Atmospheric Mercury Monitoring in China

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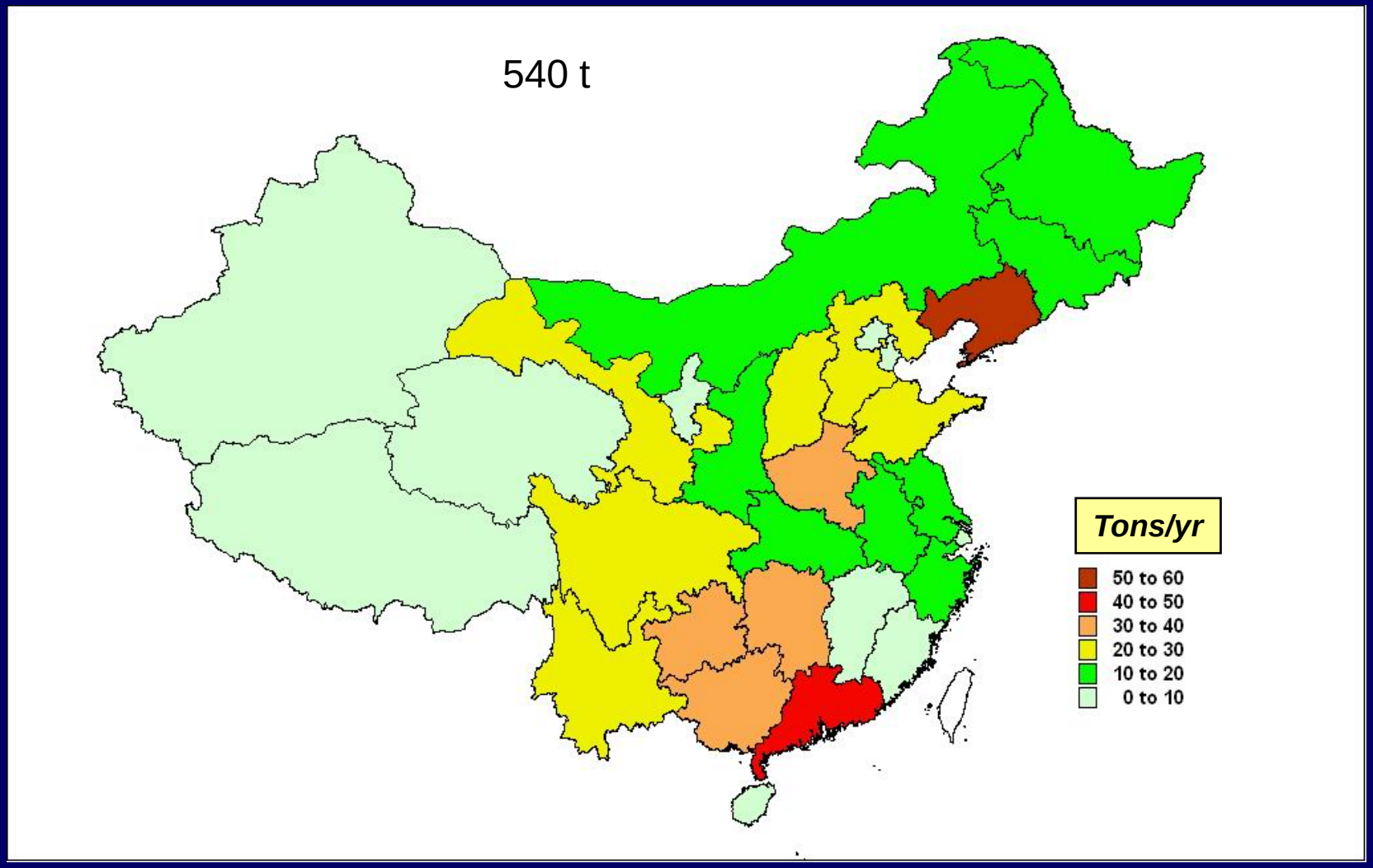
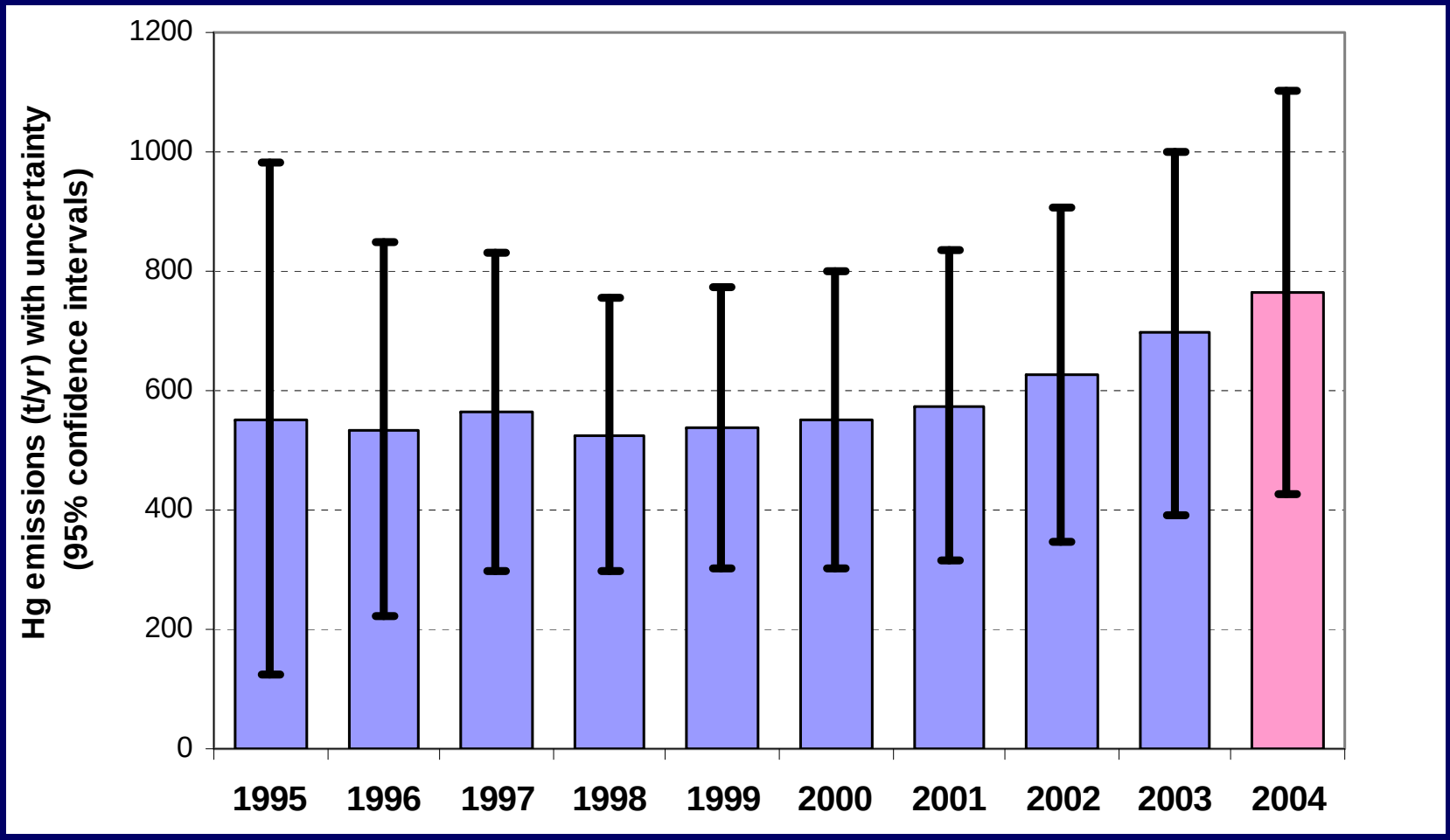
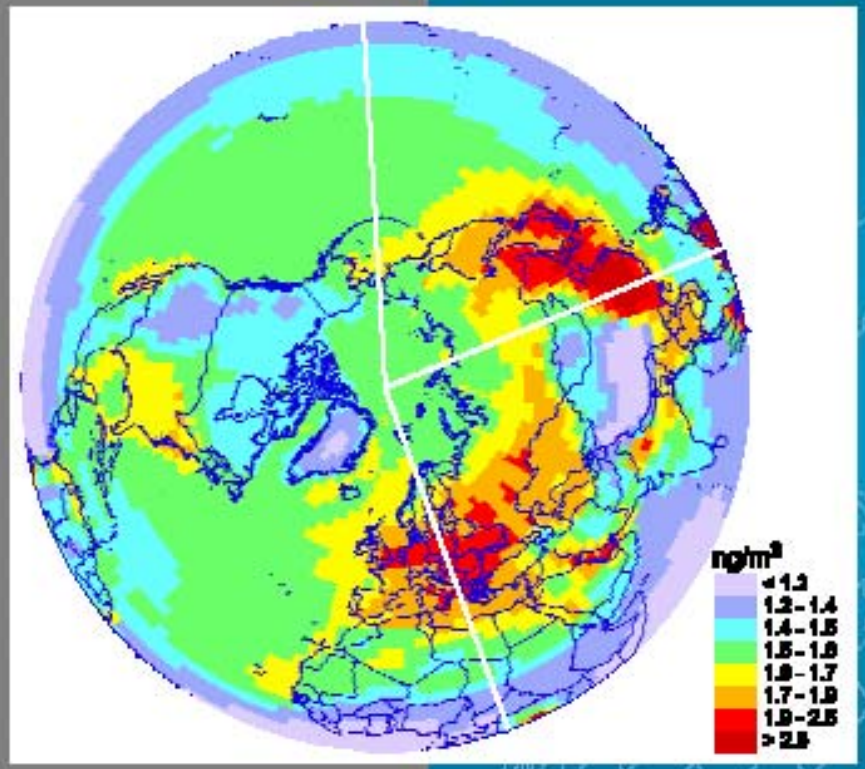
Total Hg emissions by province, 1999, China data (all sources) (Streets et al., 2005)

