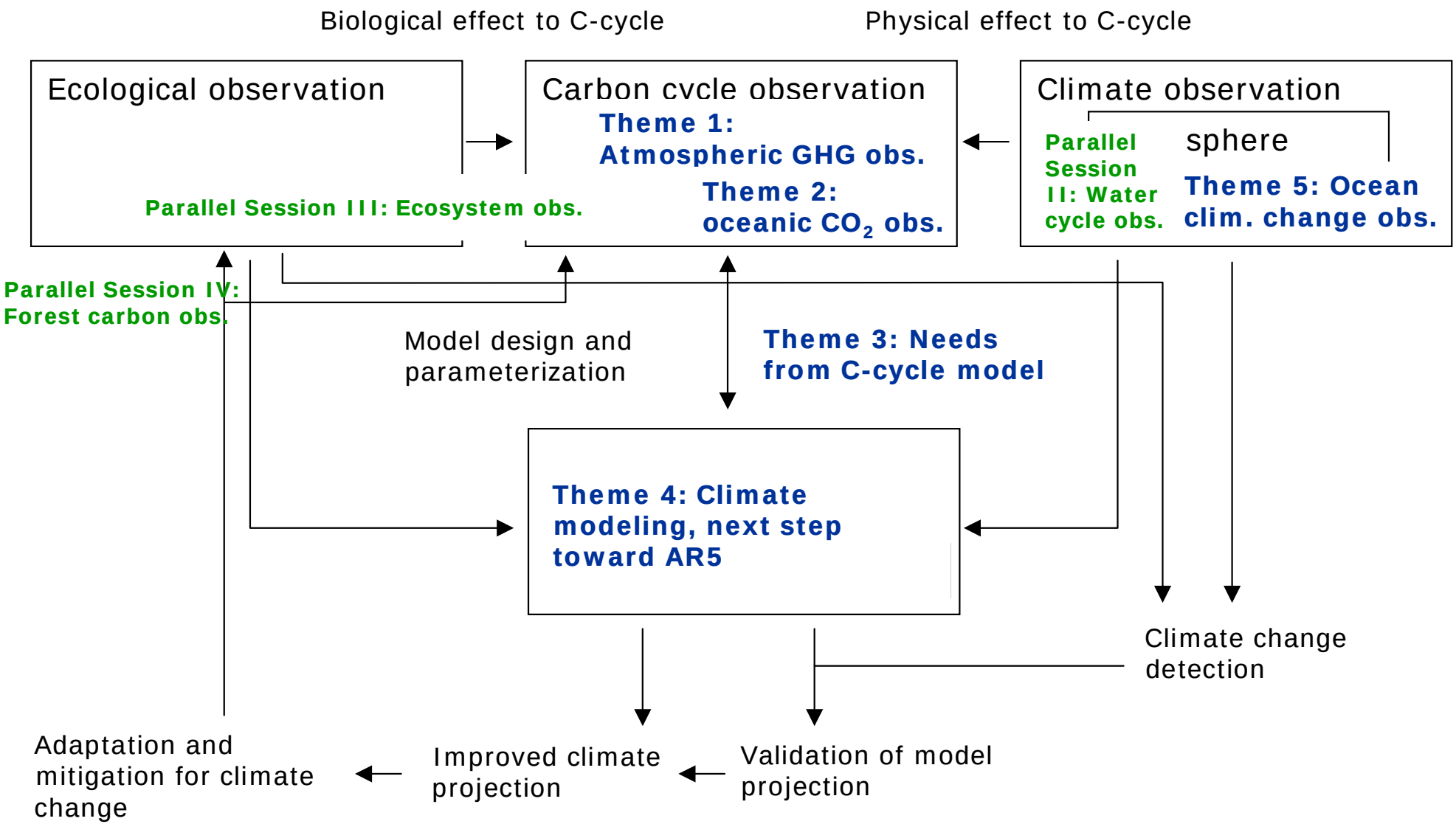
2008.4.14-16 GEOSS AP Symposium
at Mirai-kan, Tokyo, Japan

# Summary for Parallel Session 1: Monitoring and Predicting Climate Change

Yukihiro Nojiri
National Institute for Environmental Studies (NIES)
Center for Global Environmental Research (CGER)

