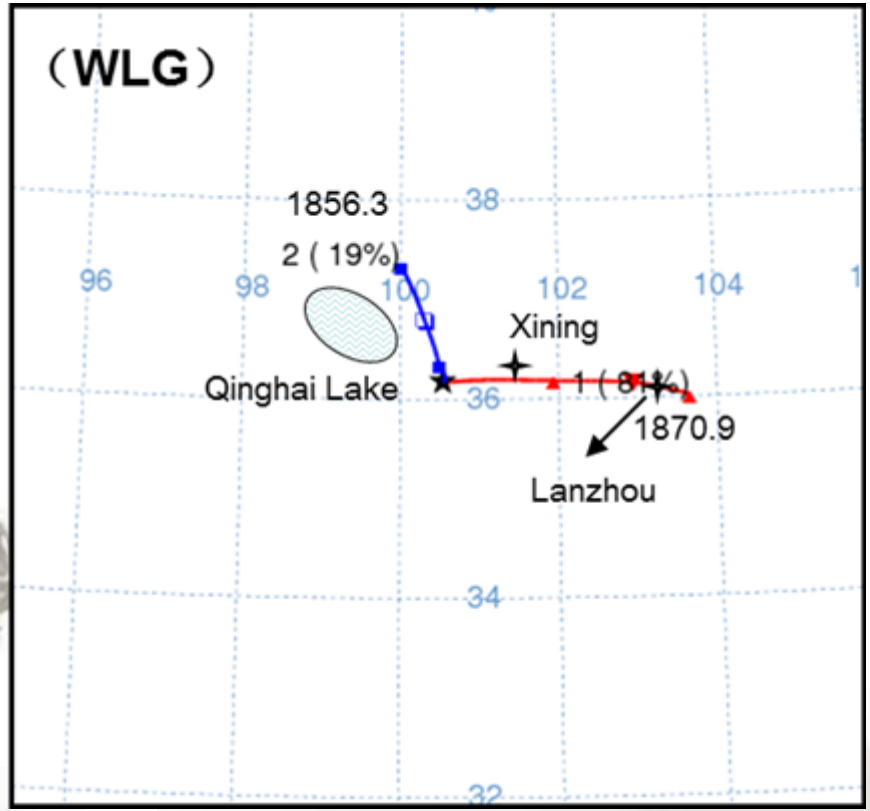


All of the three main clusters at LFS ran through big cities and agricultural area