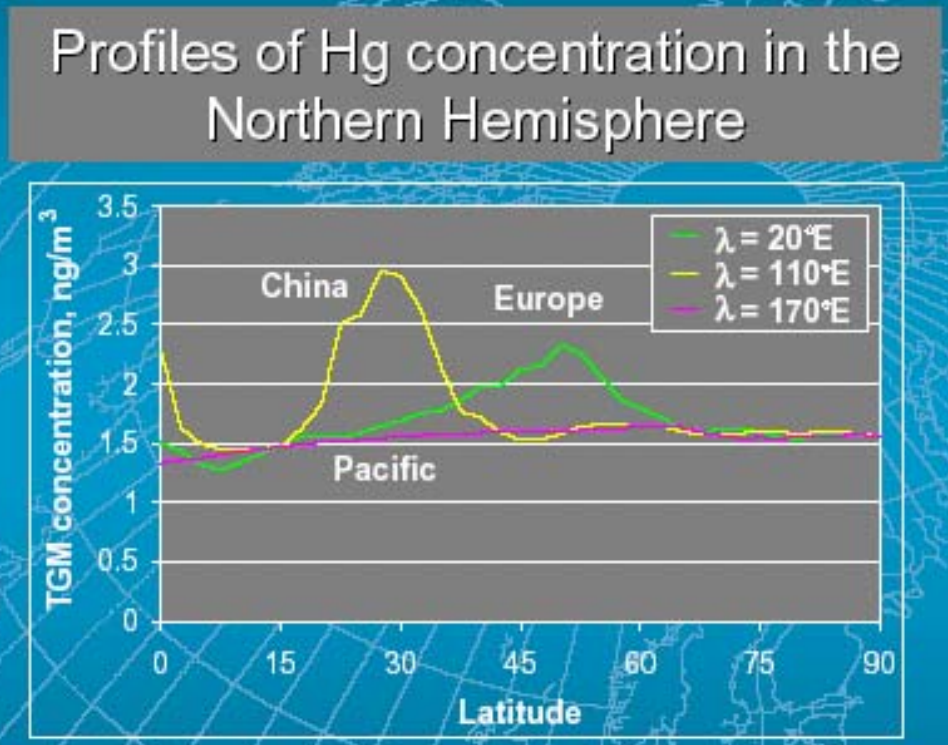


Primary man-made Hg emissions are growing fast in recent years due to rapid economic growth (Wu et al., *Environ. Sci. Technol*., 2007)

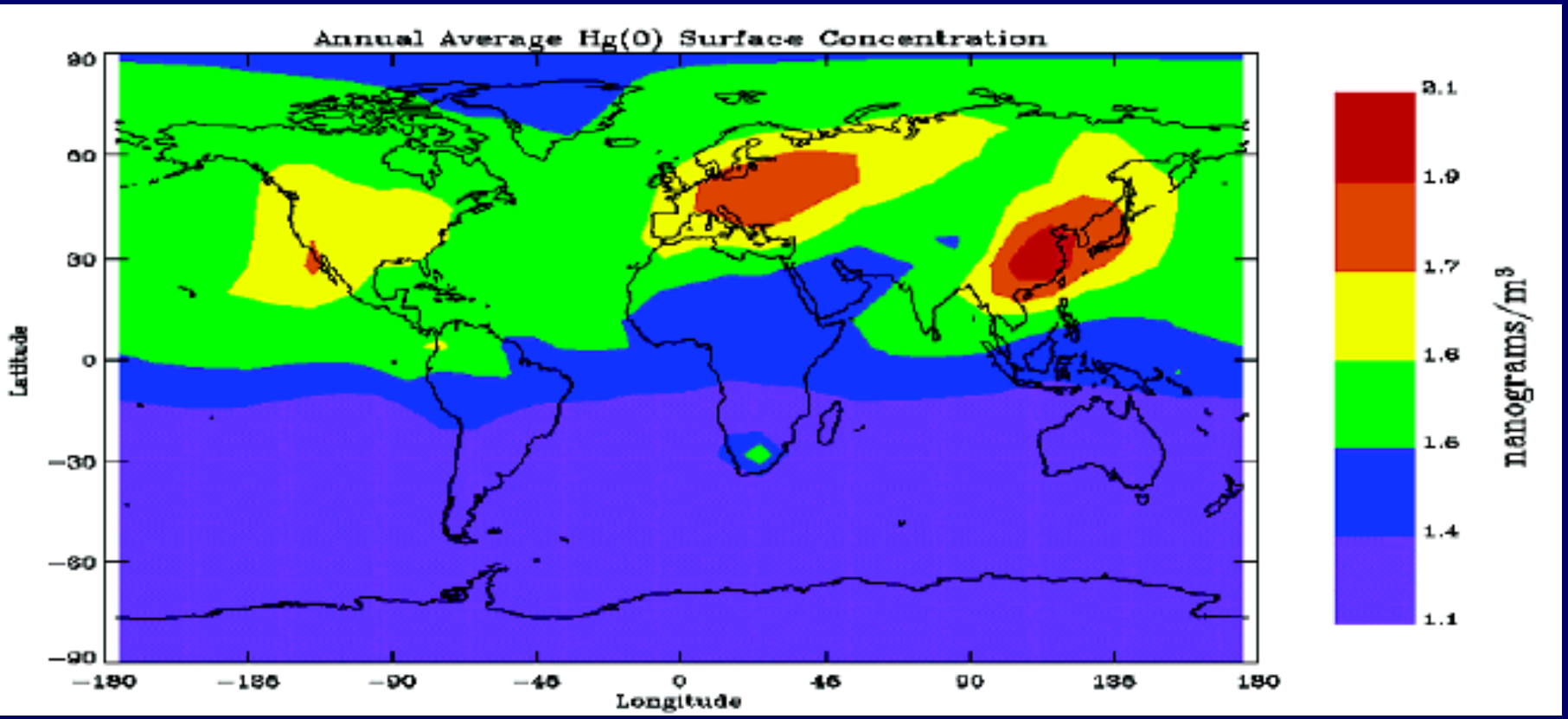


Uncertainty is still quite high, but diminishing over time (±78% in 1995; ±44% in 2003)

