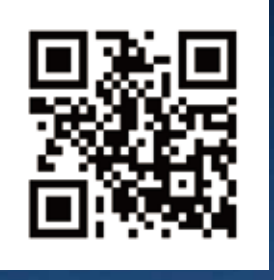
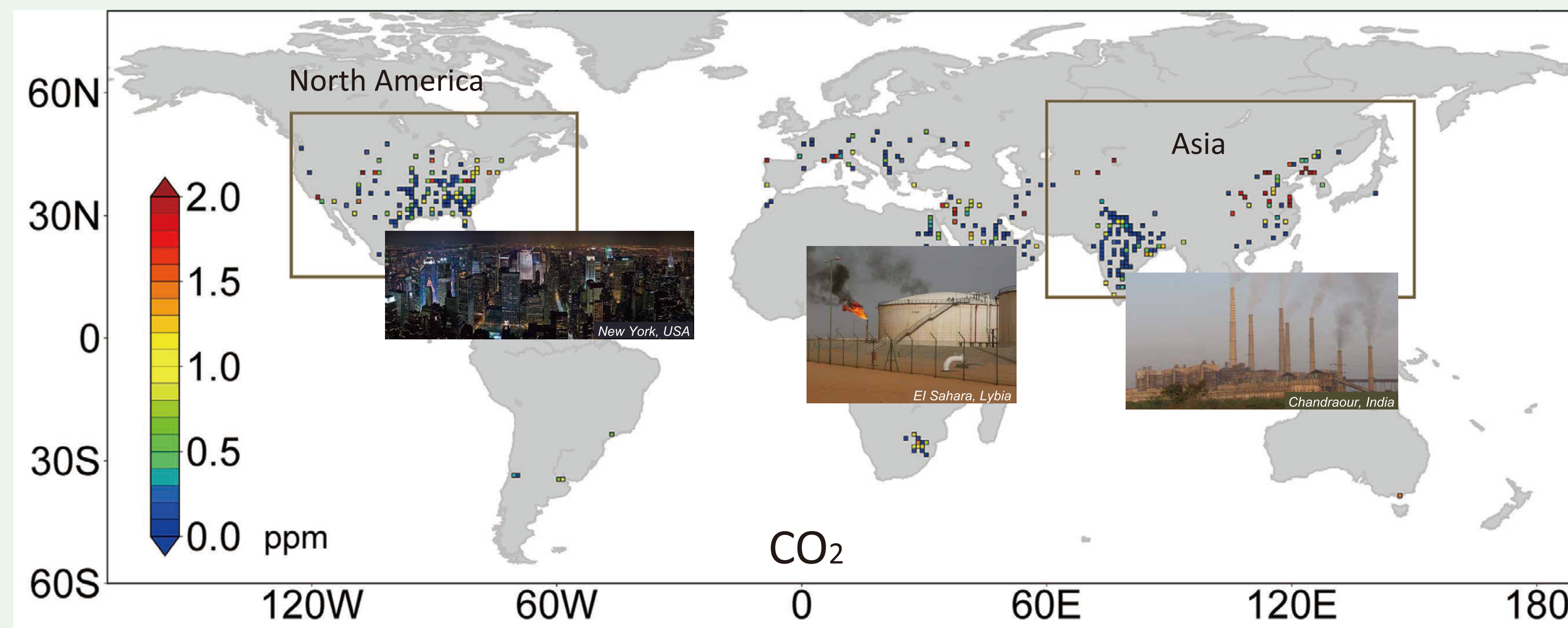


