Current status and future prospects of greenhouse gas observations in East Asia as seen from WDCGG data

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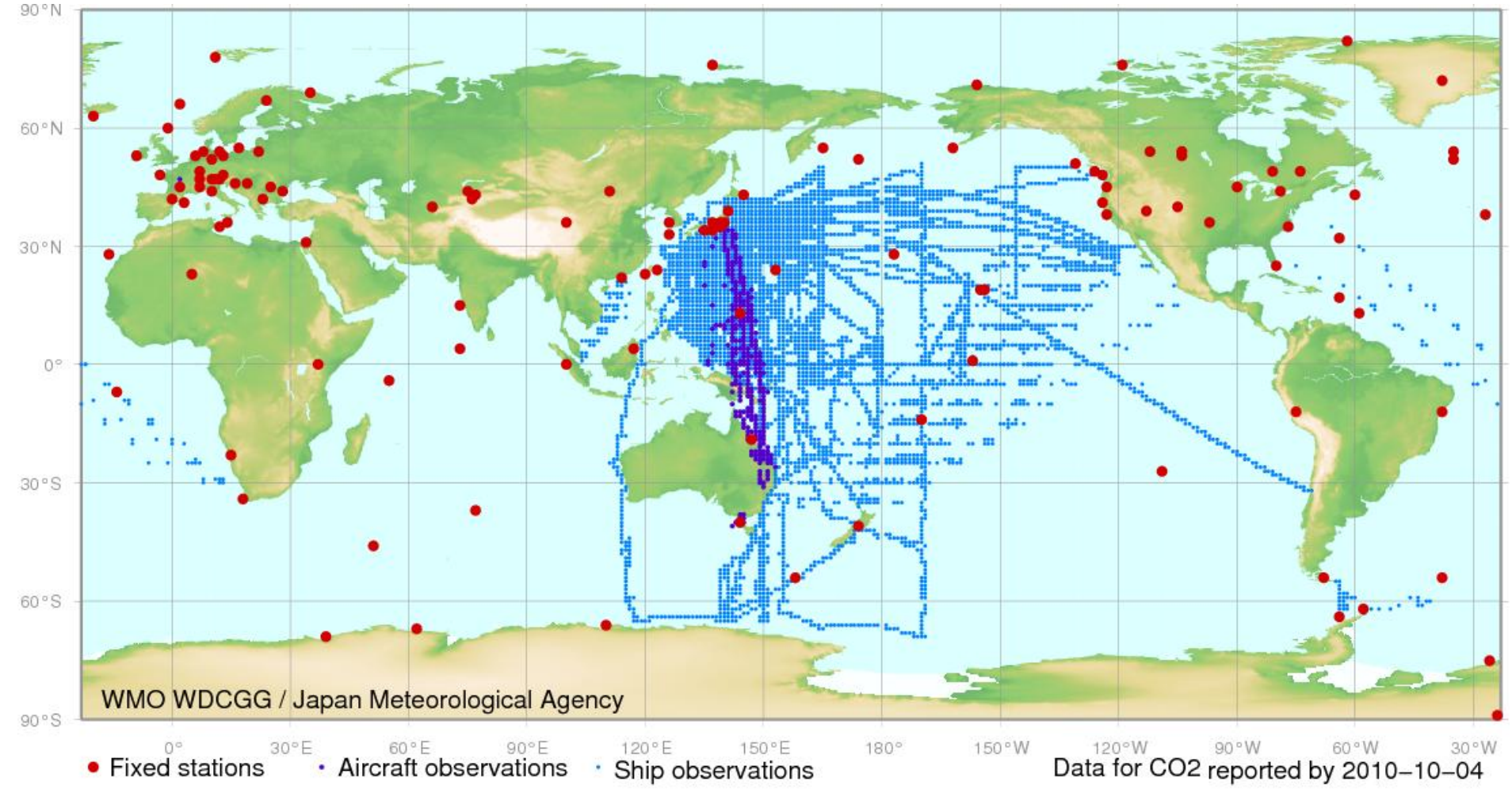
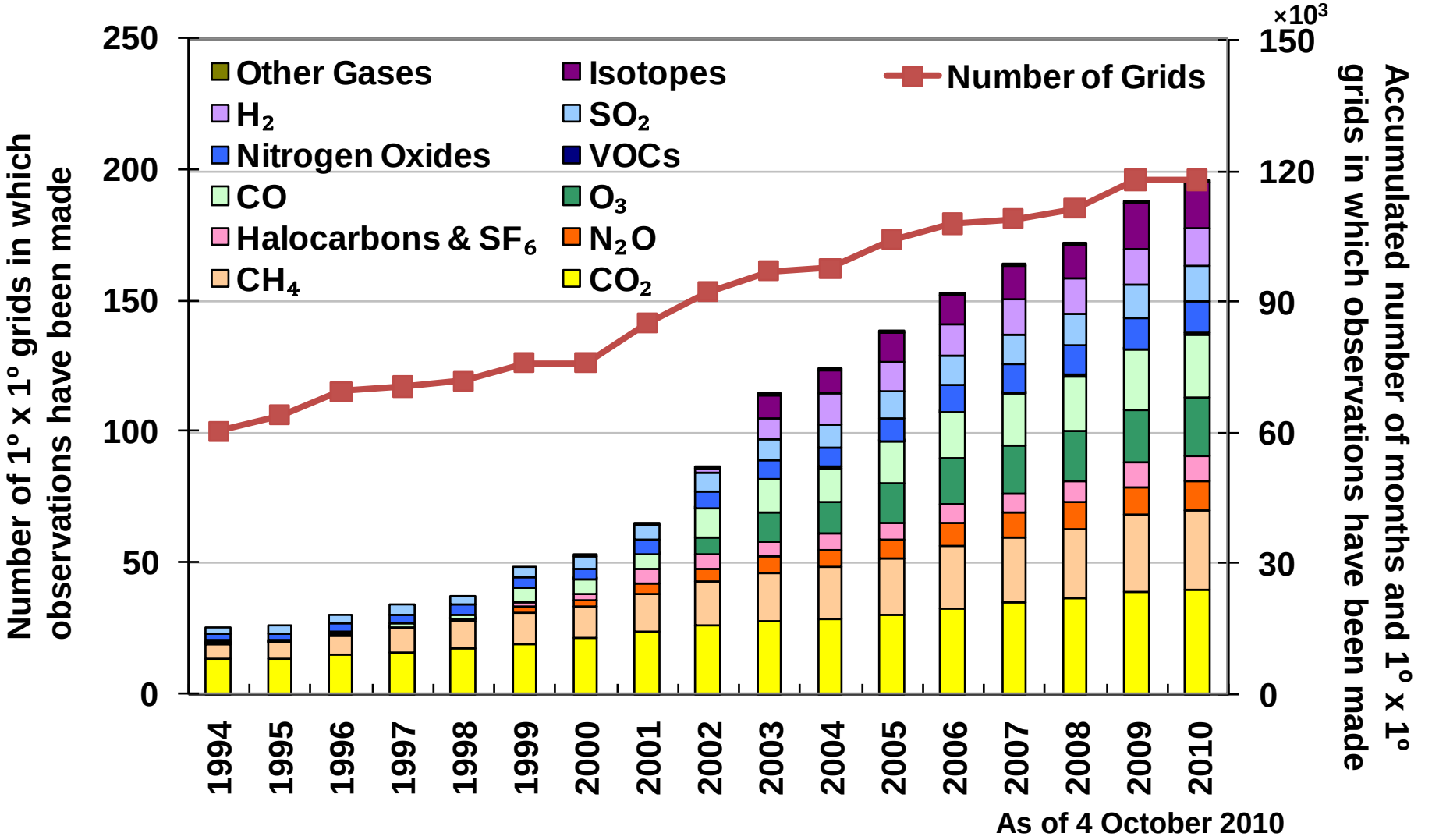
World Data Centre for Greenhouse Gases

Reported CO_2 data originate from fixed stations in more than 150 locations and mobile platforms including ships and aircraft worldwide.