Average CH_4 concentration and surface wind speed in the summer

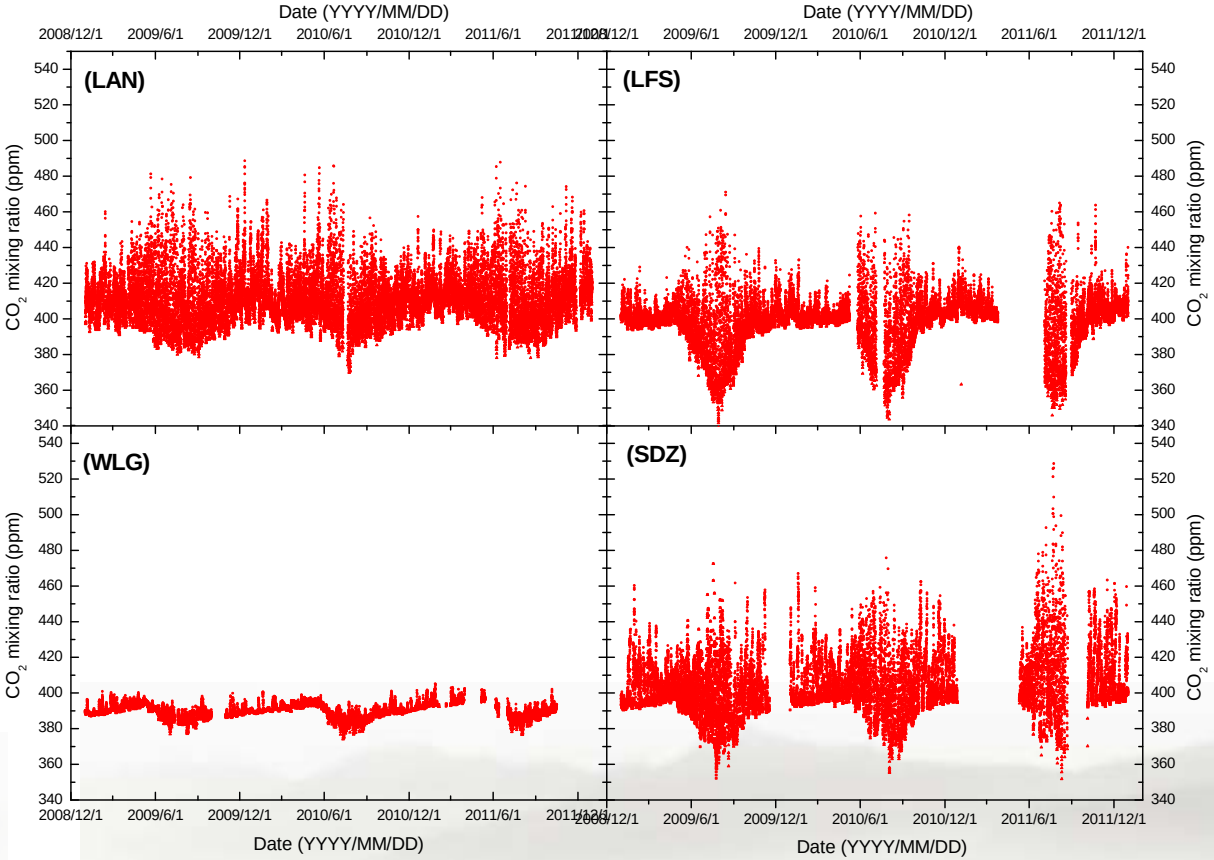




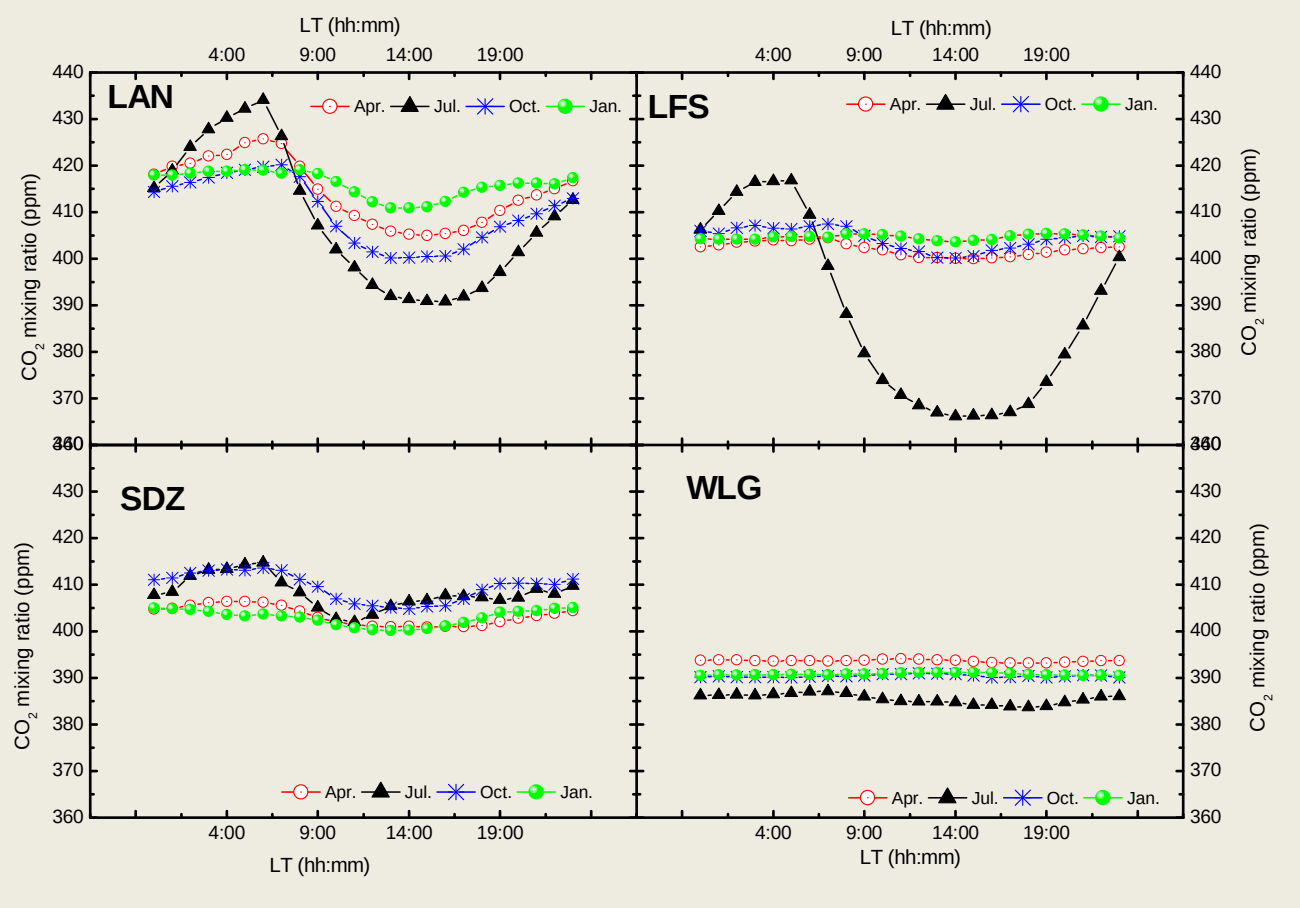
Greater CH_4 mixing ratios from NE-ENE-E-ESE . Higher CH_4 concentrations with greater Beaufort wind scale

