

# Atmospheric greenhouse gas studies in North Eurasia at NIES

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[www.nies.go.jp](http://www.nies.go.jp)

# Outline

- NEESPI related research programs in NIES
  - Top-down atmospheric observations and modeling
  - Bottom-up – surface flux observations and inventories
  - GOSAT – greenhouse gas observing satellite

## Researchers/groups working on GHG in N.Eurasia

### CGER, Climate Change Research Program (Y.Sasano)

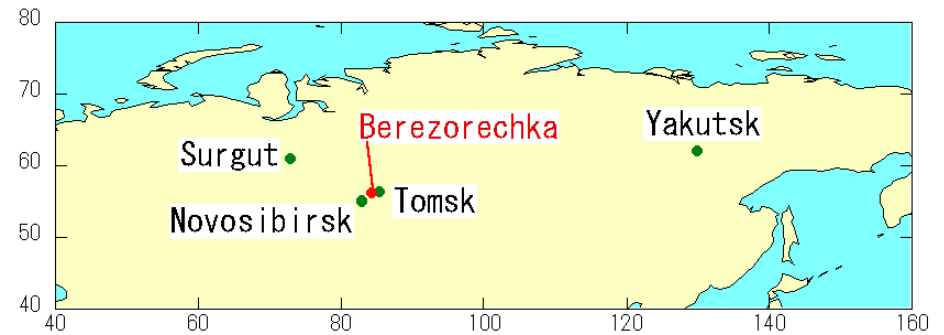
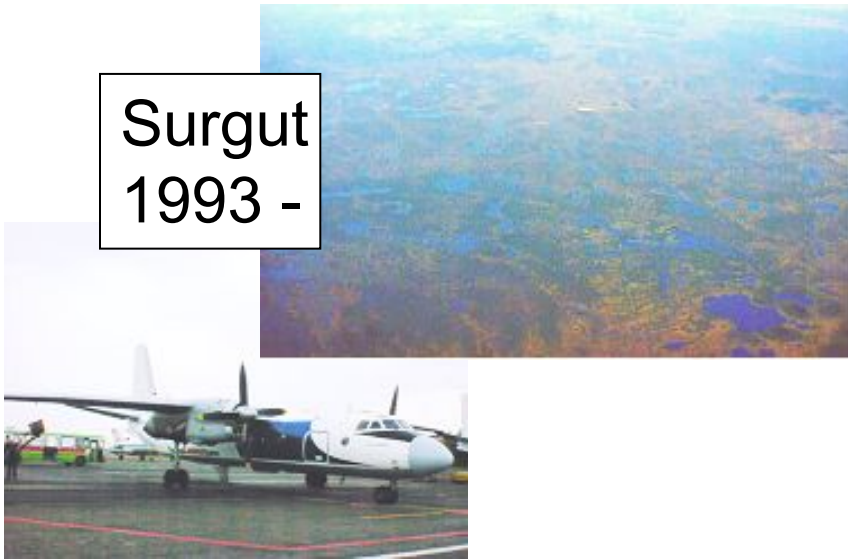
- Atmospheric monitoring program – T. Machida
- Terrestrial ecosystem monitoring – N. Liang
- Modeling – S. Maksyutov (atmospheric CO<sub>2</sub> inversion),  
A. Ito (terrestrial ecosystems)
- GOSAT (GHG observing satellite) – T. Yokota, S.  
Maksyutov

### Asian Environment Research Program (H.Nakano)

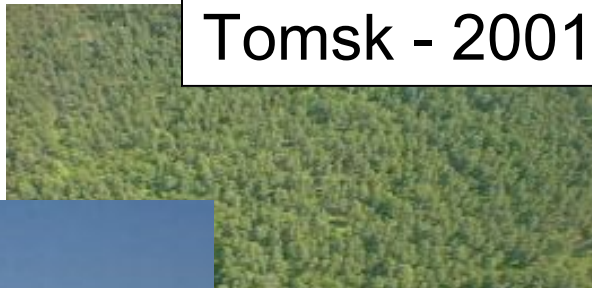
- Atmospheric chemistry (East Asia) – T. Ohara
- Hydrology & vegetation model – T.Nakayama