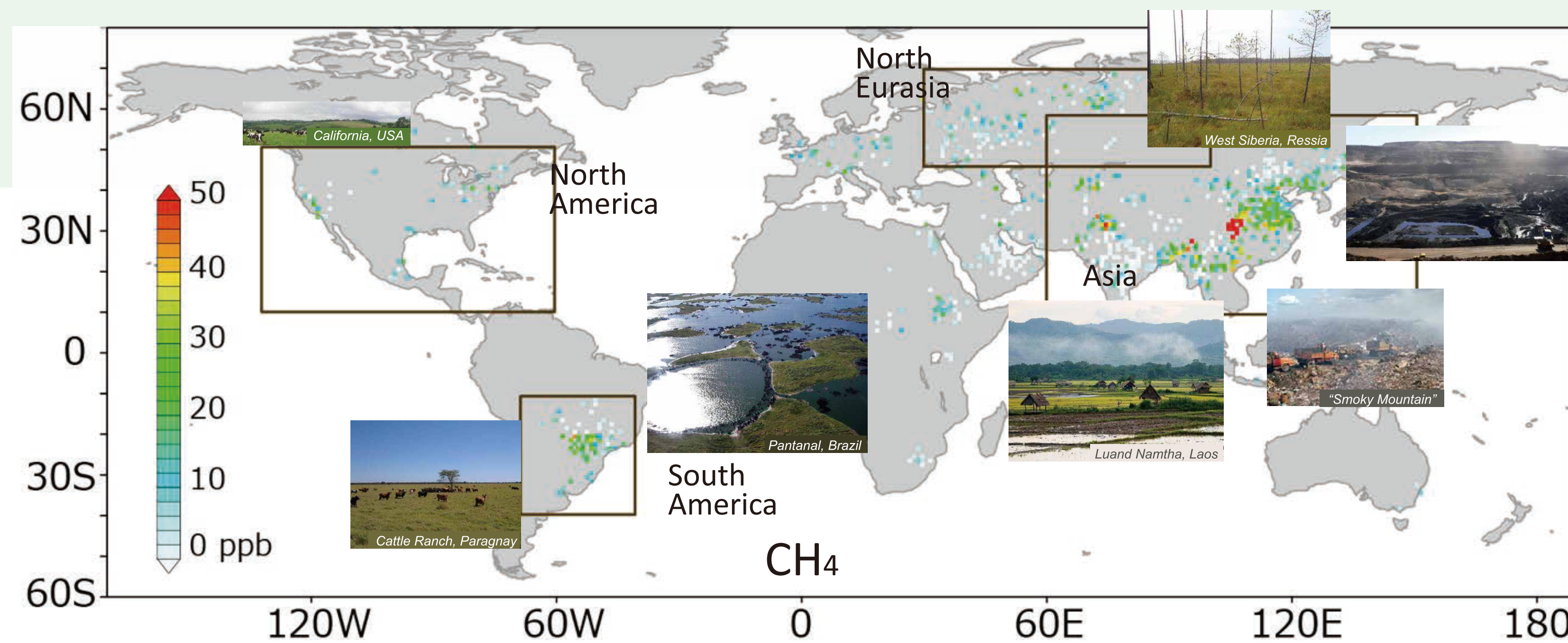
# GLOBAL GHG OBSERVATION from SPACE



## GOSAT to Detect Anthropogenic CO<sub>2</sub> and CH<sub>4</sub> Emissions



CO<sub>2</sub> concentration was analyzed for 5.5 years from June 2009 to December 2014, CH<sub>4</sub> for 3.5 years from June 2009 to December 2012 based on GOSAT data. CO<sub>2</sub> increases in mega-cities and energy industry areas, and CH<sub>4</sub> in densely populated, intense farming, or oil/natural gas producing areas, have the tendency for higher concentrations than those in their surroundings. The study demonstrates the potential utility of monitoring anthropogenic emissions\*\* of these greenhouse gases from space.