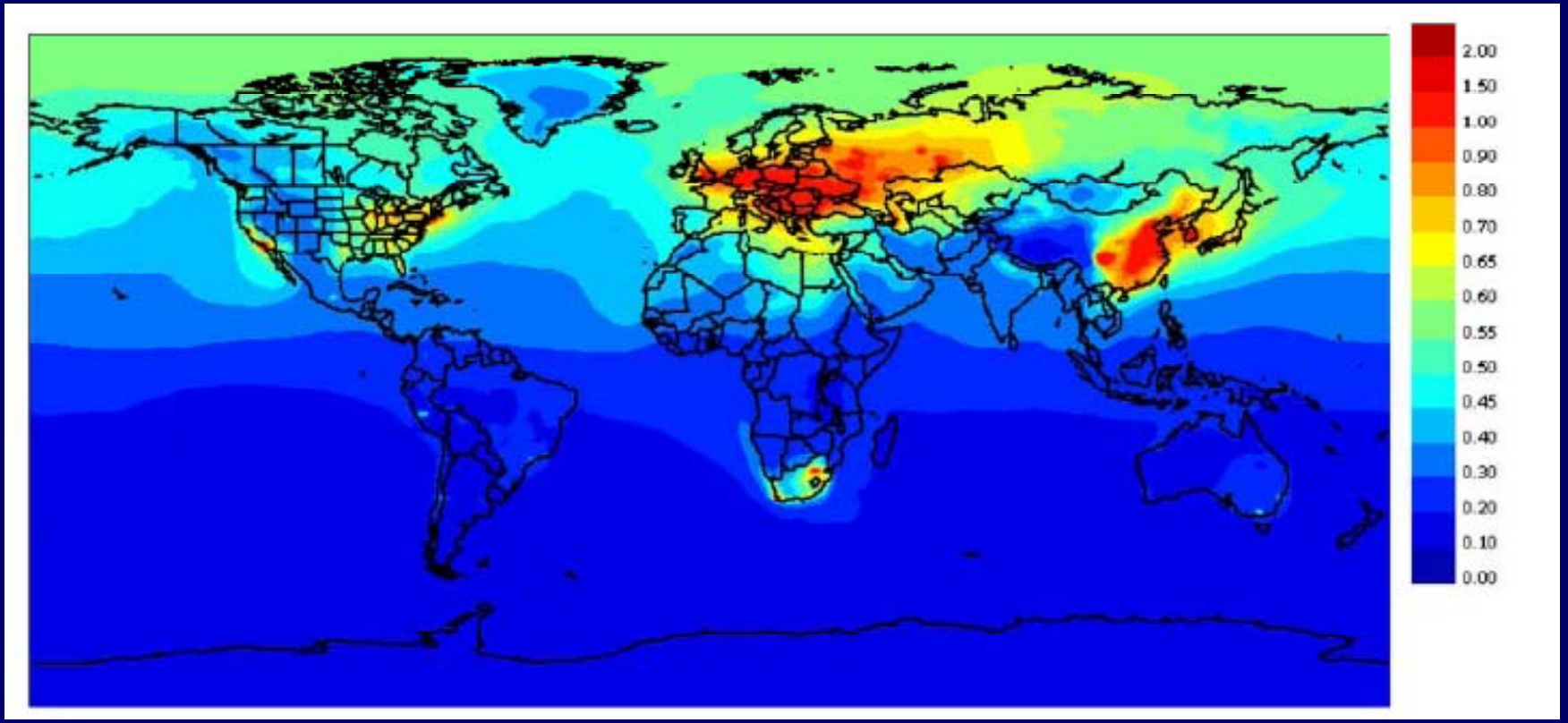




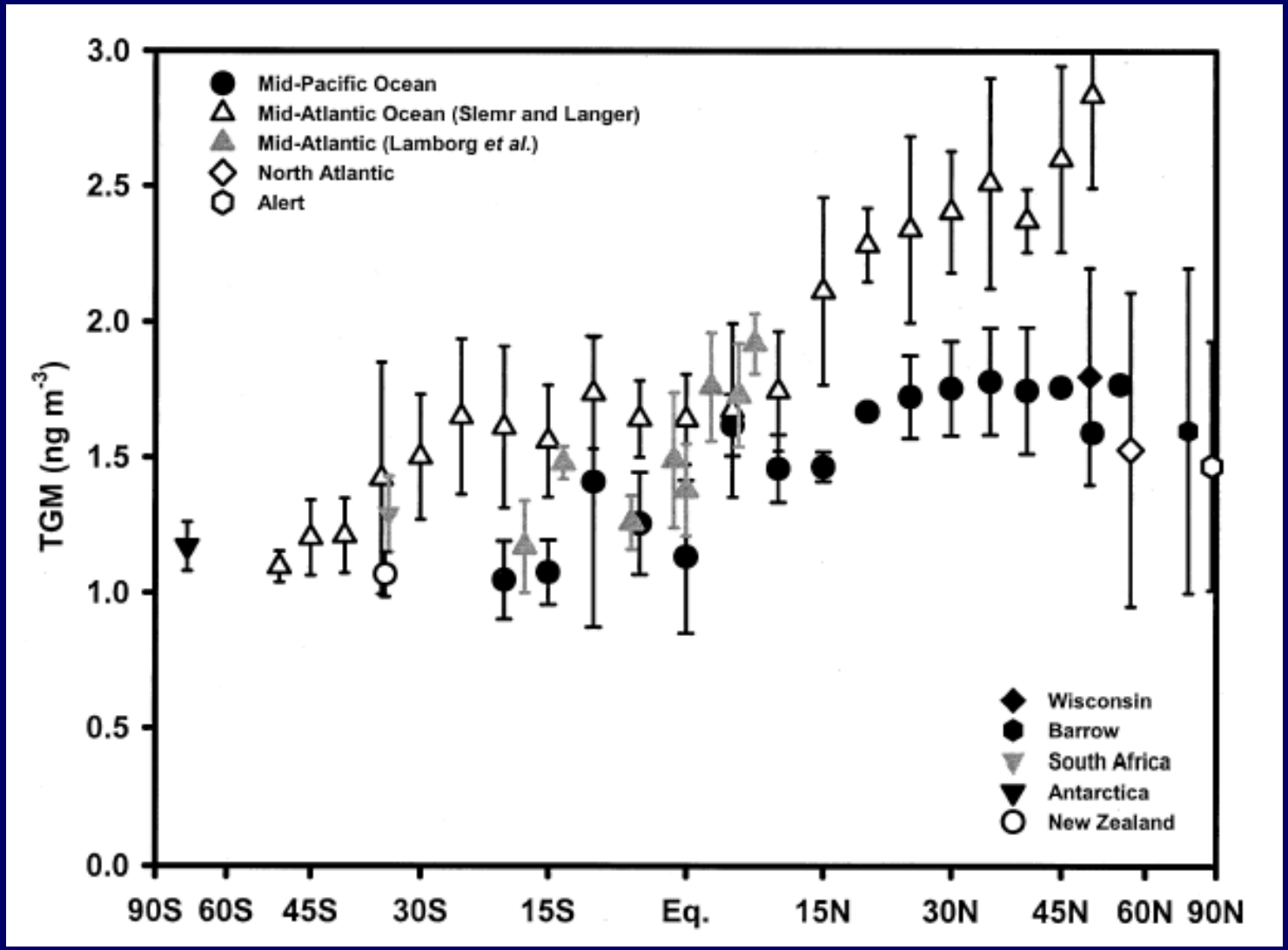
Mercury concentrations in global atmosphere (Travnikov et al., 2004)



Model simulated global annual-average surface concentrations of Hg^0 (ng m^{-3}) (Seigneur et al., 2004)



The average annual surface TGM concentrations (ng m^{-3}) (from Dastoor and Larocque, 2004)



Mercury concentrations in ambient air at different latitudes (Lamborg et al., 2002)