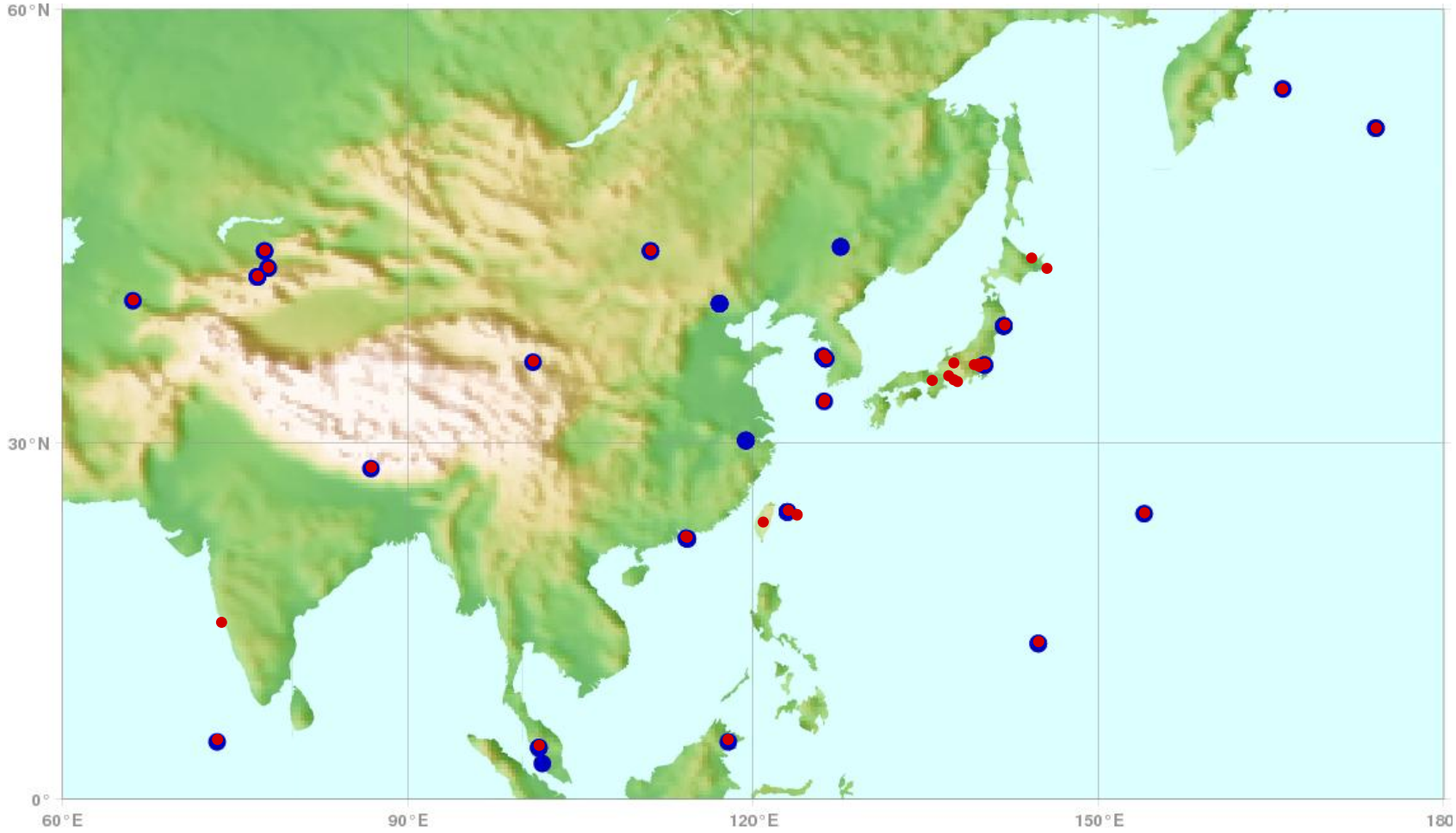
World Data Centre for Greenhouse Gases

Data from fixed stations have increased in terms of locations and amounts.



Data reported to WDCGG from GAW stations

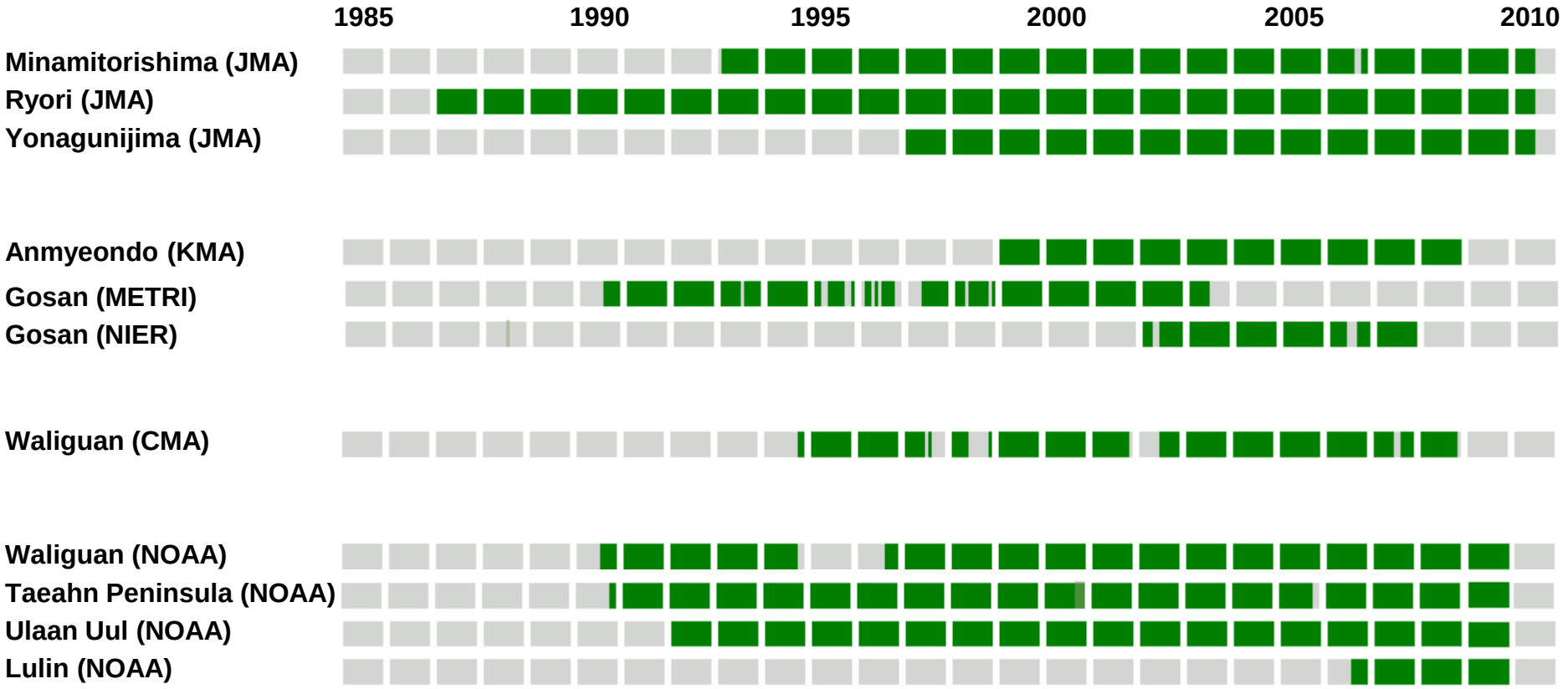
Data are reported from many of the Global and Regional Stations in the region as well as some Contributing Stations.