# Our session in GEOSS AP symposium: Monitoring and predicting climate change

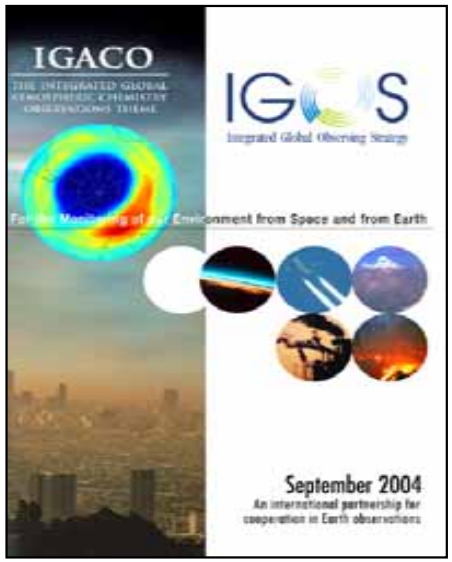


# Carbon Cycle and Climate Observation

- A network of space-based and mobile platforms for atmospheric greenhouse gas (GHG) observation in the Asia Pacific region would provide new information for understanding GHGs and carbon cycles.
- Long-term continuation of ecological research and carbon flux observation is essential to improving the evaluation of the terrestrial carbon budget.
- Ocean climate parameters need various types of observation platforms, such as autonomous buoys, to be operated and enhanced under international collaboration.
- A better understanding of radiative forcing will require aerosol, cloud and radiation budget monitoring from surface and space.