Changbai Mountain
Waliguan GAW station
Gongga Mountain
Guiyang
Leigong Mountain
Arkhangelsk
Warsaw
Minsk
St. Petersburg
Vienna
Moscow
Kyiv
Kharkiv
Nizhniy Novgorod
Ufa
Chelyabinsk
Omsk
Novosibirsk
Astana
Tbilisi
Baku
Rasht
Tehrān
Eşfahān
Mashhad
IRAN
Kābul
Islāmābād
Abu Dhabi
Multān
Lahore
PAKISTAN
Delhi
Masqaţ
Karāchi
Ahmadābād
Mumbai
Bombay
Arabian Sea
Chennai
Madras
Sri Jayawardenepura
Kotte
Malé
INDIAN OCEAN
Bishkek
Toshkent
Ürümqi
Kathmandu
Rājshāhi
Dhaka
Dacca
Chittagong
INDIA
MYANMAR
Yangon
Rangoon
Bay of Bengal
Bangkok
THAILAND
Nakhon Si Thammarat
Medan
Equator
Kuala Lumpur
Singapore
Kota Baharu
Bandar Seri Begawan
Phnom Penh
Ho Chi Minh City
Vientiane
LAOS
Hanoi
Yakutsk
Magadan
Petropavlovsk-Kamchatskiy
Sea of Okhotsk
Irkutsk
Chita
Khabarovsk
Ulaanbaatar
Ulan Bator
Harbin
Shenyang
Beijing
Lanzhou
Xi'an
Chengdu
Nanjing
Taiyuan
Wuhan
Chongqing
Kunming
Shanghai
Ningbo
Taipei
Kaohsiung
Hong Kong
Seoul
Daegu
P'yŏngyang
Mokpo
Jeju
Sapporo
Tokyo
Ch'ŏngjin
Manila
Koror
Davao
Kota Kinabalu
SUNDA ISLANDS
INDONESIA
NEW GUINEA
MICRONESIA
PHILIPPINES
PACIFIC OCEAN
South China Sea
Bering Sea
Tropic of Cancer
RUSSIA
EVENKI
TAYMYR
KOMI
KIRGIZ STEPPE
KAZAKHSTAN
EUROPE
TOMSK
IRKUTSK
AMUR
TUVA
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MONGOLIA
ASIA
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Lena
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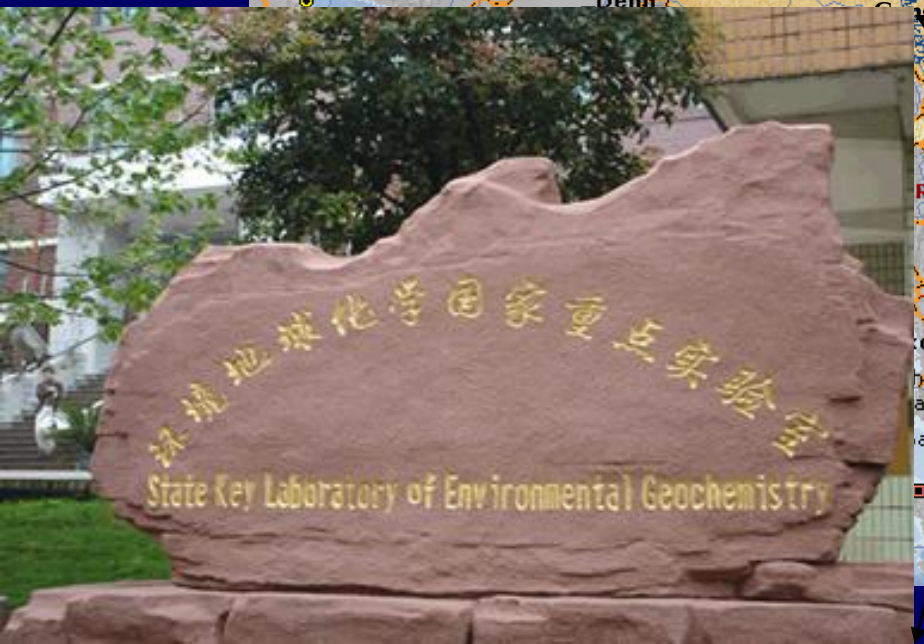
Guiyag is the capital of Guizhou province, with a population of 3.5 million. It is one of cities with acid rain problems in China due to coal combustion emissions.

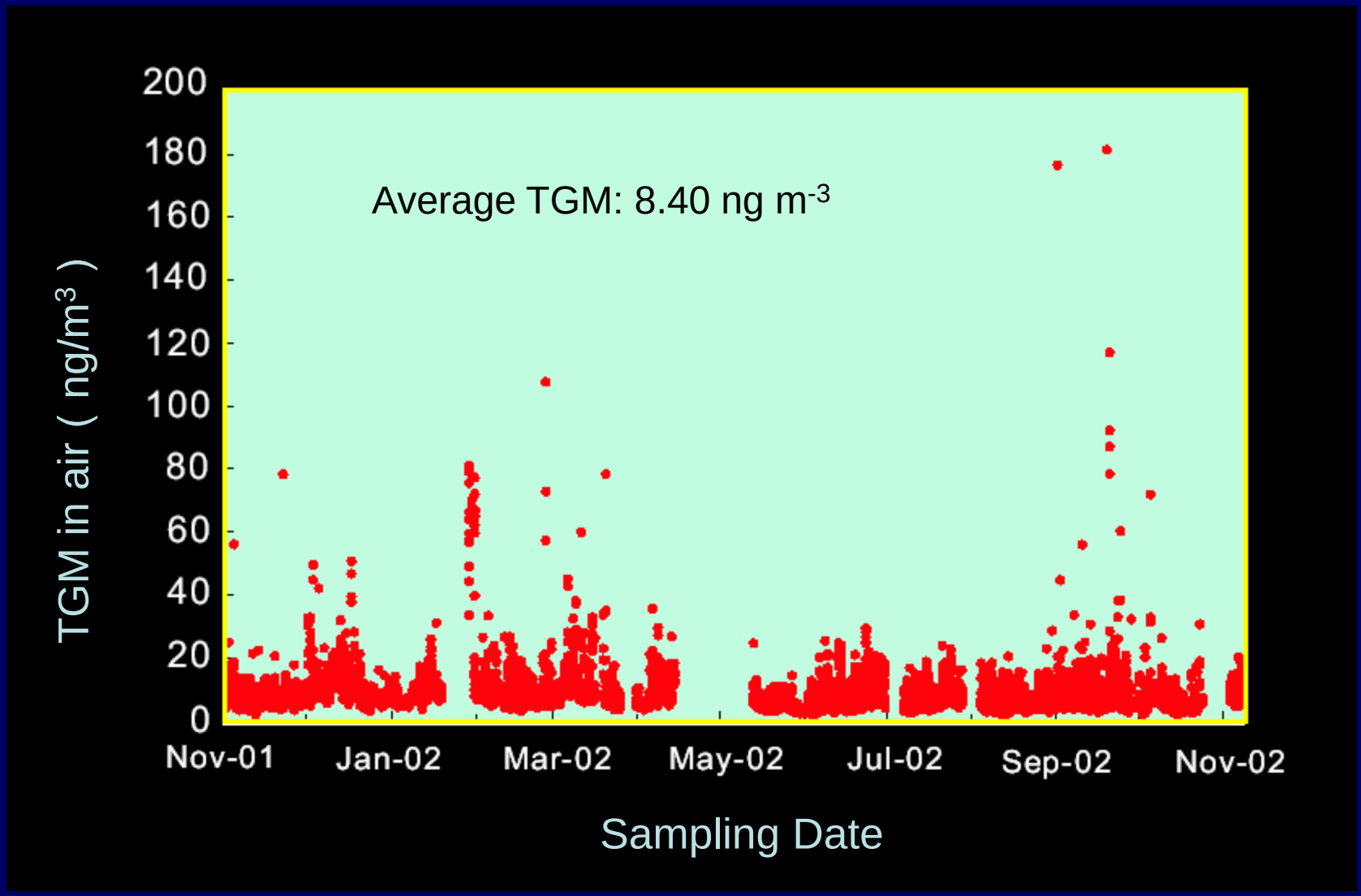


Mt. Gongga is situated on the Quaternary sections of the eastern Qinghai-Tibet Plateau and its transit zone to the Sichuan province, and is the highest mountain in Sichuan province with the summit of 7556m above sea level. The sampling site is located at the alpine ecosystem observation and experiment station (1640m a.s.l.), which is also one of the background air pollutant monitoring stations operated by Chinese Academy of Sciences.