Cluster 1 was the main one and accounted for about 81% of the total trajectories

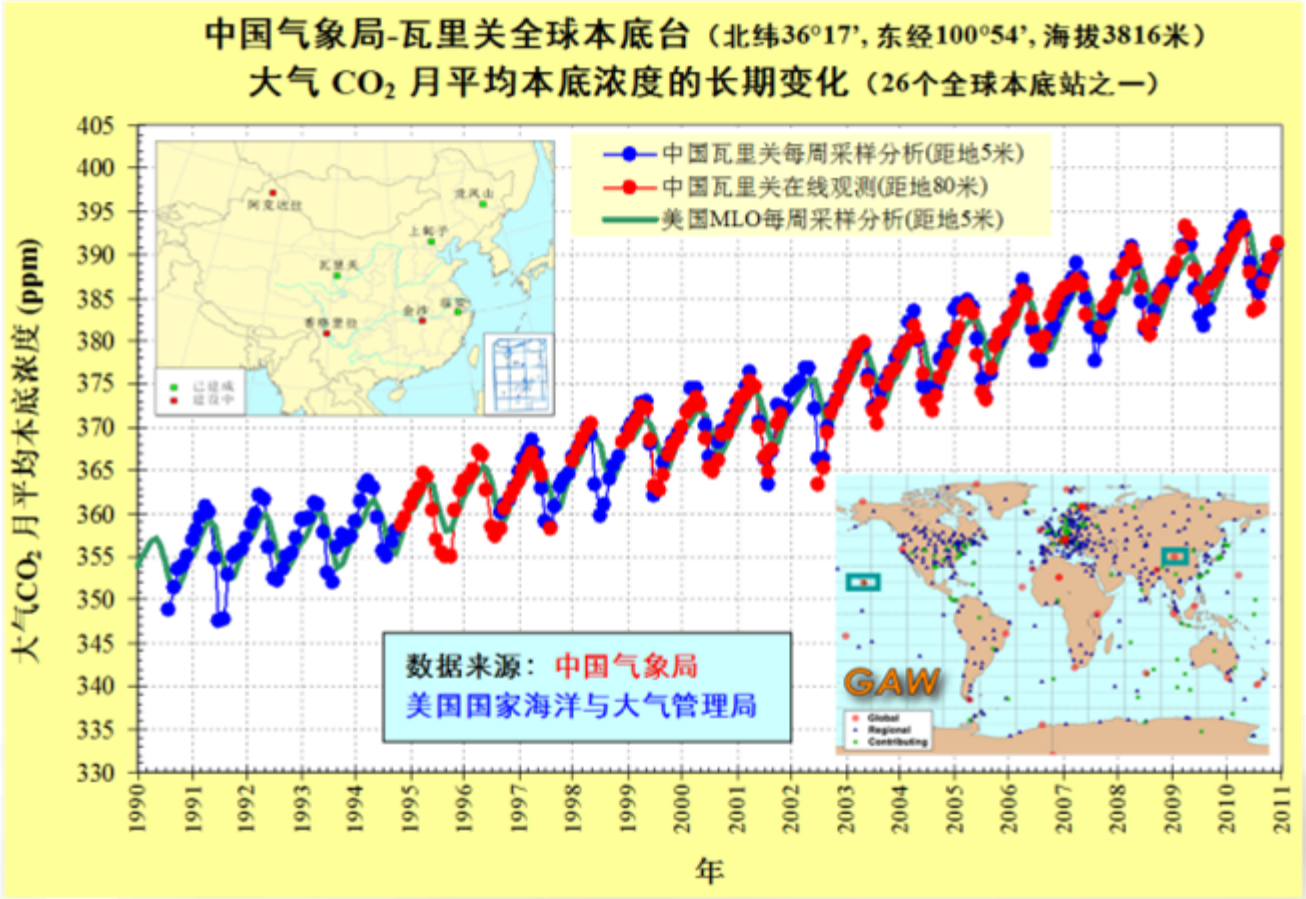
Hourly CO_2 mixing ratios from 2009 to 2011
(WLG: 80m above the ground, the others: 10m AGL)