# WMO/GAW & Integrated Global Atmospheric Chemistry Observations (IGACO)

**The GAW programme builds on the Integrated Global Atmospheric Chemistry Observations (IGACO) strategy.**



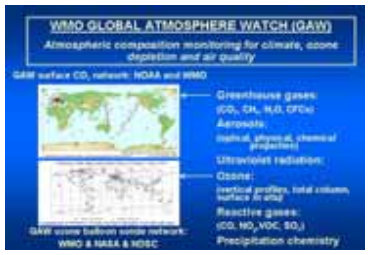

## *IGACO System Components*

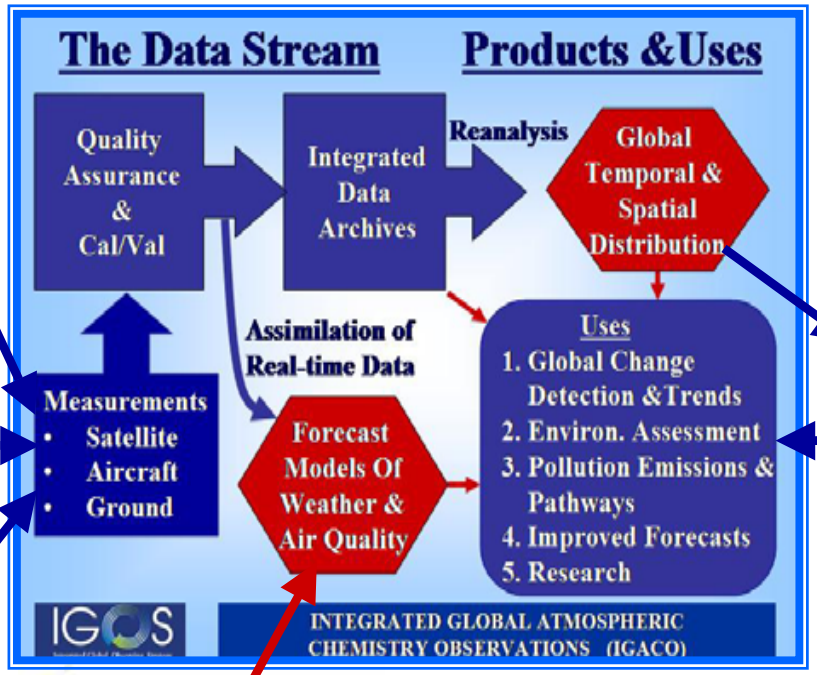
### *Observations*

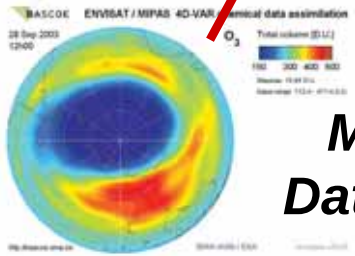
**Satellite**

**Aircraft**

**Ground-based**



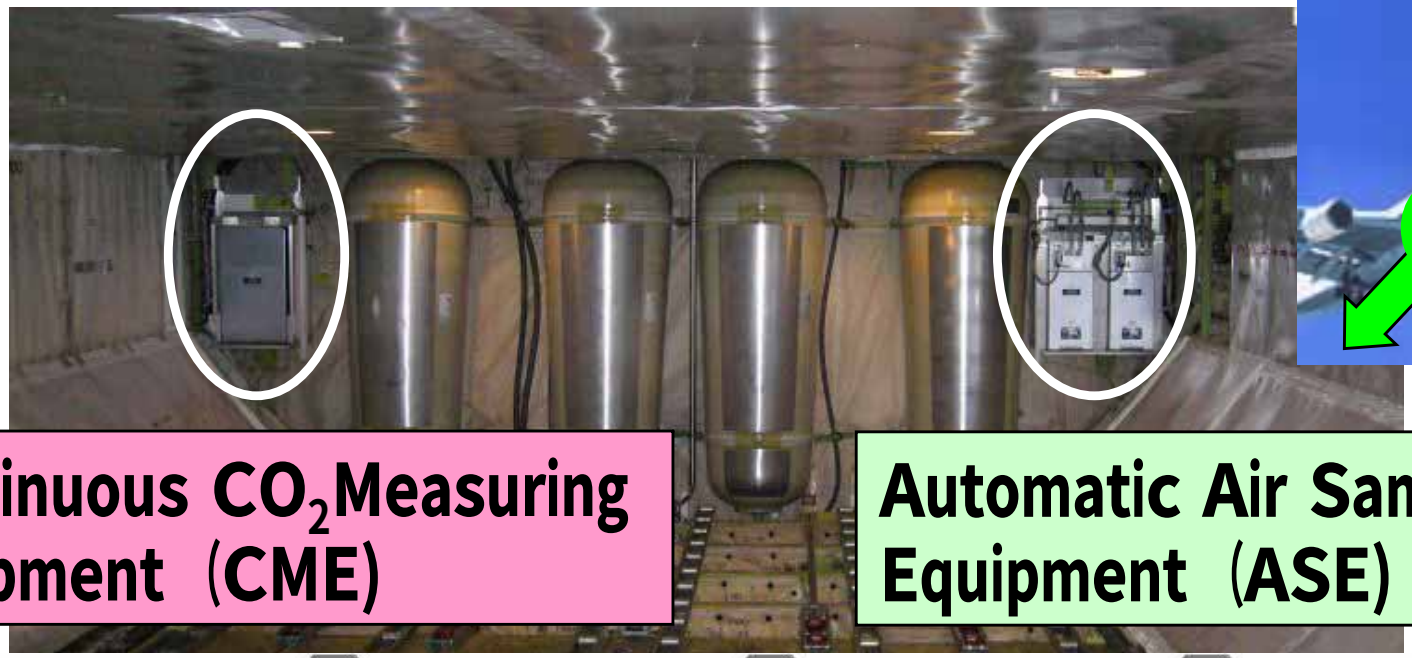