# Atmospheric monitoring: airborne air sampling and analysis

Surgut  
1993 -



Tomsk - 2001



Novosibirsk-1997



Yakutsk-1998



# Atmospheric GHG monitoring: towers



**Igrim (IGR)**  
 (63°12'N, 64°24'E)  
 47m, 24m



**Noyabrsk (NOY)**  
 (63°26'N, 76°46'E)  
 43m, 21m



**Yakutsk**



**Demyanskoe (DEM)**  
 (59°47'N, 76°52'E)  
 63m, 45m



**Parabel (PRB)**  
 (58°15'N, 82°24'E)  
 67m, 35m



**Berezorechka (BRZ)**  
 (56°09'N, 84°20'E)  
 80m, 40m, 20m, 5m

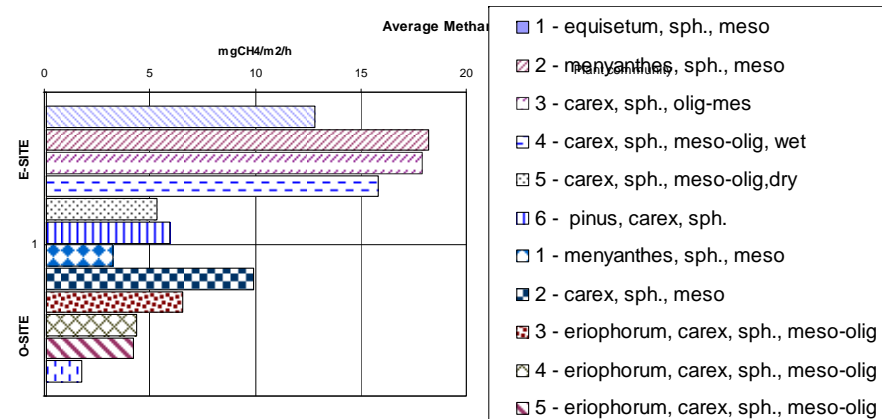
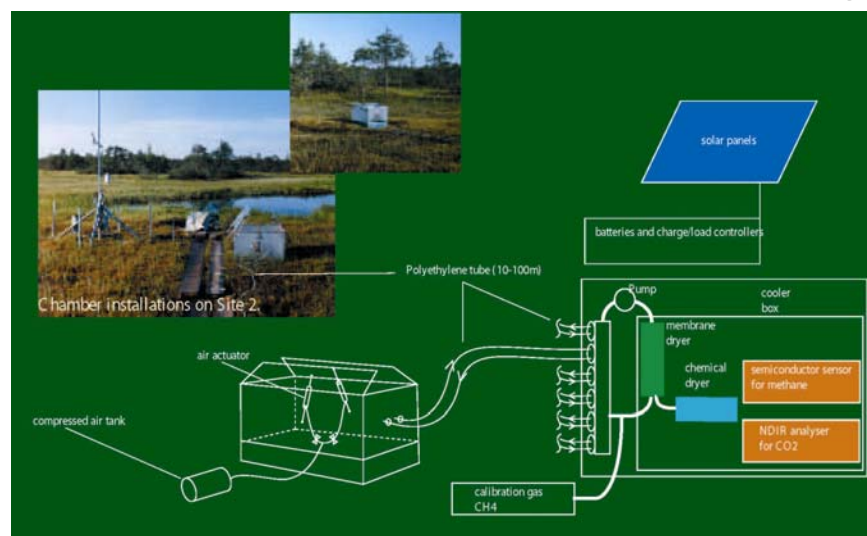


**Yakutsk (YAK)**  
 (62°50'N, 129°1'E)  
 70m, 11m

- Before 2007
- From 2007
- European proj.

## Bottom up: surface flux monitoring with automatic flux chambers

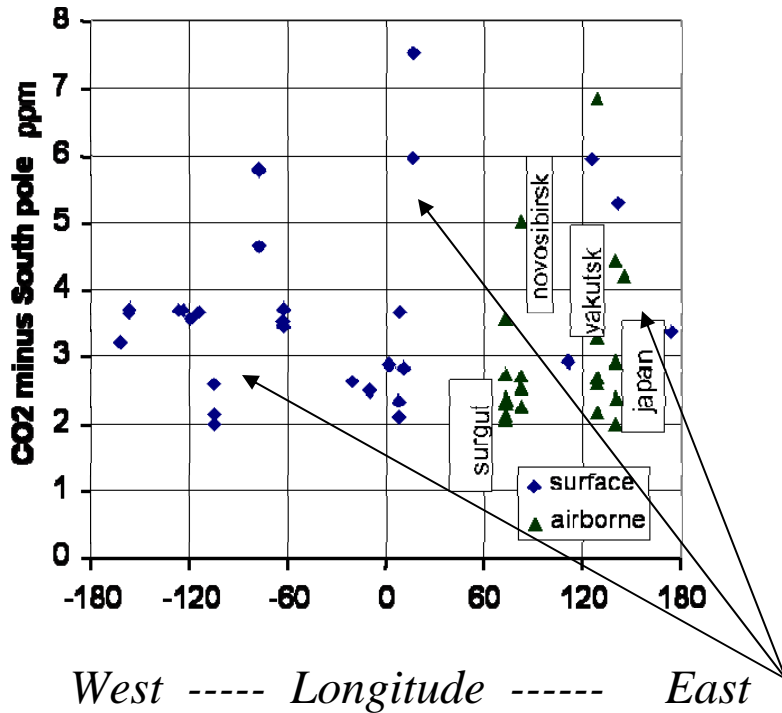
- Started by G. Inoue in West Siberian wetland
- Expanded into E. Asia by N.Liang



- Wetland CO<sub>2</sub> fluxes with eddy correlation (K.Shimoyama and G. Inoue)
- Bottom up inventories of the biomass, productivity and fluxes (A. Peregon)