● GAW Global and Regional Stations ● Data contributors

Status of reported CO_2 data

Reported data in the region mostly date back from the 1990s and continue to recent years.



As of October 2010

Calibration scale of reported data

	CO_2	CH_4	N_2O	CFCs
JMA	WMO X2005 (updating to X2007)	NOAA 2004	NOAA 2006	gravimetric
NIES	NIES 95	gravimetric	gravimetric	—
KMA	KRISS	KRISS	KRISS	KRISS
NIER	WMO X2007	NOAA04	NOAA2006	unknown
CMA	WMO X2007	NOAA 2004	—	—
NOAA	WMO	NOAA04	NOAA 2006	NOAA

Based on metadata reported to the WDCGG

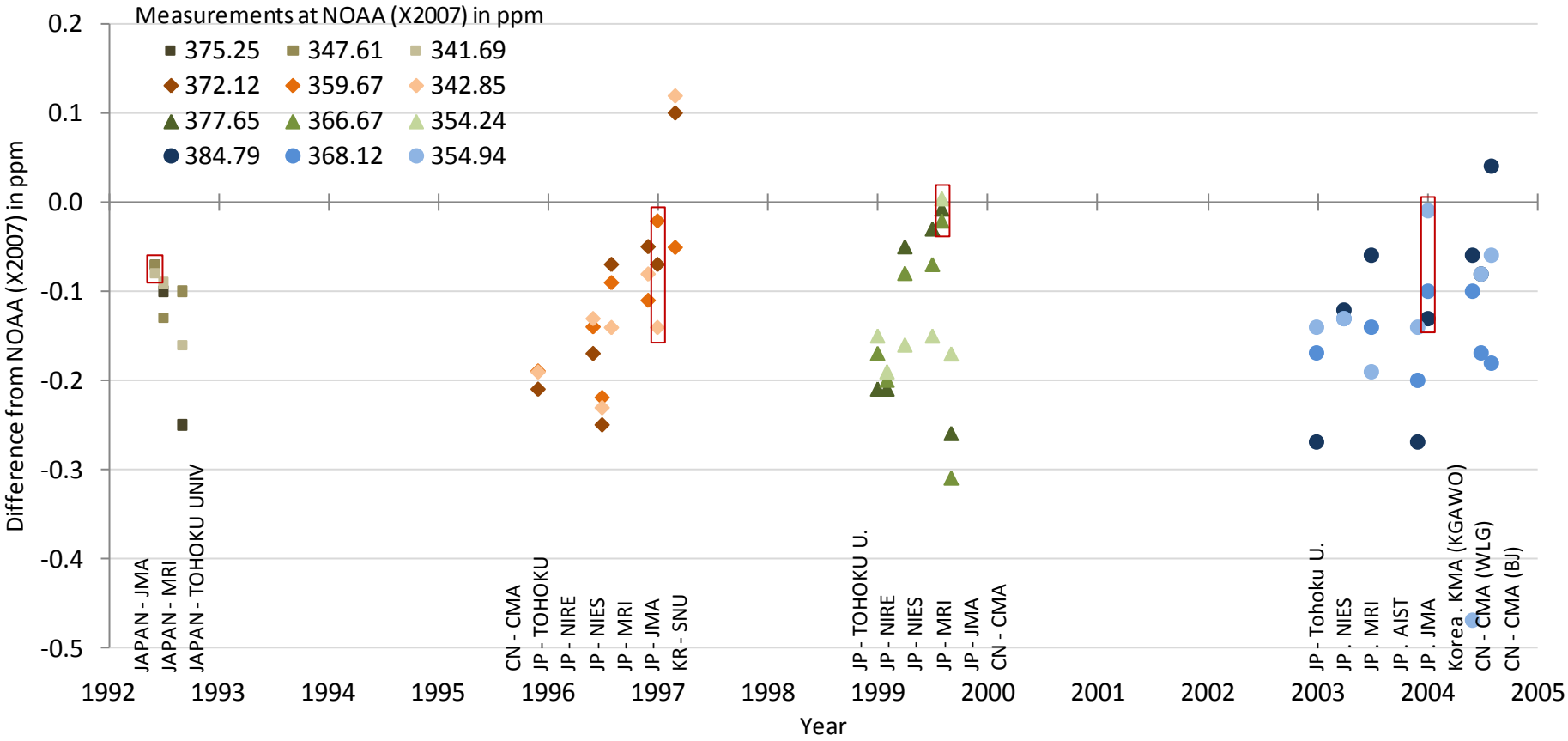
Inter-laboratory comparison exercises

Table 2. 2002 - 2007 WMO Round-Robin Intercalibration Results
Carbon Dioxide Concentrations (Preliminary).

Laboratories	Analysis Date	Report Date	TANK # CO_2, µmol mol^{-1}			Differences (Lab minus NOAA) CO_2, µmol mol^{-1}			Description of reported standard scale
GROUP ONE (Tank #4532, #4409, #4584)			4532	4409	4584	4532	4409	4584	
US – NOAA average			354.91	368.14	384.81				
JP - Tohoku U.	Jan.2003	Mar.2004	354.80	367.95	384.52	-0.11	-0.19	-0.29	Gravimetric, Tohoku U. 2003 scale
JP – NIES	Apr.2003	Mar.2004	354.81	367.99	384.67	-0.10	-0.15	-0.14	Gravimetric, NIES95 scale
JP – MRI	July.2003	Mar.2004	354.75	367.98	384.73	-0.16	-0.16	-0.08	Gravimetric, MRI 1987 scale
JP – AIST	Sept./Dec.2003	Mar.2004	354.80	367.92	384.52	-0.11	-0.22	-0.29	Gravimetric, Tohoku U. 2003 scale
JP – JMA	Jan.2004	Mar.2004	355.04	368.14	384.79	0.13	0.00	-0.02	WMO X2005 scale
Korea – KMA (KGAWO)	Mar./Jun.2004	July.2004	354.47	368.02	384.73	-0.44	-0.12	-0.08	4 tanks NOAA and 2 tanks KRISS
CN - CMA (WLG)	July.2004	Nov.2004	354.86	367.95	384.71	-0.05	-0.19	-0.10	WMO X2007 scale
CN - CMA (BJ)	Aug.2004	Nov.2004	354.88	367.94	384.83	-0.03	-0.20	0.02	WMO X2007 scale
US – SCRIPPS (CMM)	June.2005	June.2006	355.14	368.31	385.01	0.23	0.17	0.20	Manometric, CMM
US - SCRIPPS (ECM II)			355.01	368.16	384.83	0.10	0.02	0.02	Manometric, ECM II
FR – LSCE	Oct./Nov.2005	Dec.2005	354.86	368.03	384.72	-0.05	-0.11	-0.09	Calibrated by NOAA between 2001 and 2002

Source: Report of the 14th WMO/IAEA Meeting of Experts on Carbon Dioxide, Other Greenhouse Gases and Related Tracers Measurement Techniques (GAW Report No. 186)