***Modelling and Data Assimilation***

### *Global Products*

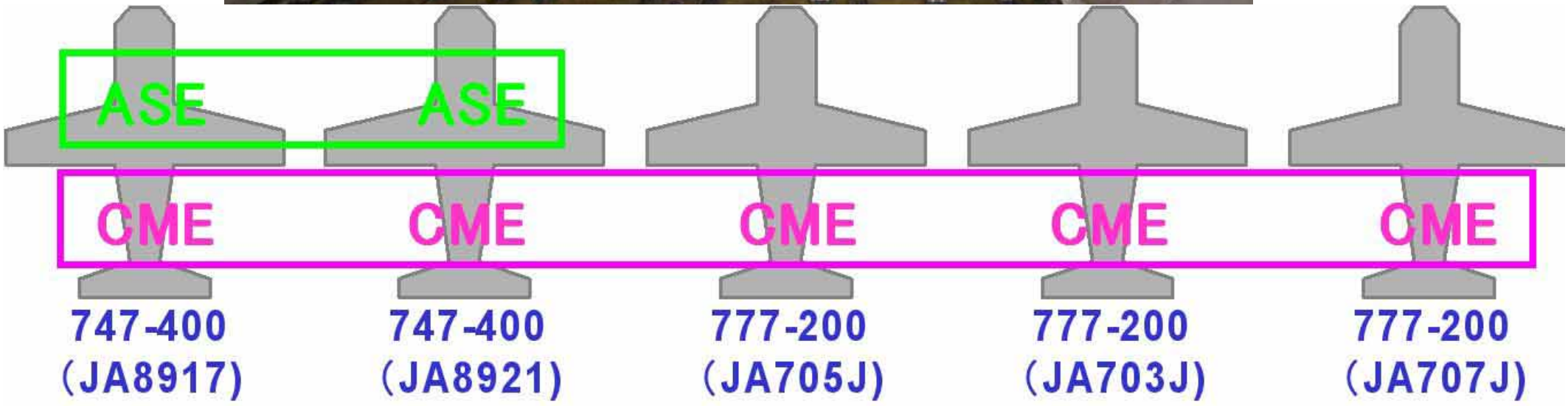

- **Ozone Depletion**
- **Air Quality**
- **Climate**

# JAL $CO_2$ monitoring started



**Continuous $CO_2$Measuring Equipment (CME)**

**Automatic Air Sampling Equipment (ASE)**




Machida et al., J.Atmos.Ocean.Technol, 2008

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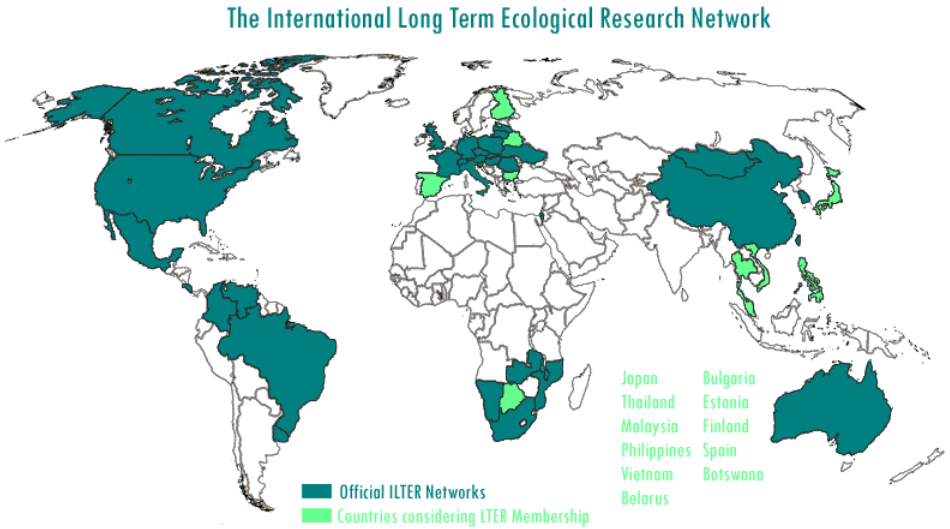
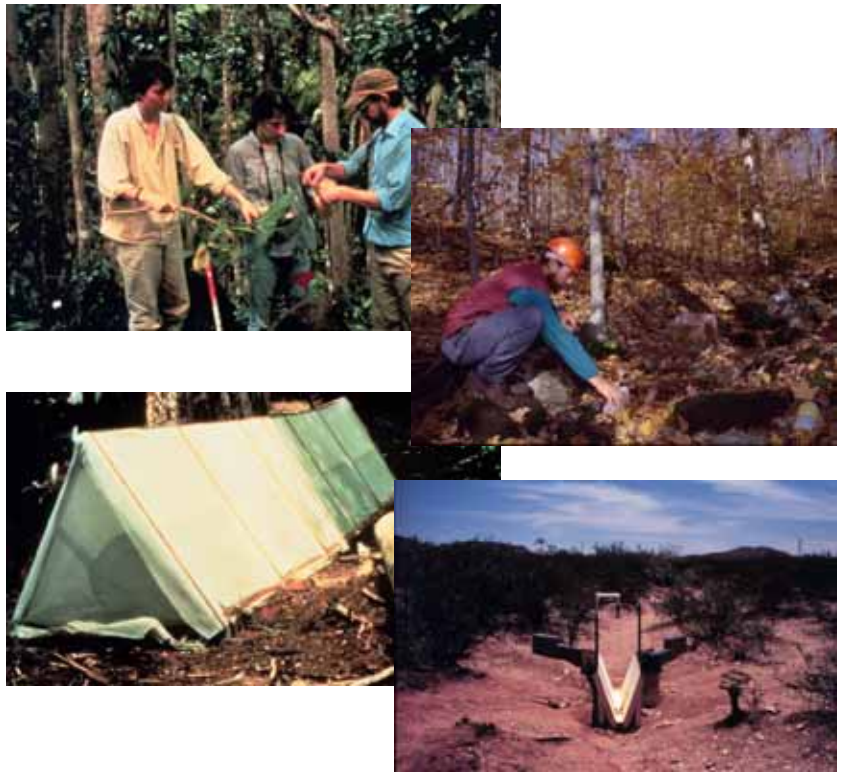
# Long-Term Monitoring