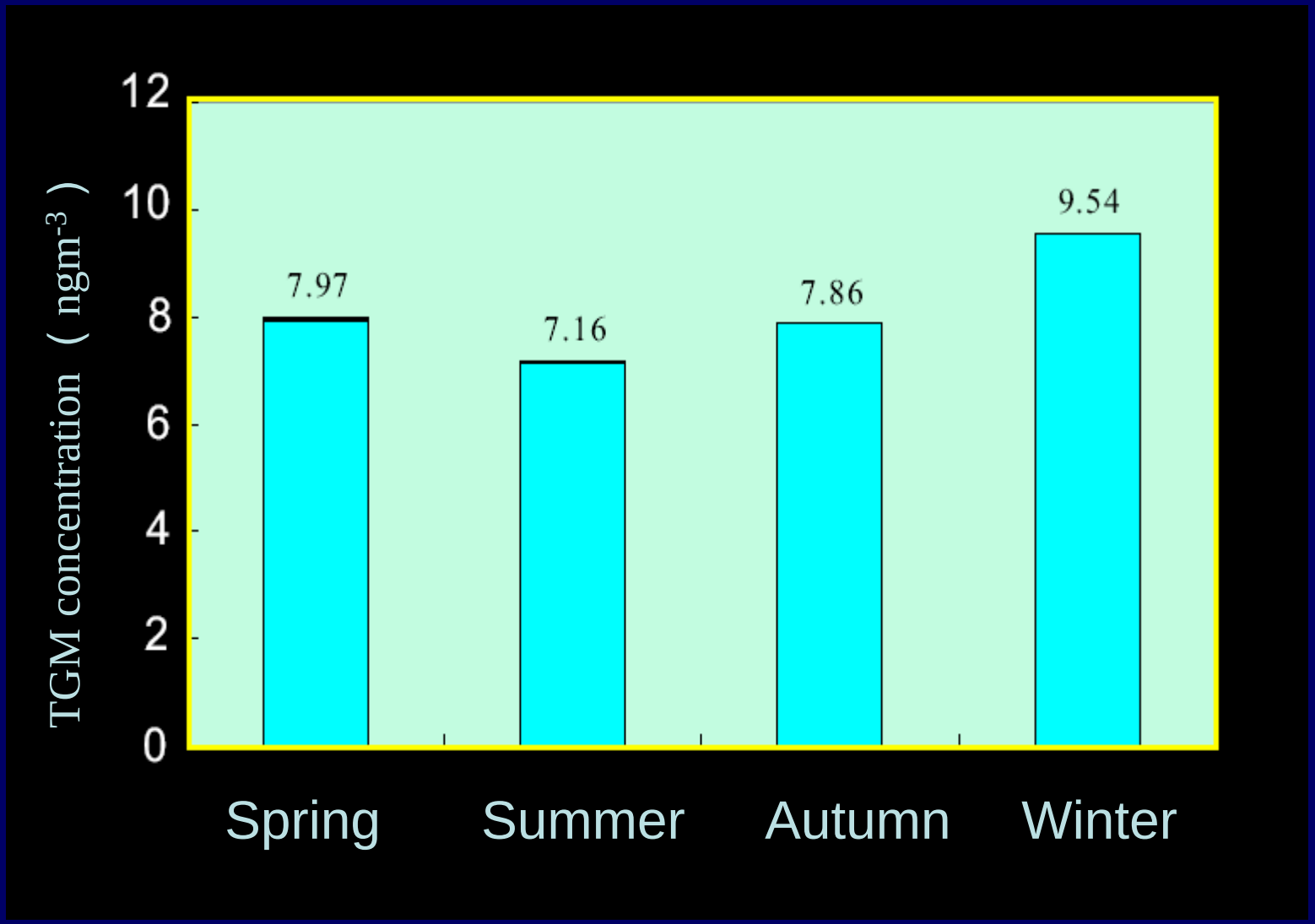
The sampling site was located in the Open Research Station of Changbai Mountain Forest Ecosystems (128°28'E, 42°24'N, 763 m a.s.l.), Chinese Academy of Sciences (CAS). The station is also one of the background air pollutant monitoring stations operated by Chinese Academy of Sciences.

Leigong Mountain station situated in Southeastern Guizhou is one of the regional background sites for acid rain study, which is located at the summit of the mountain with 2178.8 m a.s.l.

Waliguan station is one of 22 Global Atmosphere Watch (GAW) stations, which located on the summit of the mountain with elevation of 3810 m a.s.l.

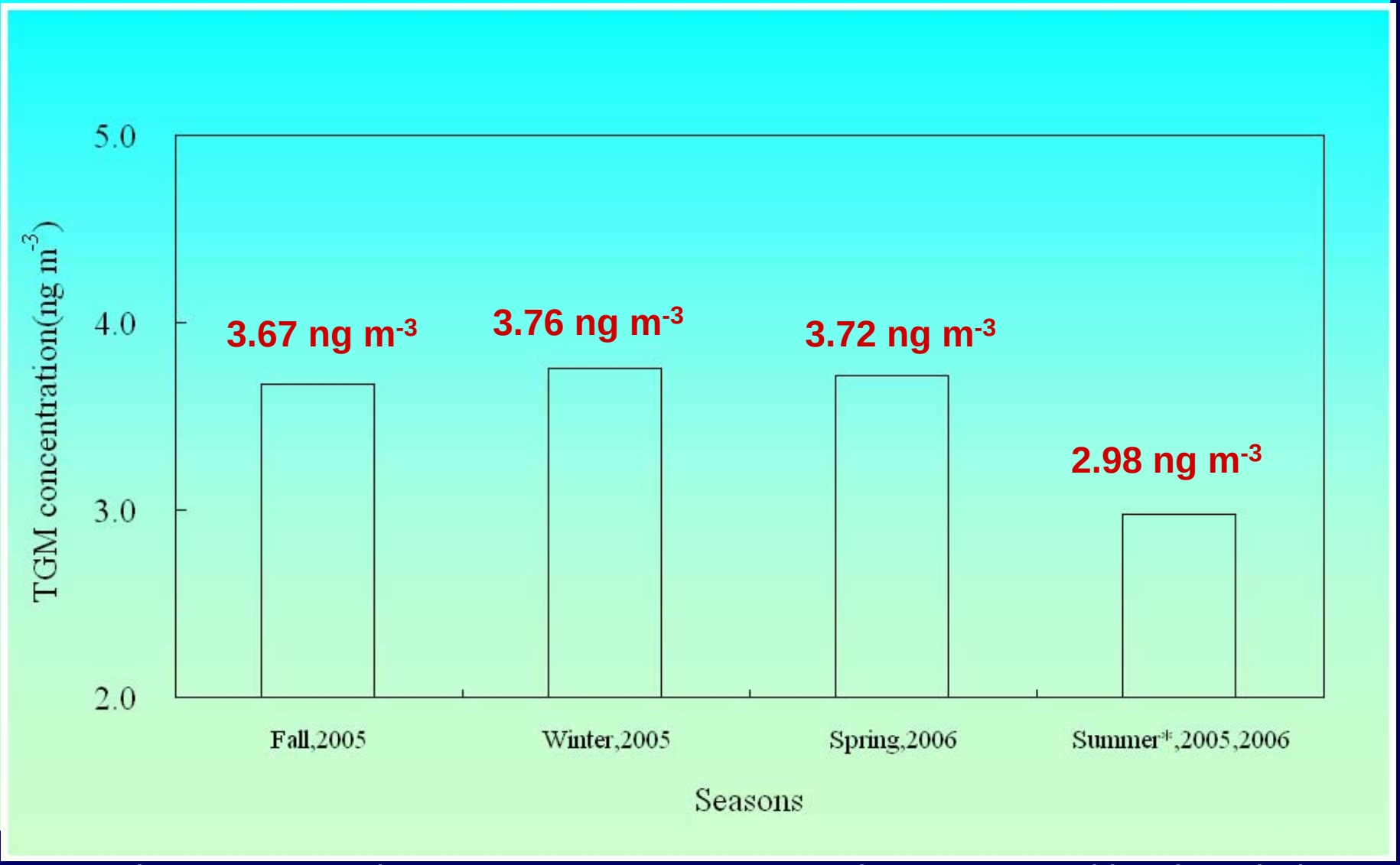


High temporal resolved TGM data in ambient air in Guiyang (Feng et al., JGR, 2004)