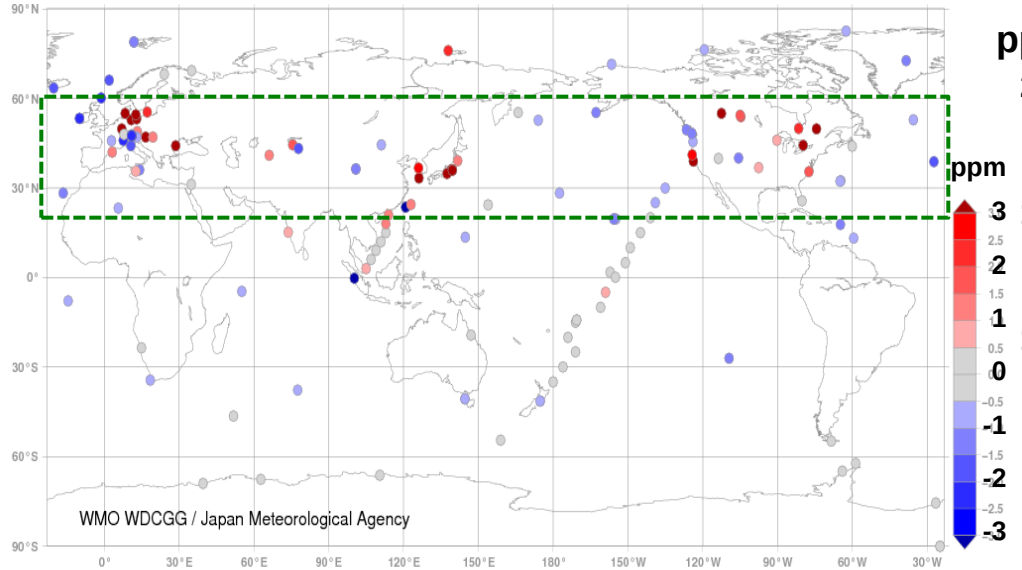
Results of inter-laboratory comparisons

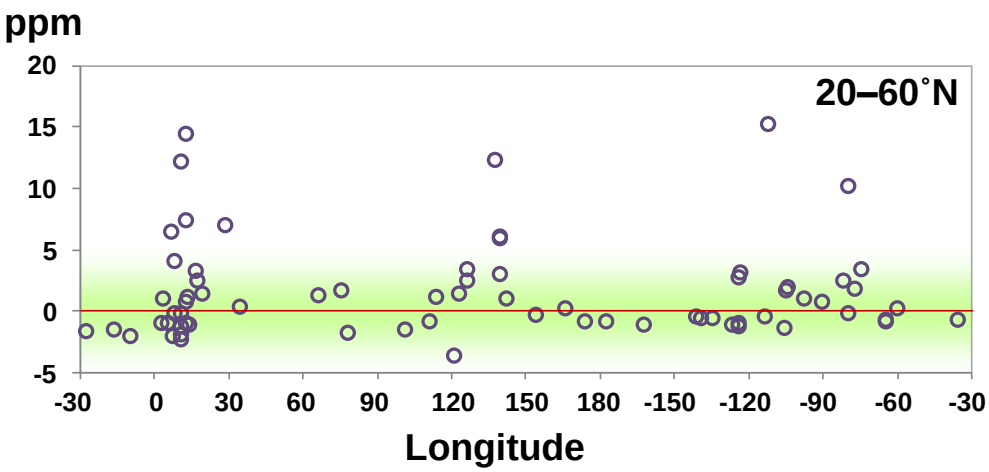


Results for laboratories in East Asia in the WMO round-robin reference gas intercomparisons during 1991–1992, 1995–1997, 1999–2000 and 2002–2007. The values are relative to the measurements at NOAA/ESRL on the WMO-X2007 scale. The values for JMA surrounded by red squares are recalculated experimentally on the WMO-X2007 scale.

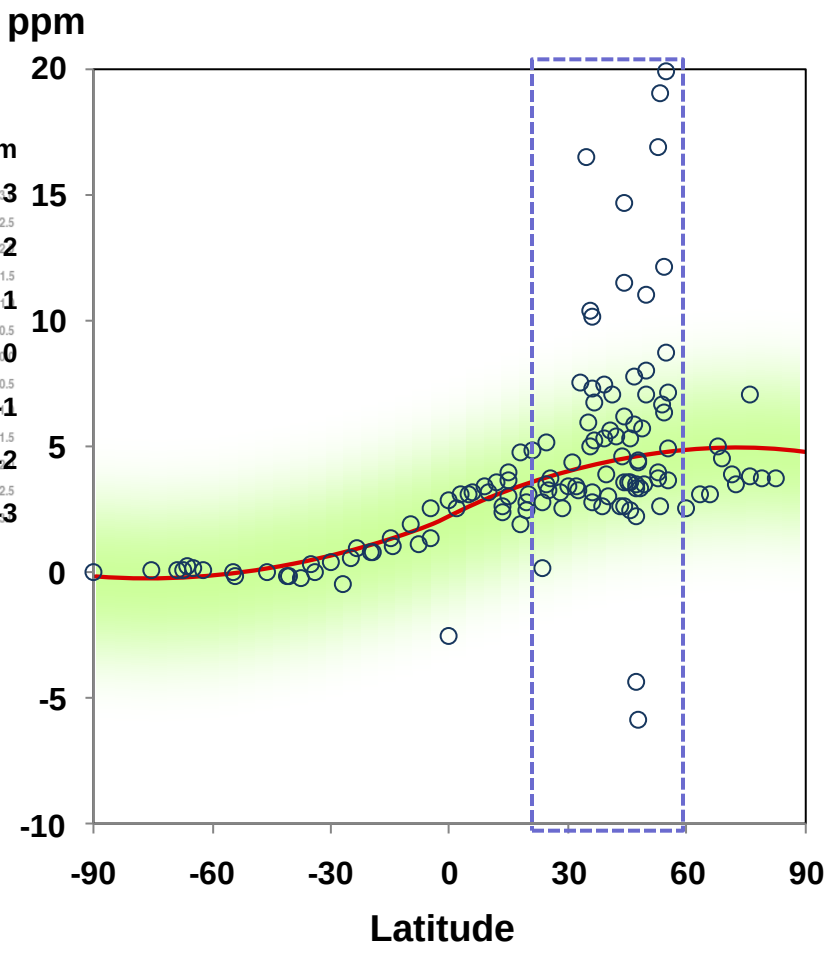
Characteristics of CO_2 data obtained at Asian sites