Long-term observation is essential for understanding dynamics of terrestrial ecosystems, including carbon budget.

=> LTER, Long-Term Ecological Research




| East Asia-Pacific Region | Central/Eastern European Region | Western European Region | African Region | North American Region | Central/South American Region |
|---|---|---|---|---|---|
| Australia LTER Network | CZ LTER Network | Austria LTER Network | Malawi LTER Network | Canada EMAN | Brazil LTER Network |
| CERN | Hungary LTER Network | France LTER Network | Mozambique LTER Network | Mex LTER Network | Colombia LTER Network |
| Mongolia LTER Network | Israel DEN | Italian LTER Network | Namibia LTER Network | US LTER Network | Costa Rica LTER Network |
| South Korea LTER Network | Latvia LTER Network | LTER-D Network | SAEON | | Uruguay LTER Network |
| TERN | Lithuania LTER Network | Swiss LWF Network | Zambia LTER Network | | Venezuela LTER Network |
| | Poland LTER Network | UKECN | | | |
| | Romania LTER Network | | | | |
| | Slovakia LTER Network | | | | |
| | Slovenia LTER Network | | | | |
| | Ukraine LTER Network | | | | |



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# Global Argo Network

**3129 floats as of Mar. 2008**

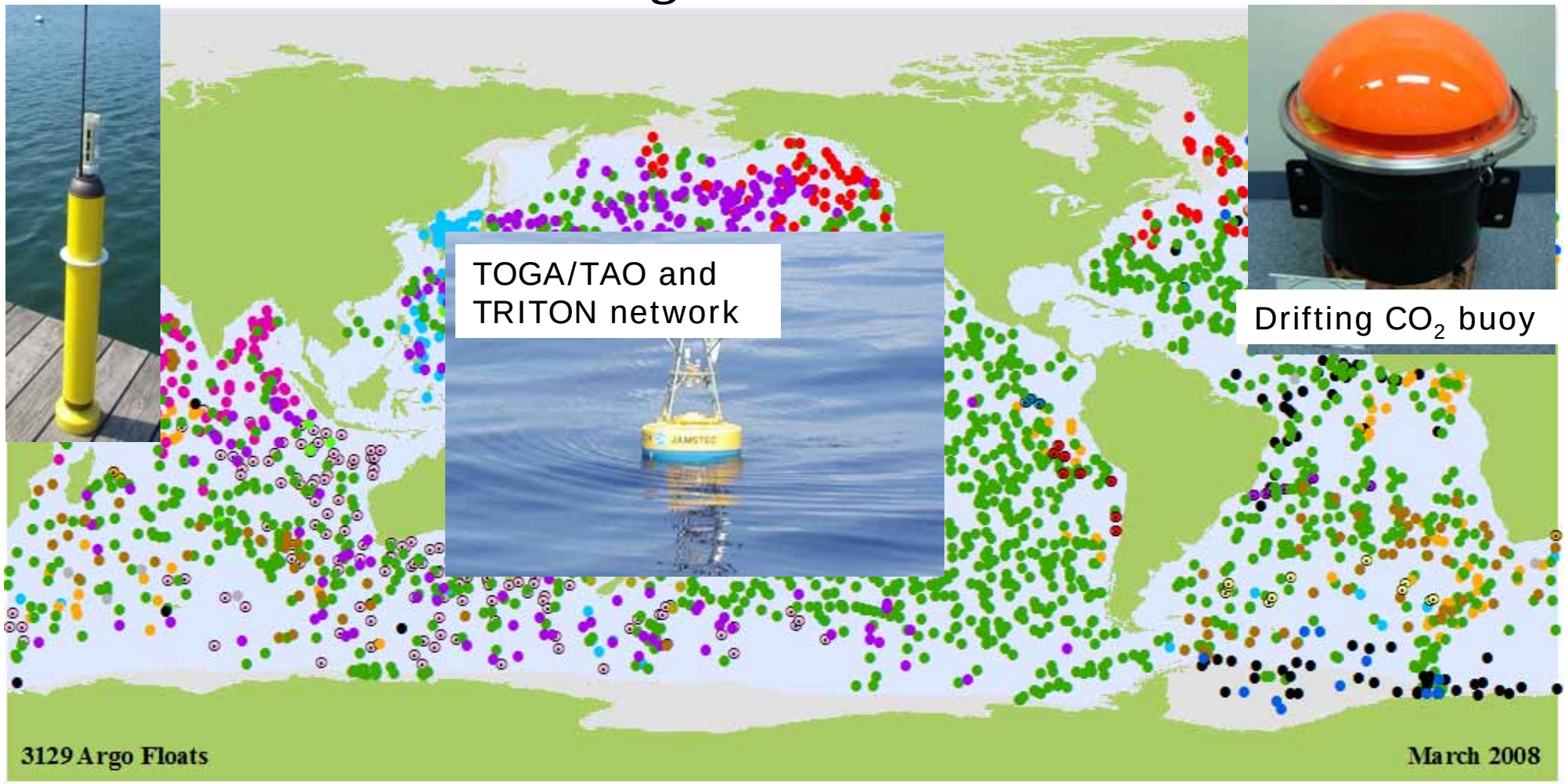




Drifting $CO_2$ buoy



TOGA/TAO and TRITON network




**Sustained Argo network is essential for global ocean monitoring and climate change prediction**

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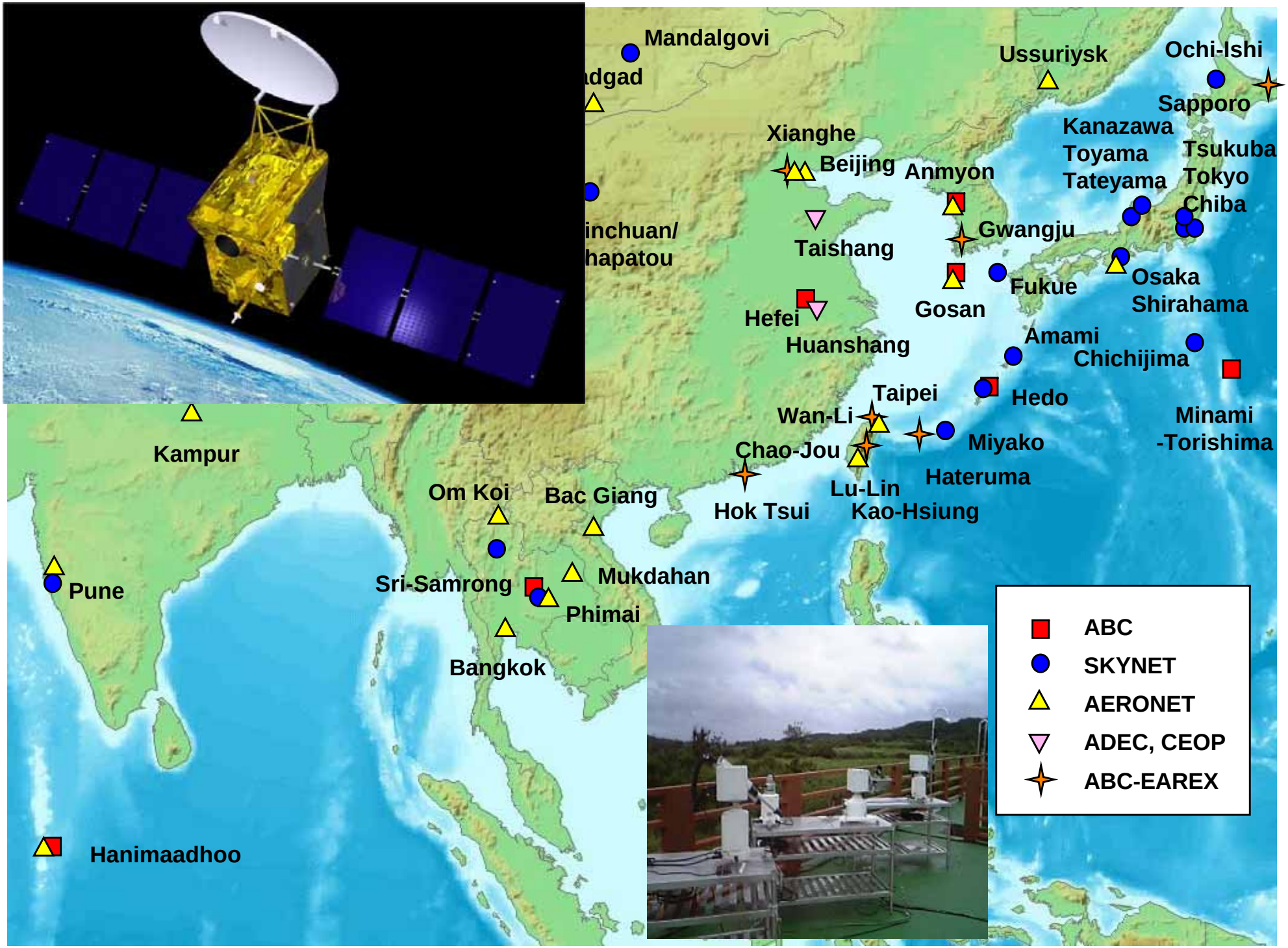
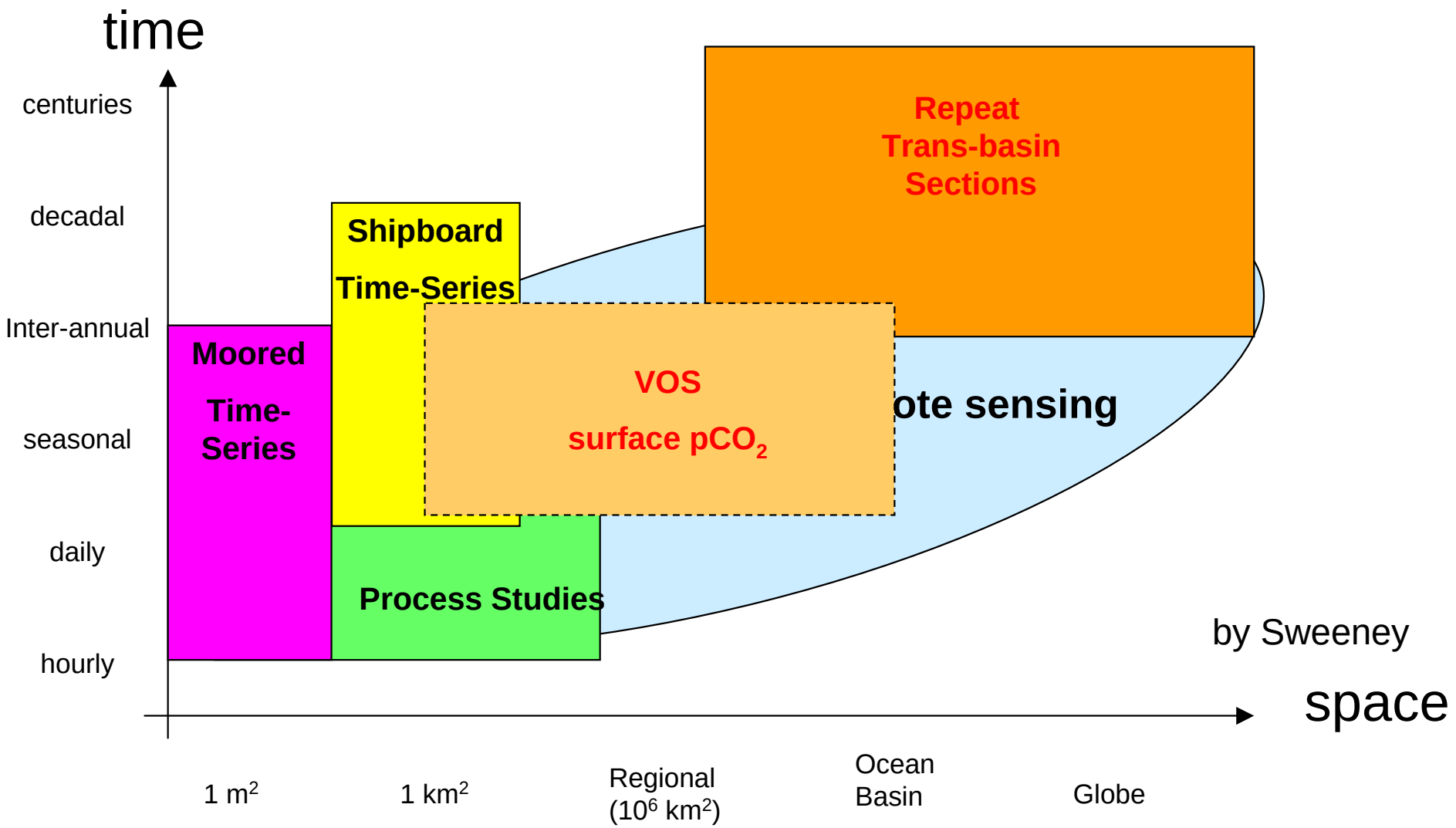