Mean diurnal CO_2 variations during the four seasons (2009- 2011)



Reported CO_2/CH_4 data to WDCGG (from Picarro G1301 after 2009.1)



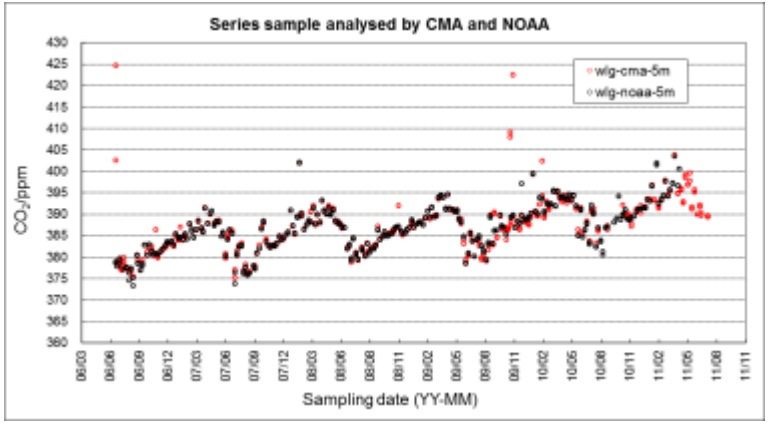
Problems we are encountering

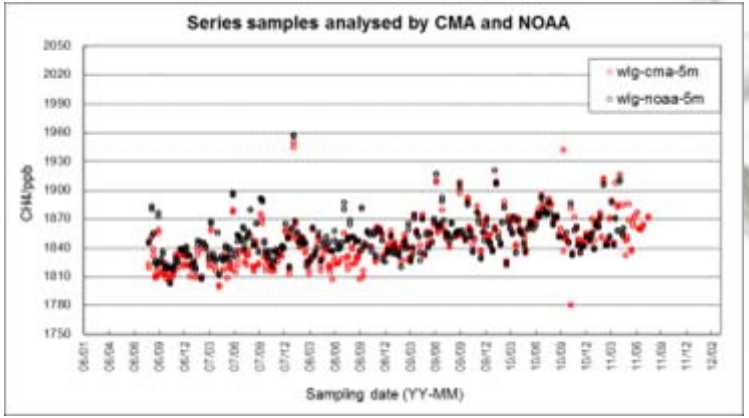
Data process/quality control routine

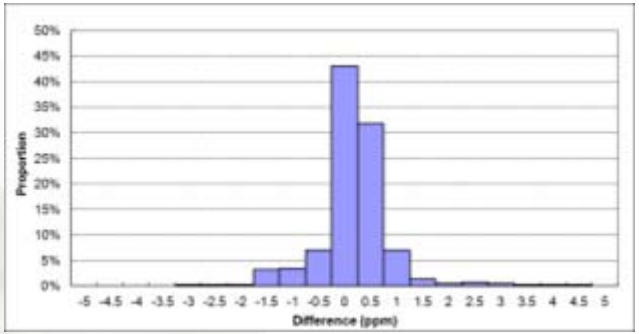
With the help of NOAA, we preliminary configured our data processing/ICP program.