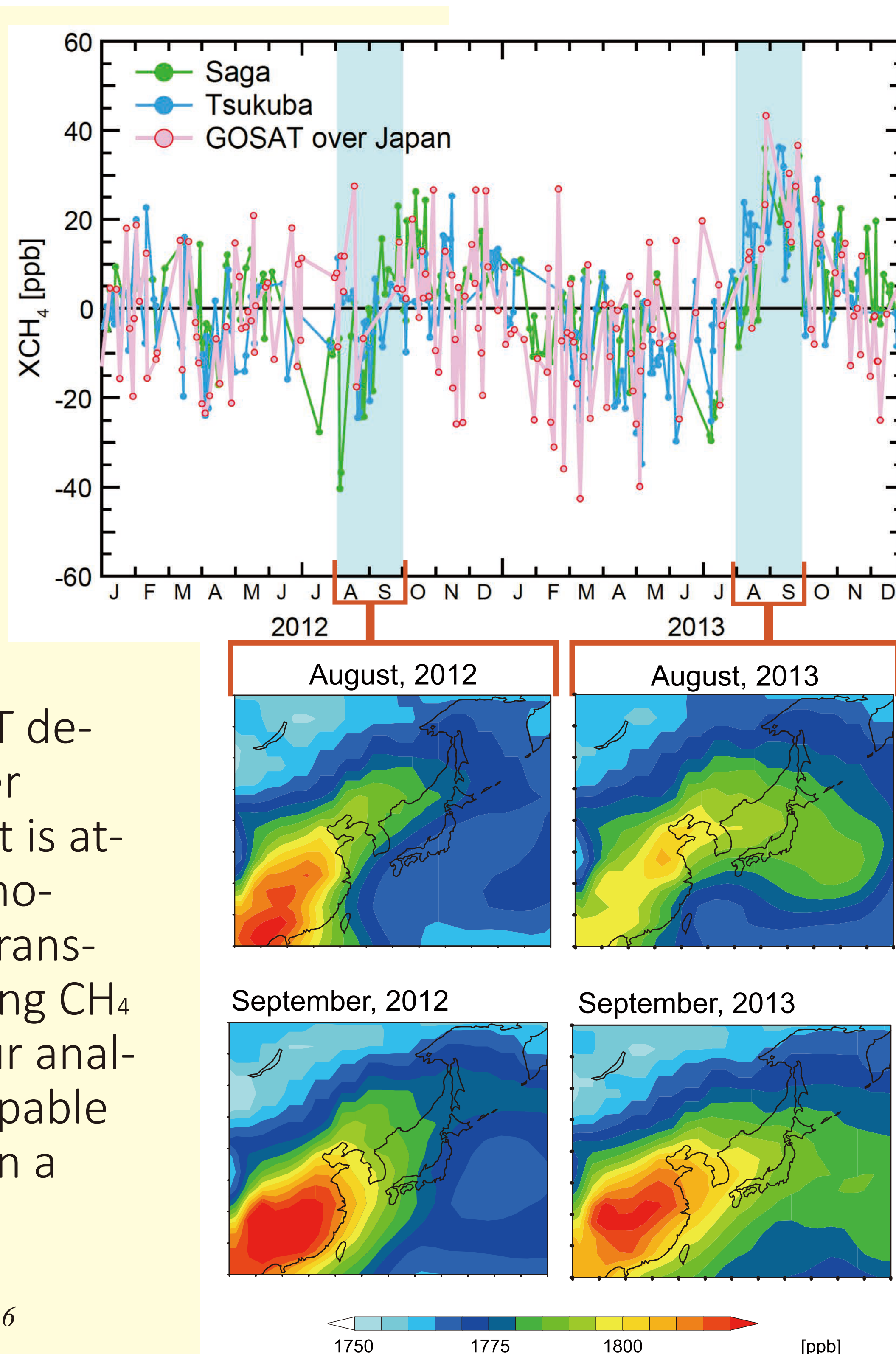
\*\* Higher CO<sub>2</sub> concentration is found at China: Zhangjiakou, Anshan, Harbin, and Tianjin; India: Kolkata; Eastern part of Uzbekistan; Southern edge of Kazakhstan; Eastern area of Kyrgyzstan; Northern edge of Tajikistan; Northwestern part of Saudi Arabia; Jordan; US: Pittsburg, Los Angeles; Mexico: Acapulco. Higher CH<sub>4</sub> concentration is found at China: Chengdu, Chongqing; India: Kolkata, Meghalaya; Bangladesh: Dacca; Pakistan: Lahore; US: Pittsburg, New York, Los Angeles; Brazil: Campo Cerrado, Pantanal; Russia: Surgut.

\* Photo by David Iiff; Javier Blas; Sndhansha; Ninabalkar; Cgoodwin; NASA; Alice Yo; Peter V; Takas Bahay.