# Atmospheric CO2 modeling: inverse model of regional CO2 fluxes

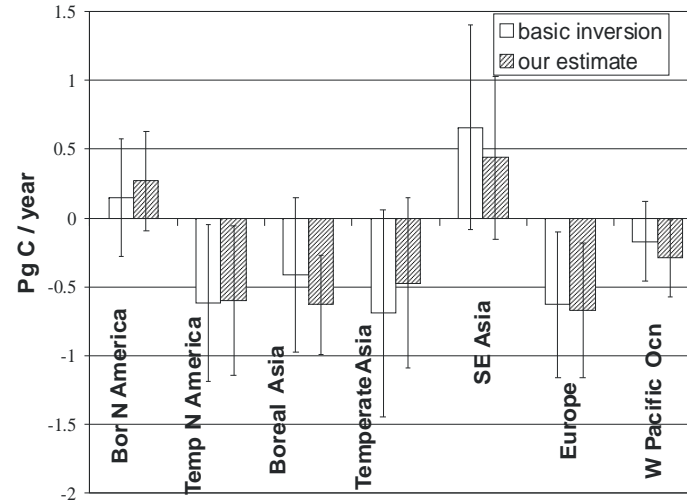
Annual mean CO2 concentration.



**Higher CO2 over emitting regions:  
N.America, Europe, East Asia**



*Gurney et al Nature 2002*



Effect of Siberian observations on regional fluxes

# GOSAT Greenhouse Gases Observing Satellite

Joint effort by:

JAXA

Ministry of Environment

NIES

Coordination:

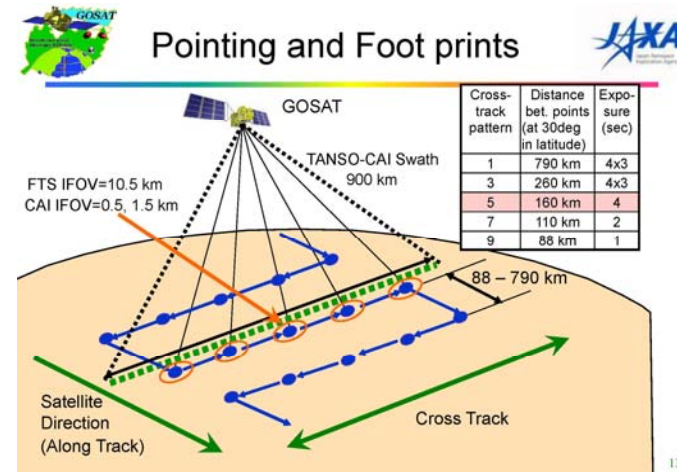
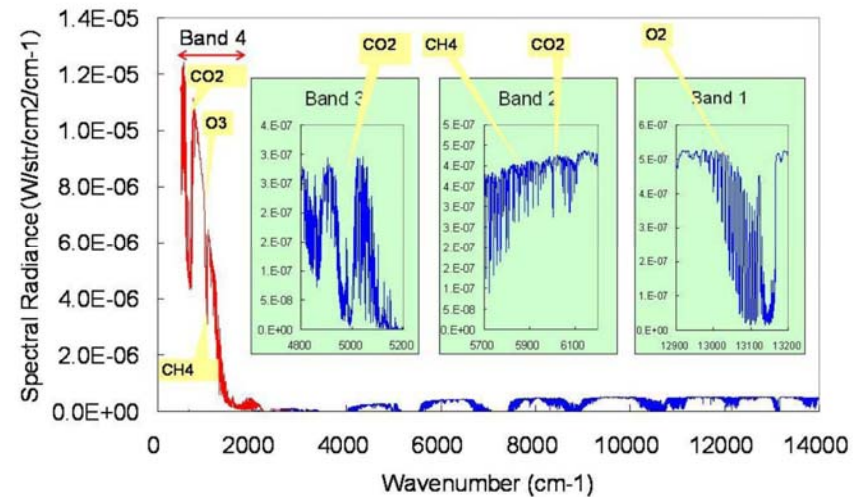
Science team, leader GOSAT chief scientist Prof Gen Inoue

Products @NIES

Level 2: retrieved CO<sub>2</sub> and CH<sub>4</sub> column averages at 0.5-1% accuracy

Level 3: global 2D fields (monthly)

Level 4: monthly CO<sub>2</sub> fluxes for 64 regions



# GOSAT Greenhouse Gases Observing Satellite

- Important dates (approximate)
  - April 2008 Research Announcement, where NEESPI participants can contribute through:
    - 1) use of GOSAT data CO<sub>2</sub>, CH<sub>4</sub> in the studies of N. Eurasian carbon and methane fluxes
    - 2) contribution the models and inventories of the surface CO<sub>2</sub>, CH<sub>4</sub> fluxes to operational data assimilation systems.
  - Jan 2009 Launch
  - April 2009 First data retrieved
  - July 2009 First data to users

Thank you

# Tower observations