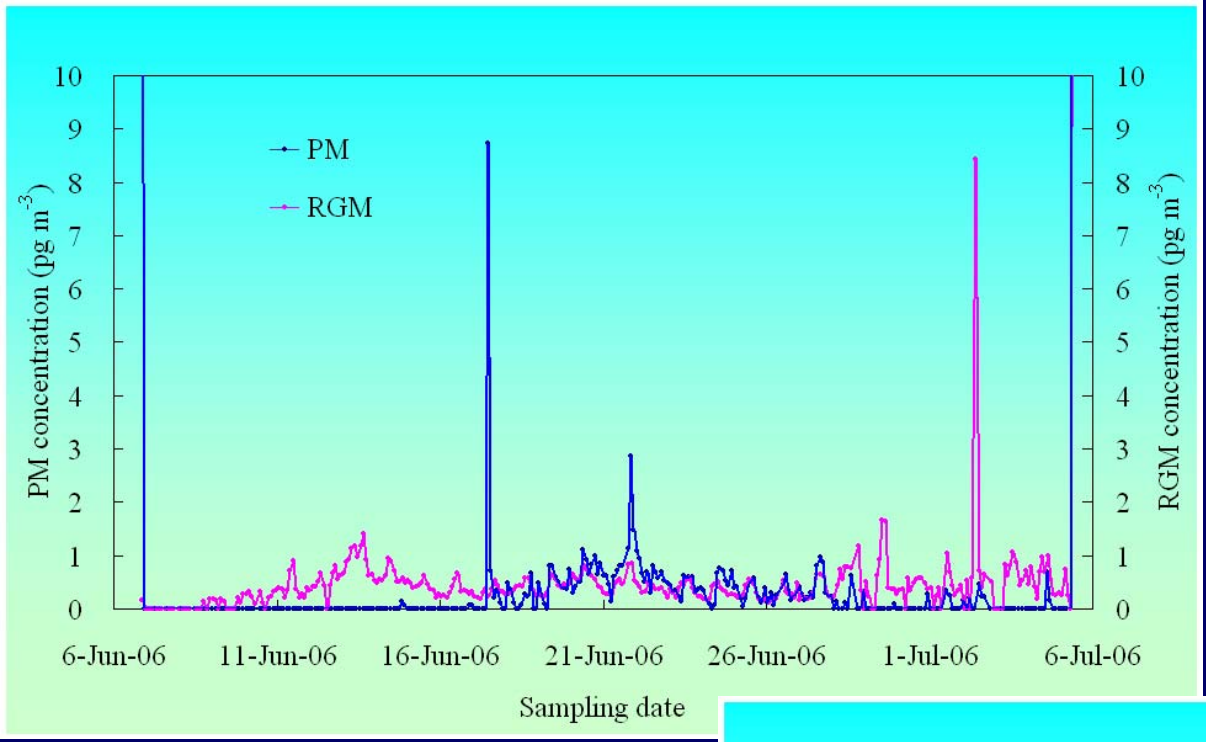


Seasonal variation of TGM in ambient air of Guiyang

(Feng et al., JGR, 2004)

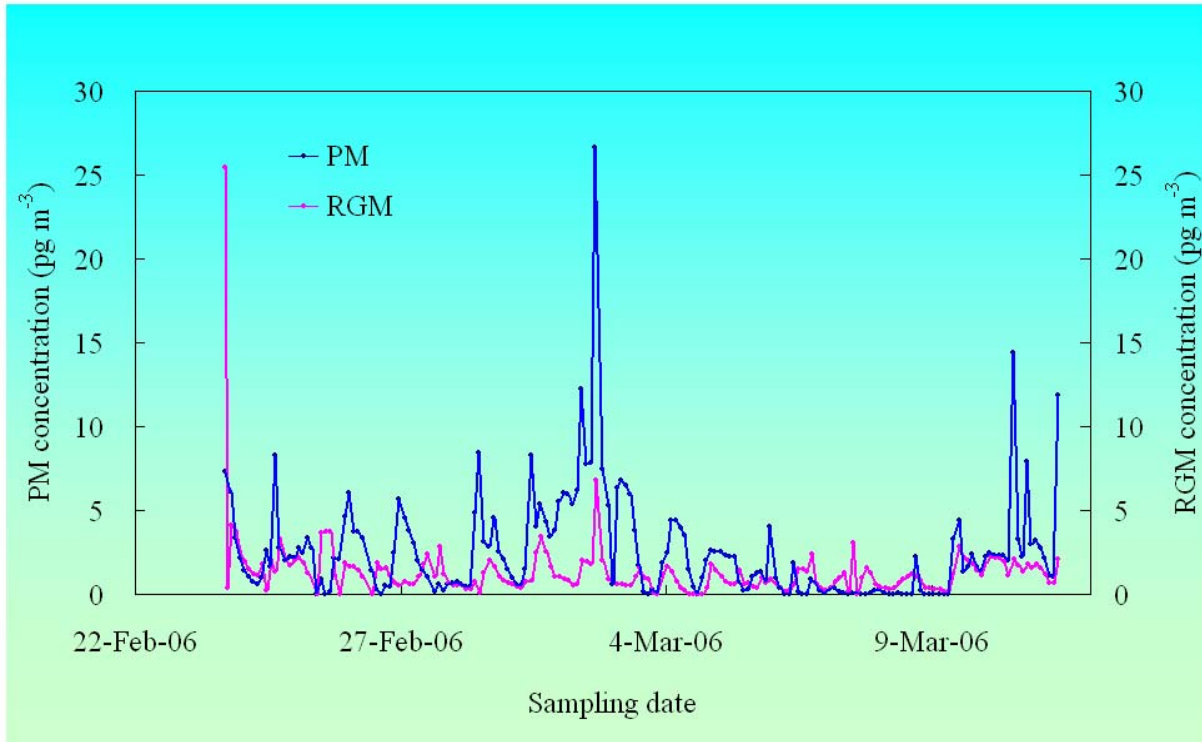


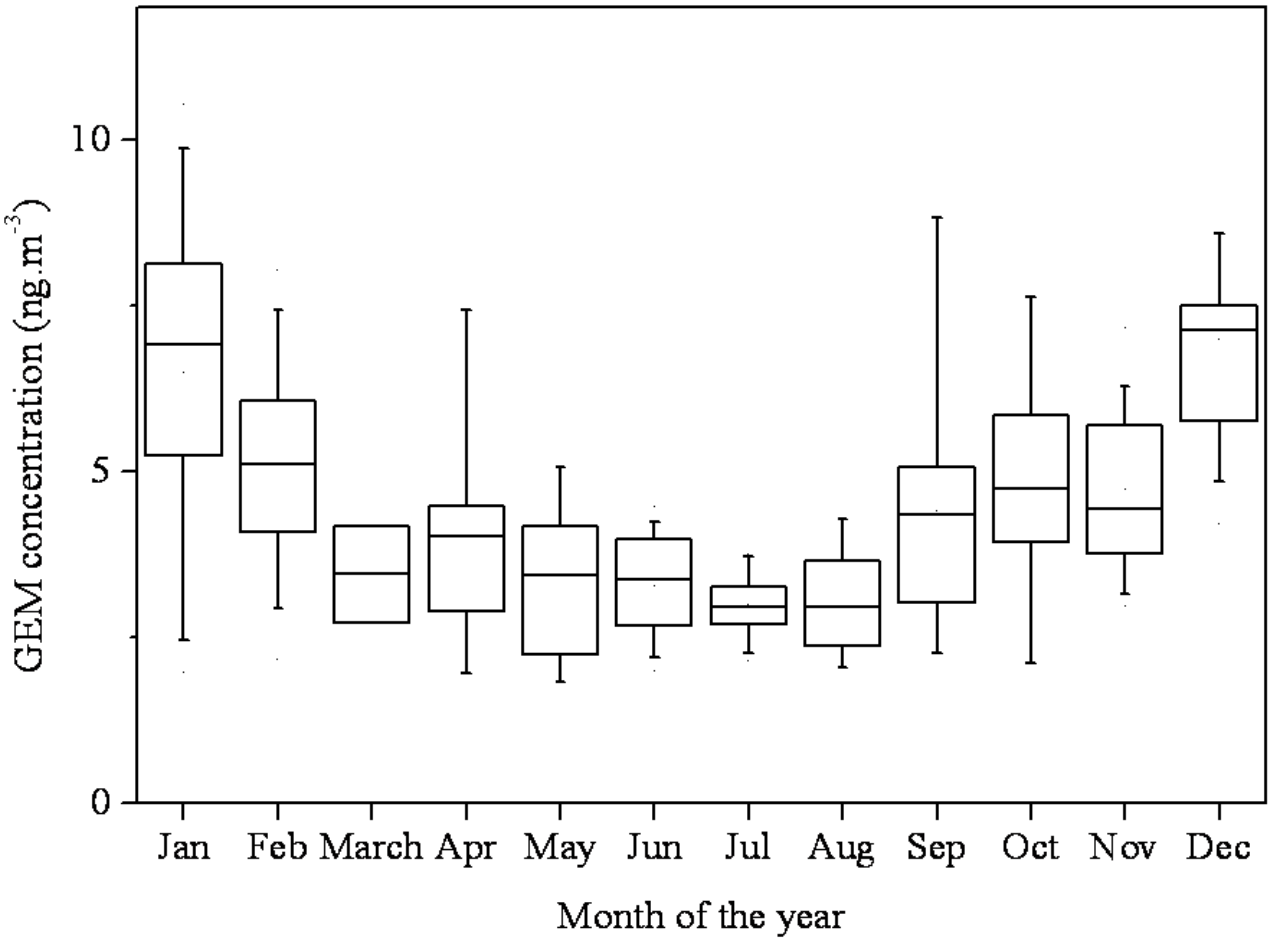
Hourly average total gaseous mercury concentrations measured in Changbai Mountain area in southwestern China (Wan et al., ER, 2009)