Deviation from the fitting curve

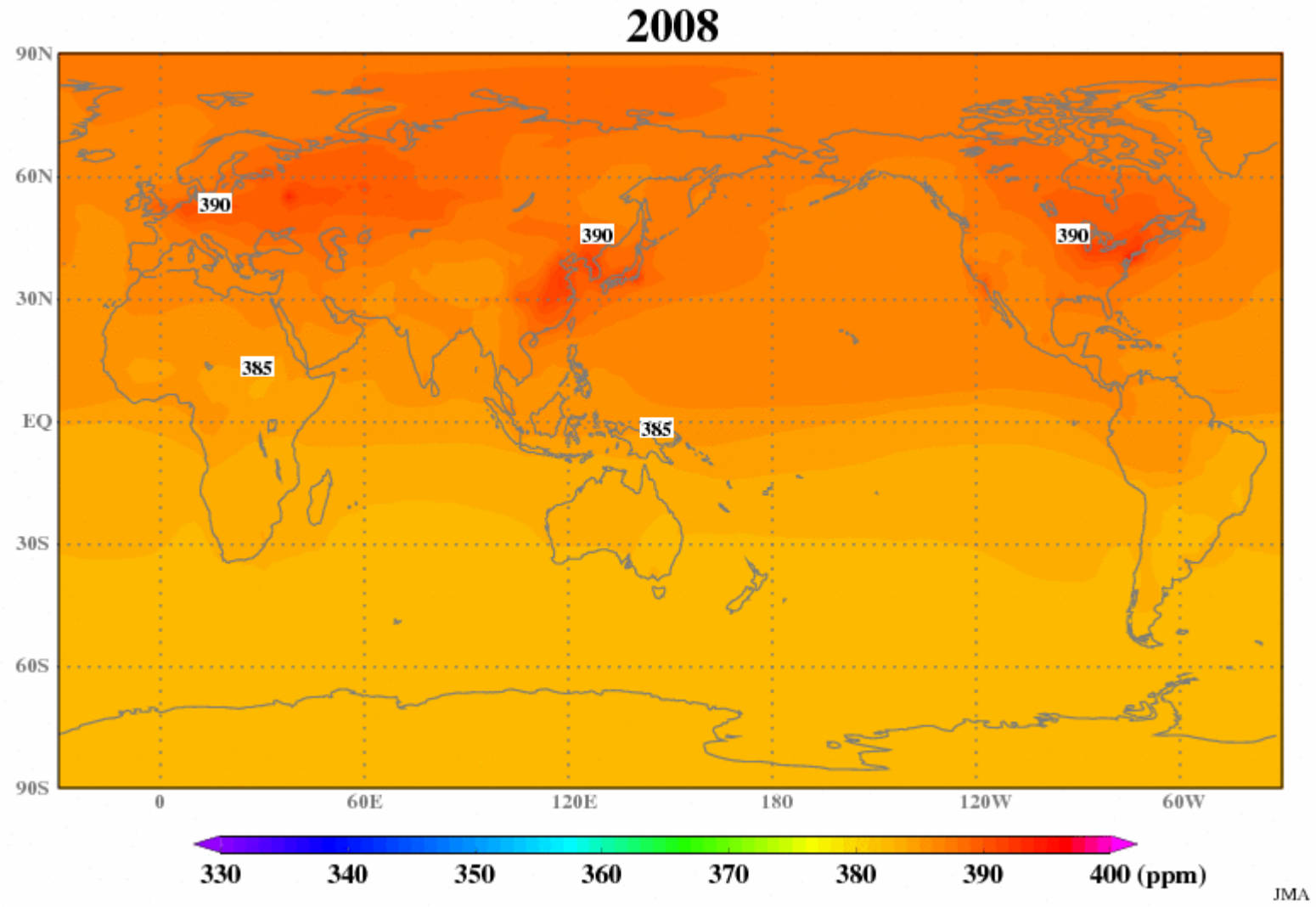




Deviation relative to the South Pole

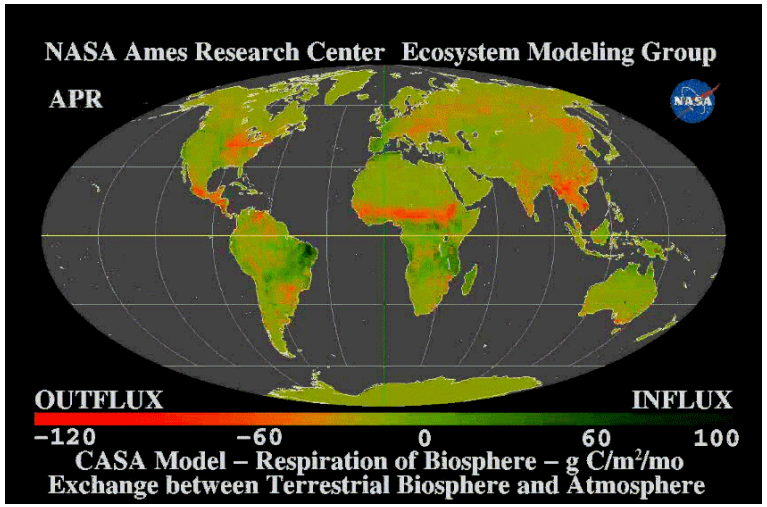


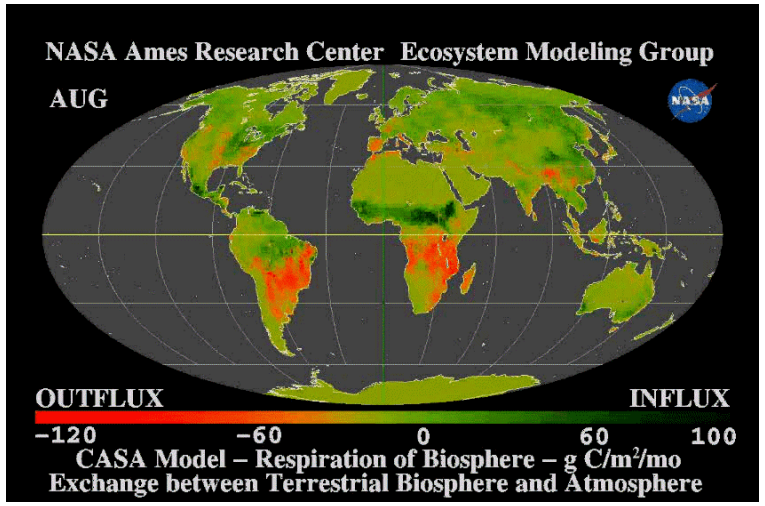
Global distribution of CO_2 concentrations



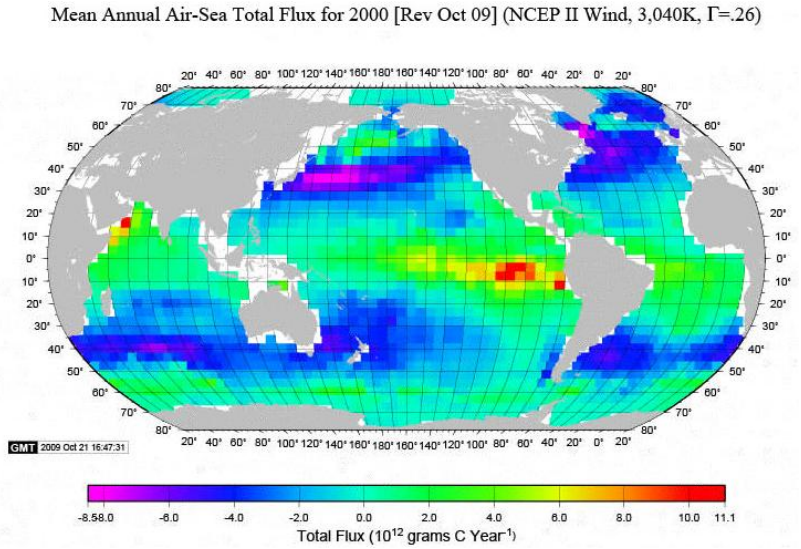
Annual mean concentration in 2008 calculated by JMA using transport and inverse models.