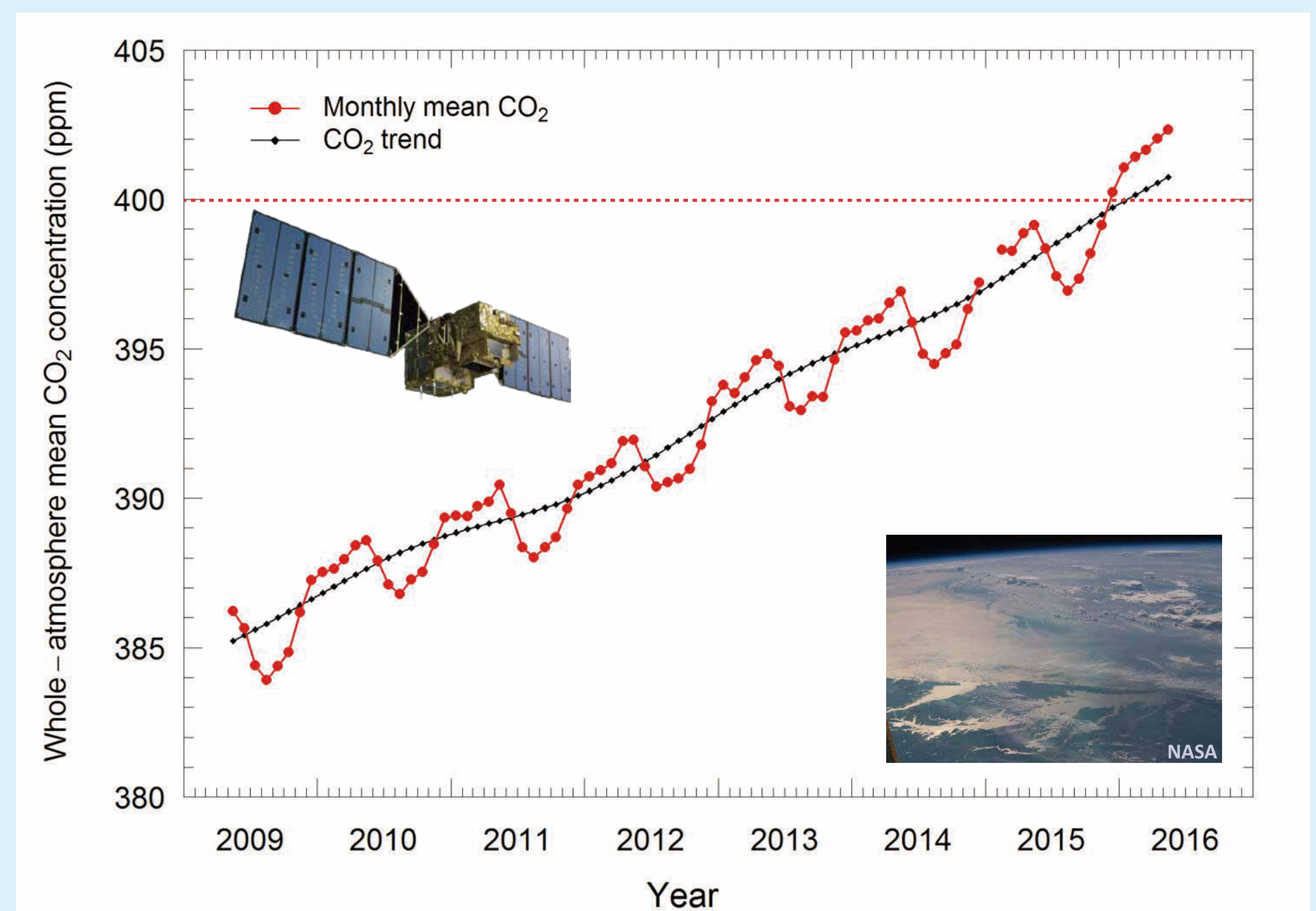
## Large XCH<sub>4</sub> anomaly in summer 2013 over Northeast Asia observed by GOSAT

In the Summer of 2013, GOSAT detected large XCH<sub>4</sub> anomaly over Japan. The extreme XCH<sub>4</sub> event is attributed to the anomalous atmosphere pressure pattern that transported a CH<sub>4</sub>-rich air from strong CH<sub>4</sub> source areas in East China. Our analysis demonstrates GOSAT is capable of monitoring an XCH<sub>4</sub> event on a synoptic scale.

Ishizawa et al. Atmos. Chem. Phys., 16,9149-9161,2016



## Whole-atmosphere Monthly Mean CO<sub>2</sub> Concentration by GOSAT



The whole-atmosphere mean CO<sub>2</sub> concentration was calculated based on GOSAT data, covering from the surface to the top of the atmosphere (70km above the surface), for more than 7 years after May 2009. Monthly mean CO<sub>2</sub> concentration reached 402.3 ppm in May 2016, and CO<sub>2</sub> trend\* reached 400.2ppm in February 2016 (seasonal fluctuations subtracted).

\* The values constituting the black line show the average of 1 – 2 years.