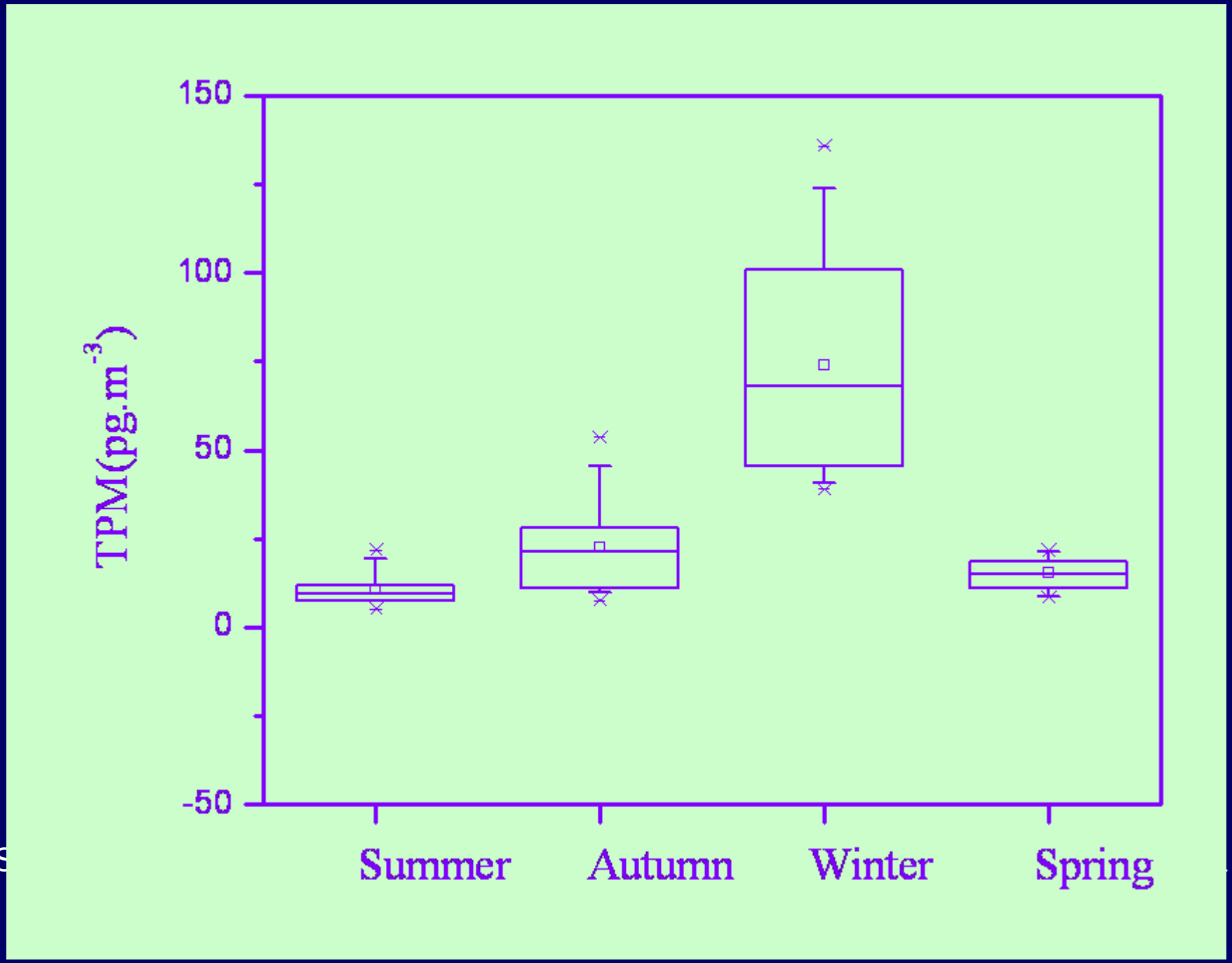
PM and RGM measured in warm season in Changba Mountain site

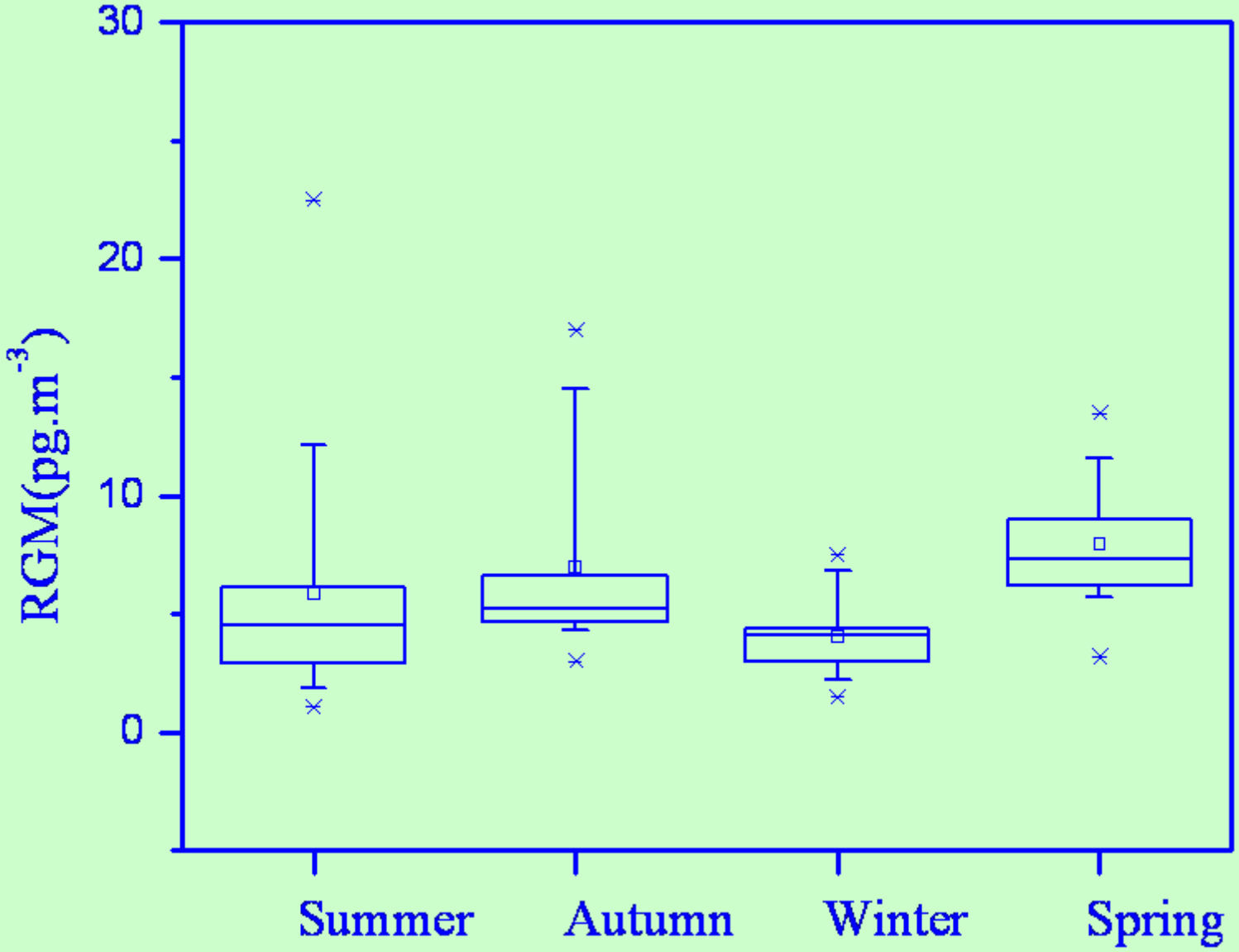
PM and RGM measured in cold season in Changba Mountain site