Global distribution of CO_2 fluxes

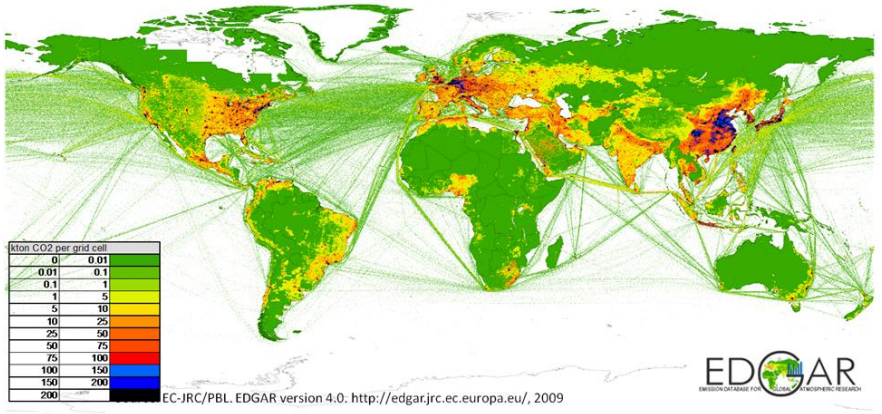




Source: NASA-CASA Project



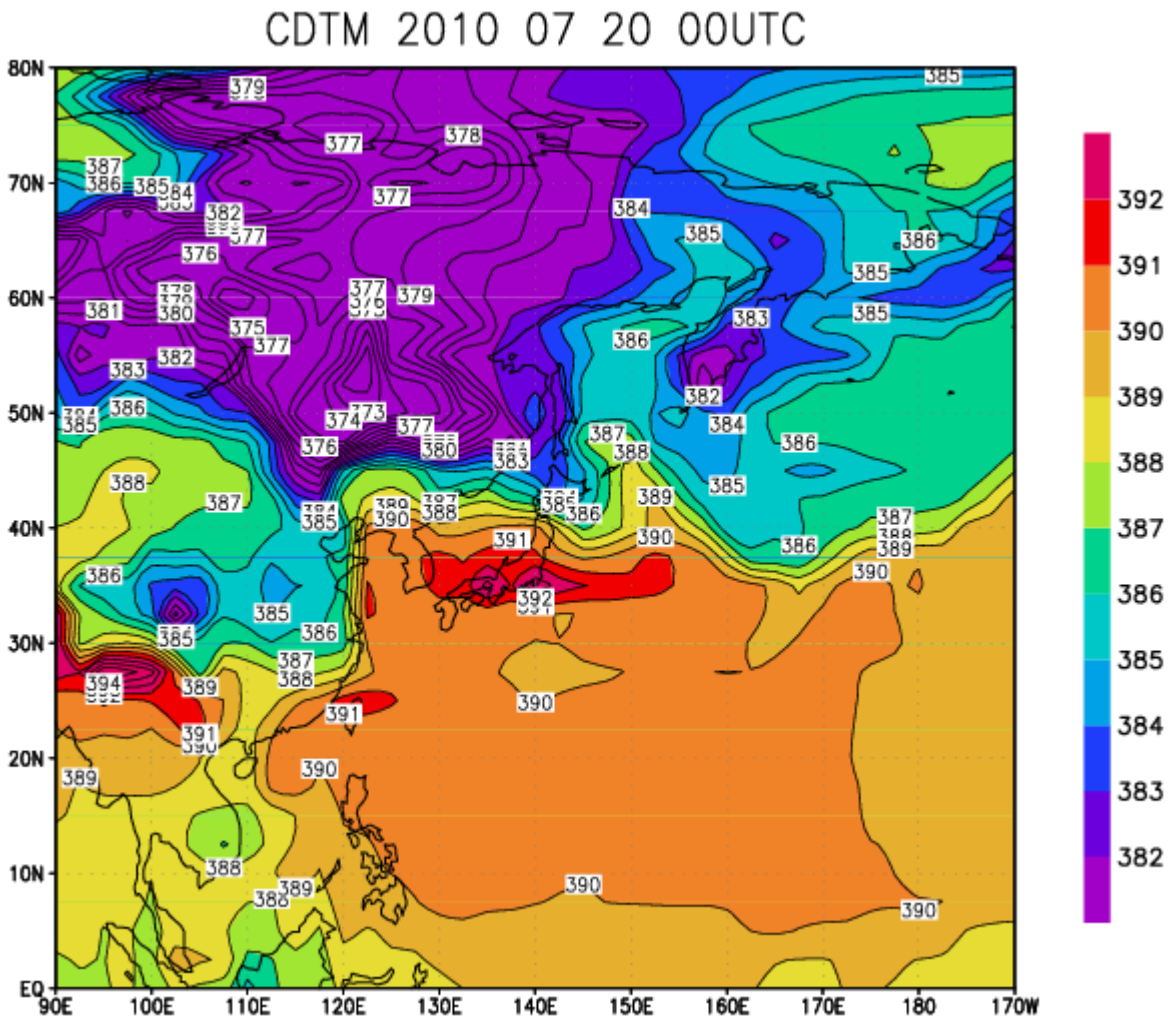
Source: Takahashi, et al., 2009



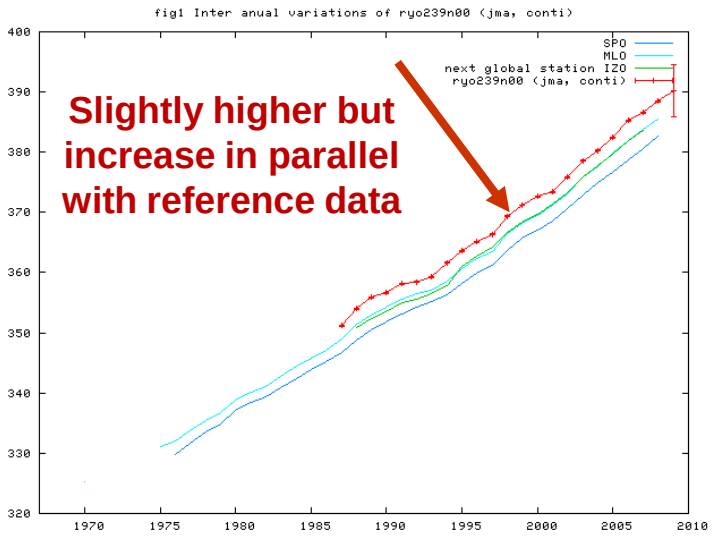
Global gridded CO_2 emissions in 2005

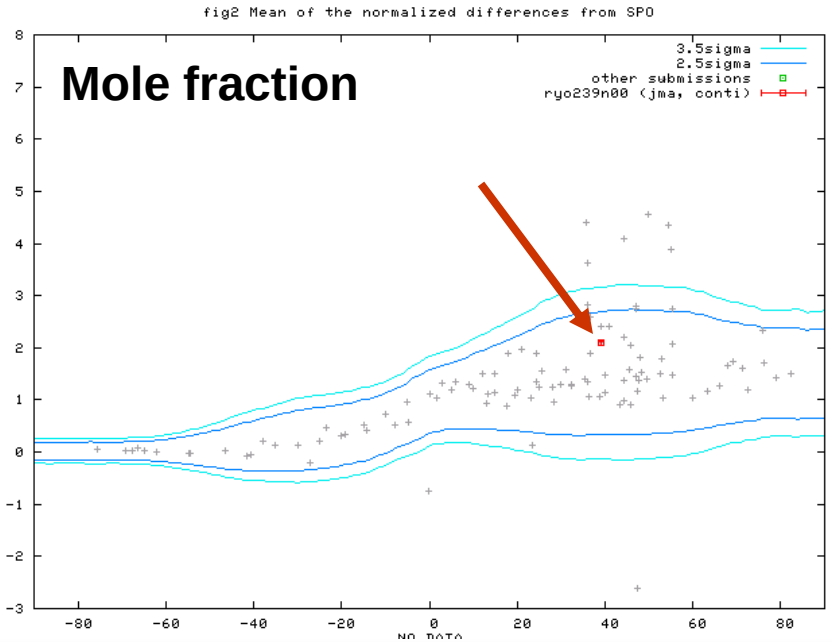
Source: EDGAR, 2009