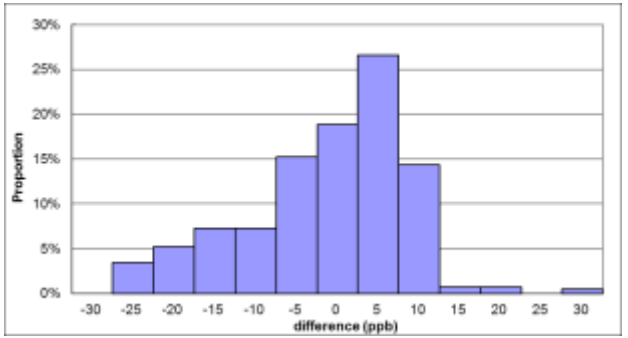
Data process/quality control routine

Under the Cooperative China – U.S. GHGs and Related Tracers Measurement Program, Compared with the results from CMA and NOAA



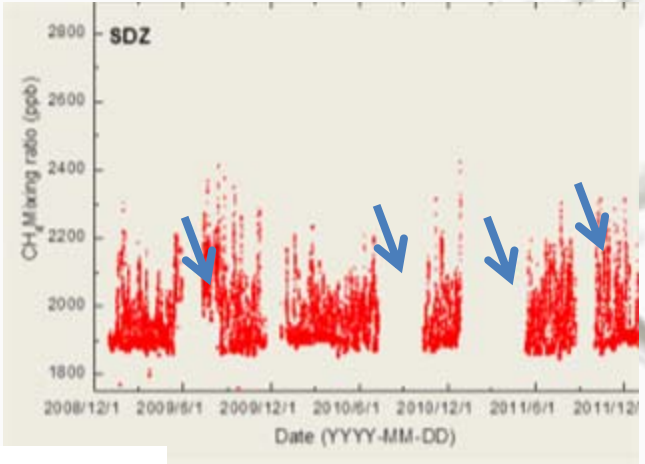






System maintenance – lack of experience

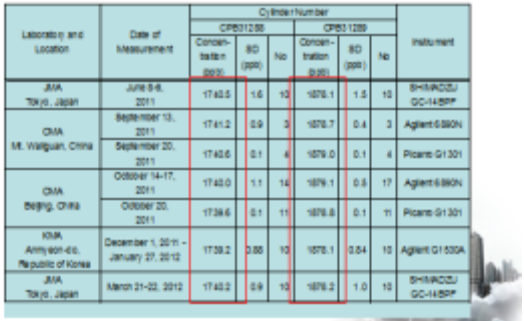
- Calibration (guarantee the data's quality)
- System maintain--Data gaps (system malfunctions, operator's faults etc)
- Analysis of the data/Scientific results



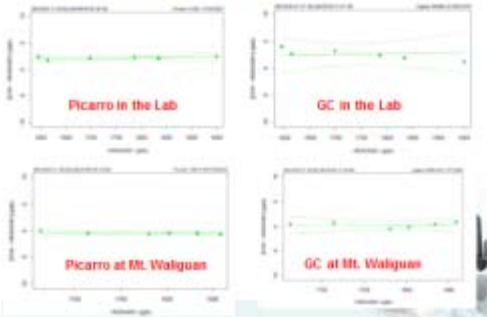
The CO results of 2010 WMO/GAW Round-Robbin CO results are much better now.

Laboratories	Measurement concentration			Differences (Lab - Avg NOAA) COppb		
	CC89592	CC114953	CC86204	CC89592	CC114953	CC86204
NOAA-final	197.1	197.8	198.7			
NOAA-initial	196.9	193.7	198.0			
JP-NIES	201.7	200.4	206.9	4.6	2.6	8.2
JP-TU	205.4	204.0	209.7	8.3	6.2	11
CN-CMA (BJ)	197.9	194.5	199.5	0.8	-3.3	0.8
	198.2	197.8	201.5	1.1	0	2.8
CN-CMA (WLG)	190.5	189.5	191.9	-6.6	-8.3	-6.8
JP-JMA	192.3	191.6	203.4	-4.77	-6.22	4.69
KOR-KMA	209.1	208.6	211.1	11.97	10.8	12.37
KOR-KRISS	210.3	210.2	211.5	13.2	12.4	12.8
BRA-IPEN	203.1	203.8	201.9	6.0	6.0	3.2

Results: 2011 methane reference gas inter-comparison



Audit results- CH_4 at CMA and Mt. Waliguan



Install new sampling method/system

we had set up systems including PFP/PCP, standard gases compressing system etc. We are short of hands…..

Flask analysis system

Flask isotope system

Flask Picarro system

GC system

Standard gas filling system

M60/70 sampler

M80/90 sampler (PFP/PCP)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Thank you!