Mandalgovi
Ussuriysk
Ochi-Ishi
Sapporo
Kanazawa
Toyama
Tateyama
Tsukuba
Tokyo
Chiba
Xianghe
Beijing
Anmyon
Gwangju
Taishang
Fukue
Osaka
Shirahama
Gosan
Hefei
Huanshang
Amami
Chichijima
Taipei
Hedo
Wan-Li
Minami
-Torishima
Miyako
Chao-Jou
Hateruma
Lu-Lin
Hok Tsui
Kao-Hsiung
Kampur
Om Koi
Bac Giang
Pune
Sri-Samrong
Mukdahan
Phimai
Bangkok
Hanimaadhoo
ABC
SKYNET
AERONET
ADEC, CEOP
ABC-EAREX

# Sustainability of Observation Network

- For sustainability of global observation system for climate in the Asia Pacific region, where Monsoon prevails, operational use of high resolution observation network on a long-term basis is essential, building where possible on existing infrastructure.
- Climate change observation activities in Asia need coordination and capacity building in developing countries under the framework of GEOSS.

# Multi-scale observational platforms and sensors




Diff. space & time scales, data coverage & anal. methods → consistent synthesis
Needs for long term maintenance of global network of multi-scale platforms!!

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# AsiaFlux Training Courses

AsiaFlux Training Course 2007 on Micrometeorology
- Theory and Practice of $CO_2$ Flux Measurement -
Date: Tue.17 July – Thu.26 July 2007
Venue: NICEM Seoul Natl Univ & Yonsei Univ, Korea
Field practice: Gwangneung KoFlux Supersite, Korea
organized by Yonsei Univ, Seoul Natl Univ, Korea, AsiaFlux TC-SWG and KoFLux teams
- To teach basic theory and observation techniques to Asian flux researchers
- 24 participants from 10 Asian countries
- Several leading scientists from Korea, Japan, US and China served as volunteers/lecturers




By courtesy of Y. Ohtani & J. Kim