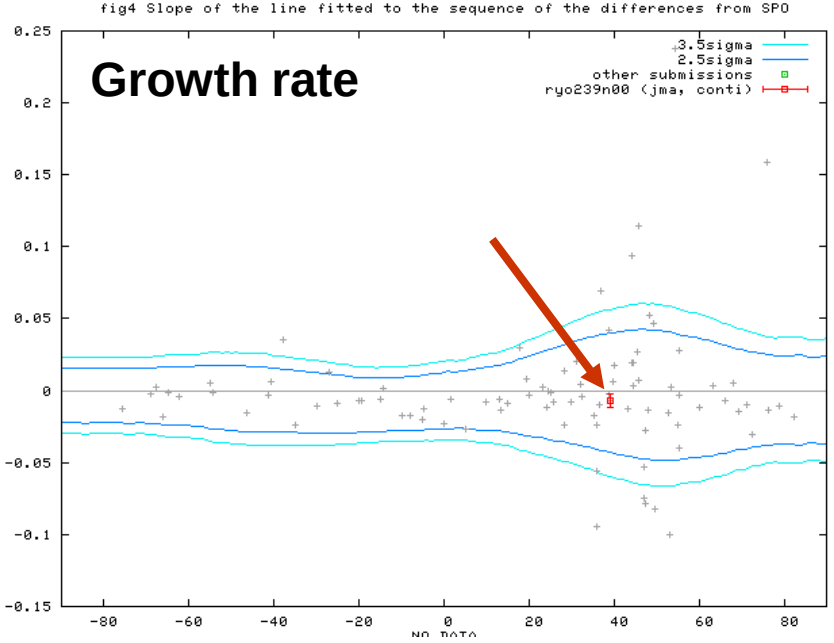
CO_2 concentrations in East Asia



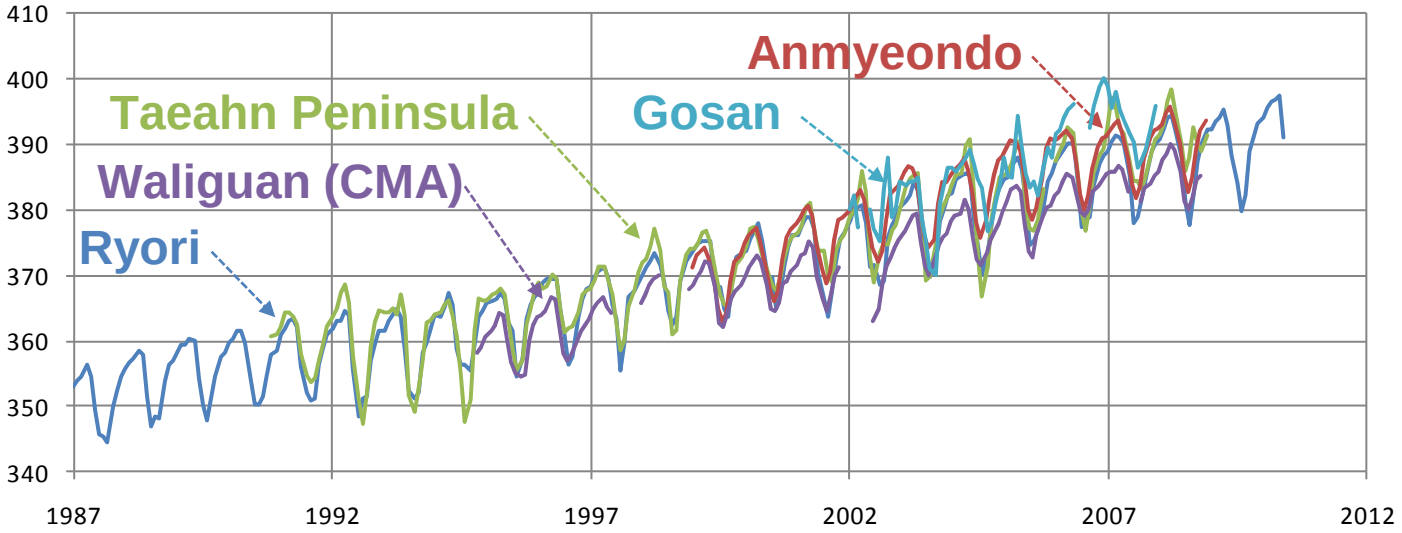
CO_2 data from Ryori

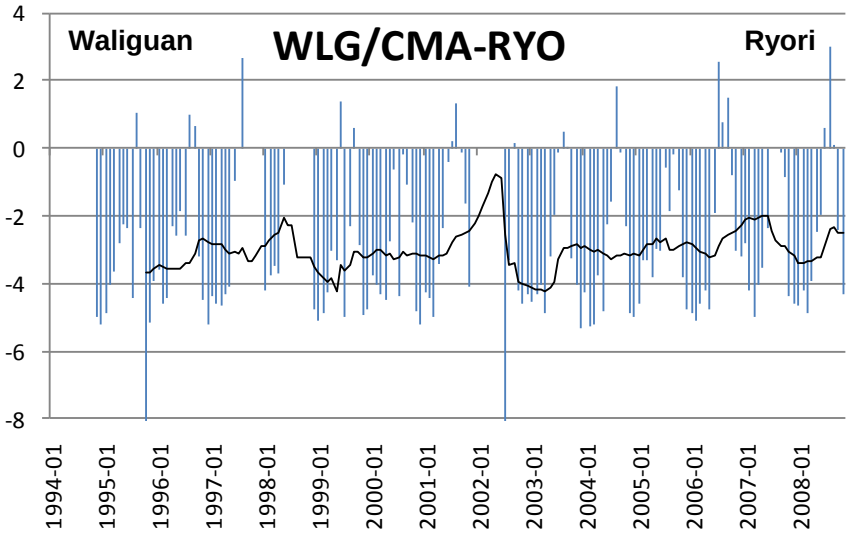


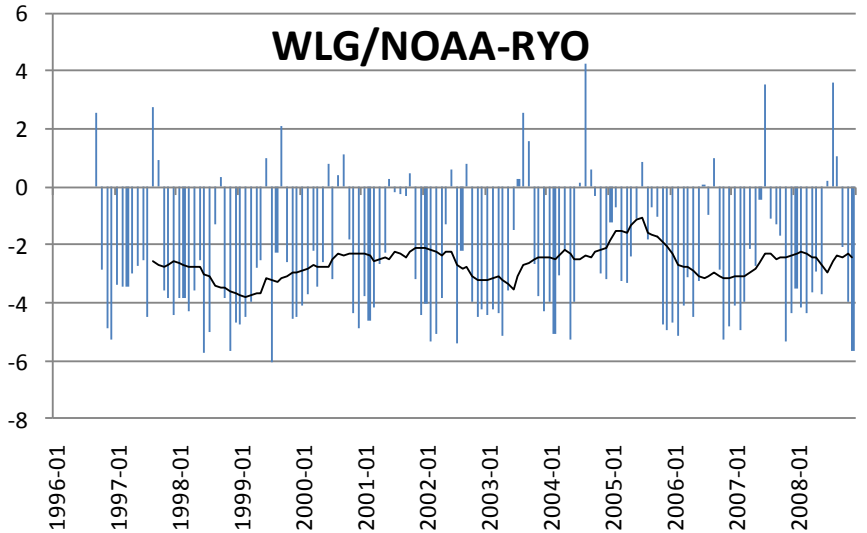




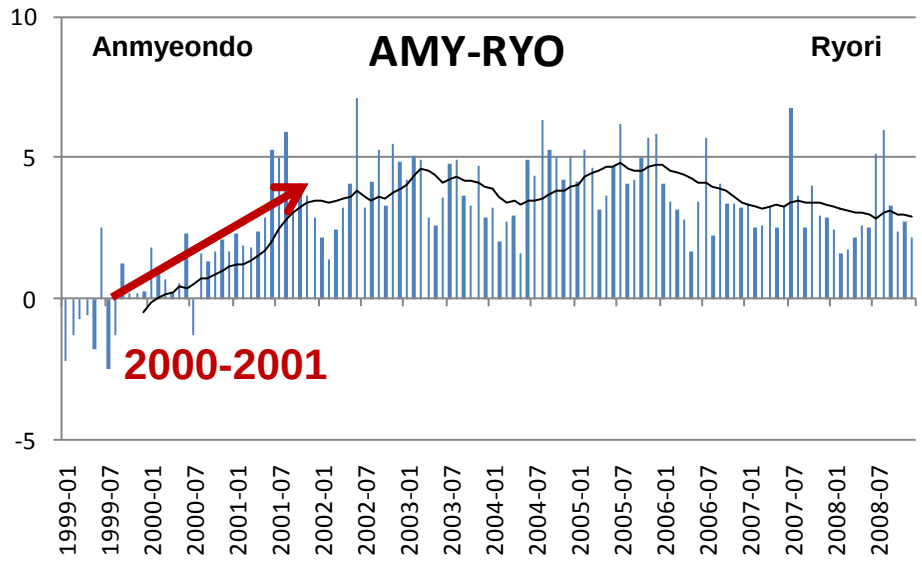
Comparison of data from different stations (1)