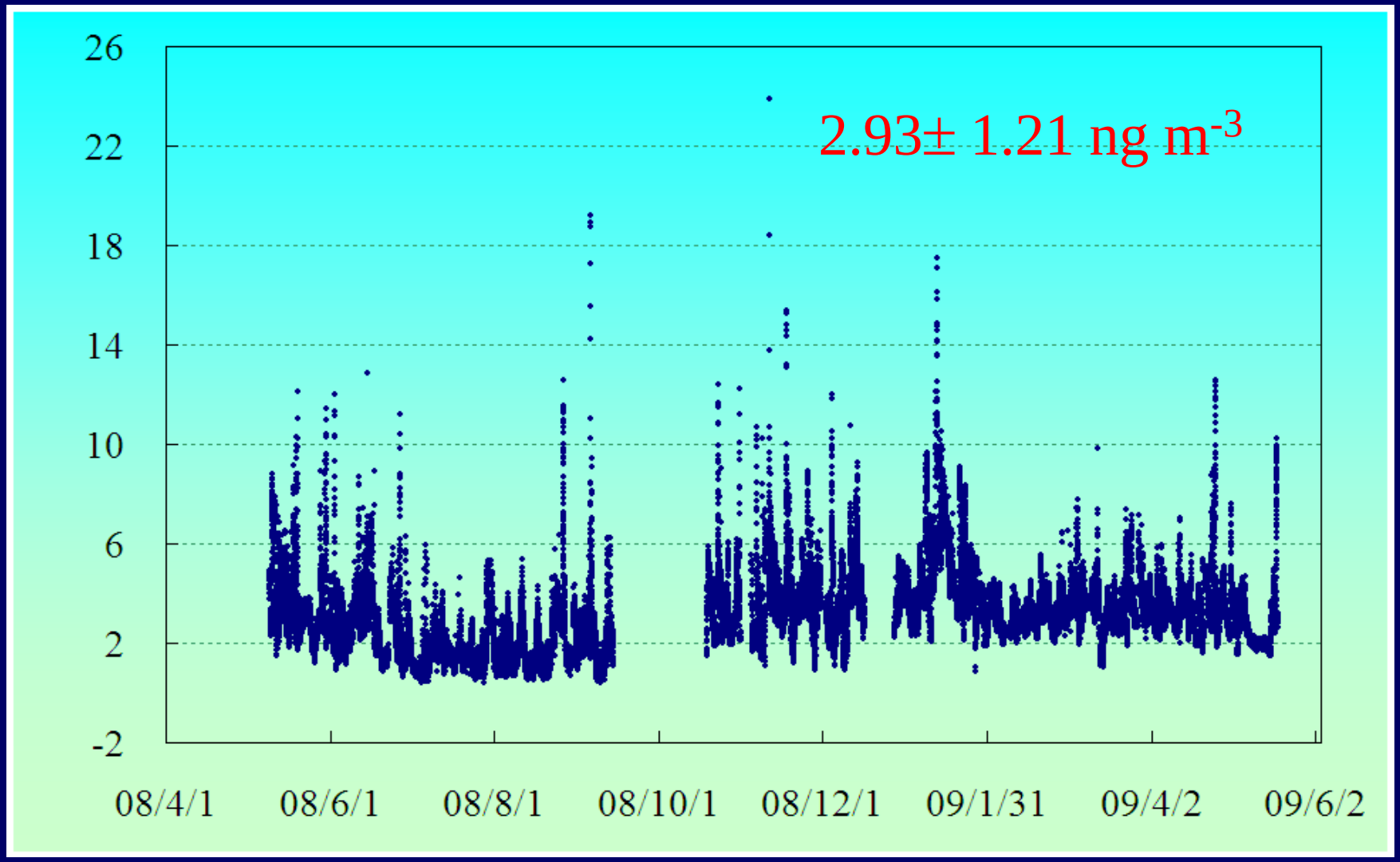




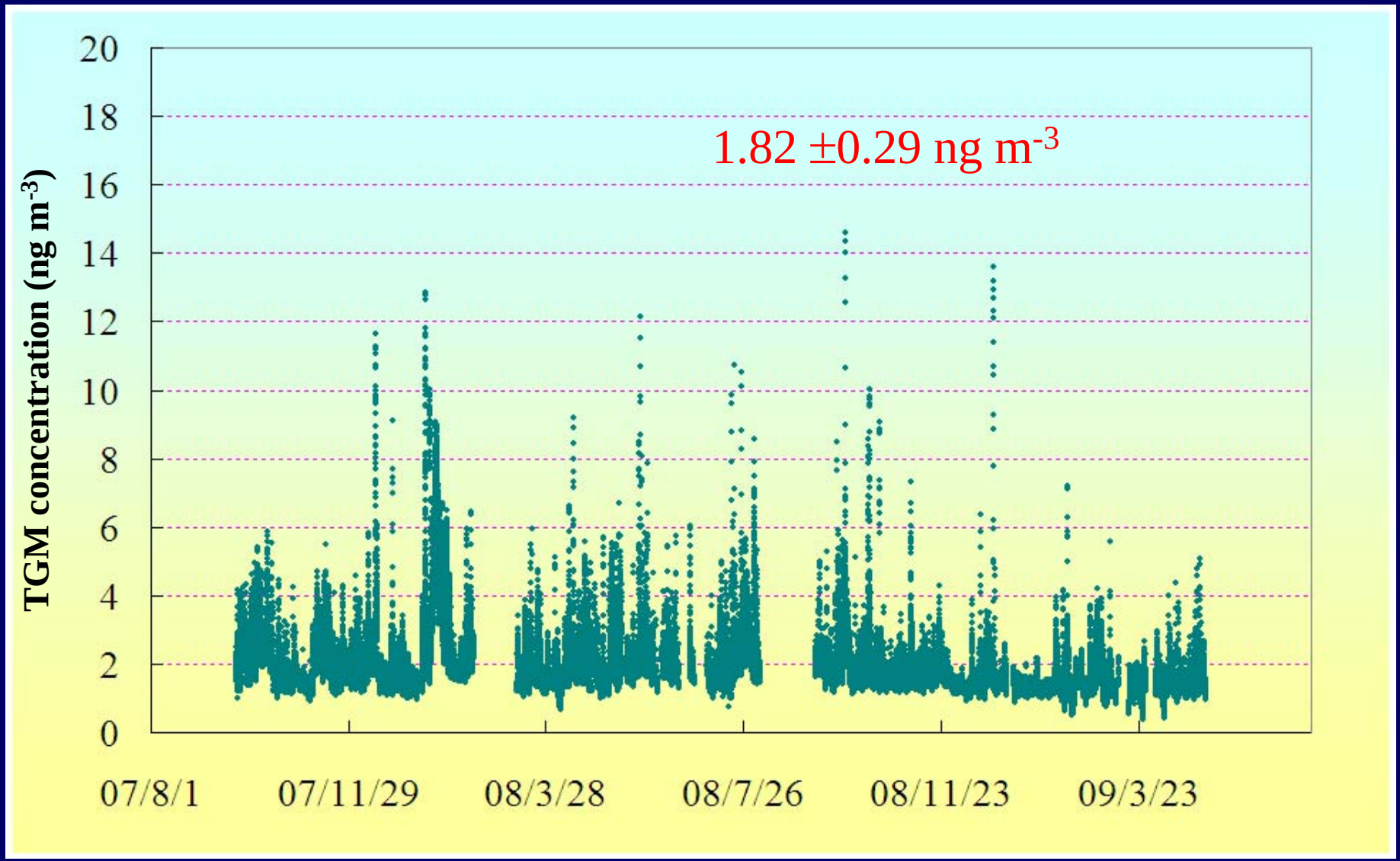
Hourly average total gaseous mercury concentrations measured in Gongga Mountain area in southwestern China (Fu et al., 2008a)


150
100
50
0
-50
TPM(pg.m-3)
Summer
Autumn
Winter
Spring


30
20
10
0
RGM(pg.m-3)
Summer
Autumn
Winter
Spring



Total gaseous mercury concentrations in ambient air at Leigong Mountain site (May 2008- May 2009)



Total gaseous mercury distribution (hourly averaged) in ambient air at Waliguan GAW station (Sept 2007- now) (Feng et al., unpublished data)

Main Conclusions

- **With rapid economic development, the anthropogenic mercury emissions in China is increasing though there are large uncertainties associated with current estimate of mercury emissions in China.**
- **Total gaseous mercury concentrations in ambient air at both urban and remote areas in China are elevated compared to the values reported in remote areas in North America and Europe.**

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