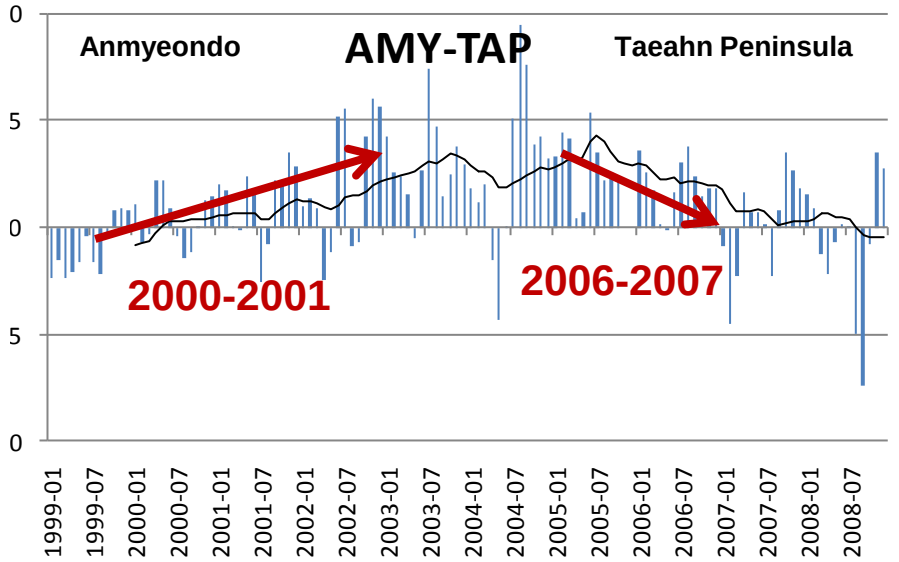


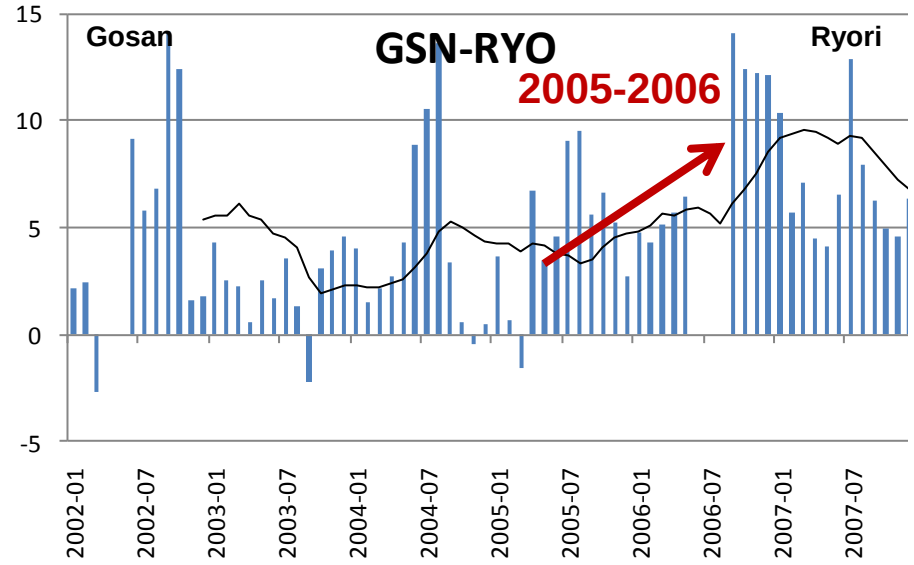


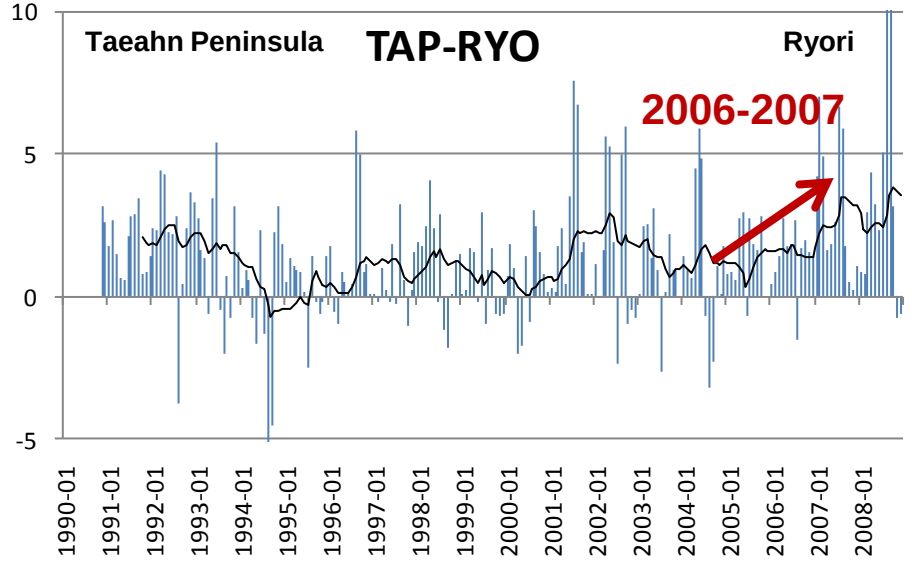


Comparison of data from different stations (2)





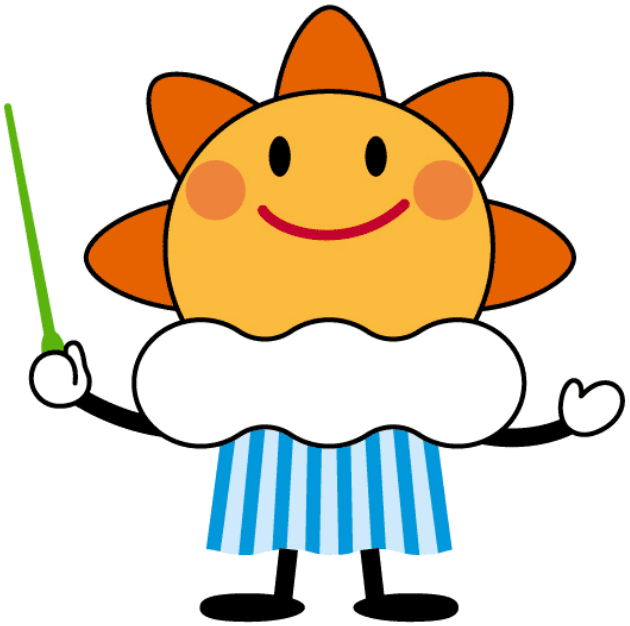




Summary

- Several stations in East Asia has reported greenhouse gas data to the WDCGG. Some more stations are expected to join.
- The measurements are made by different institutes on different calibration scales. Inter-laboratory comparisons are organized to identify interrelationship of the scales.
- East Asia is susceptible to local- and regional-scale sources and sinks of greenhouse gases. Collaboration in long-term and systematic data analysis is required to identify regional characteristics.
- Exchange of observational data, as well as calibration and intercomparison histories, is encouraged among relevant institutes for discussing data quality.

감사합니다



Thank you