

APWSSCO, NIES/Tsukuba, Japan (3/17-19, 2008)

The New Vision of "ASIAFLUX"

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What is *VISION*?

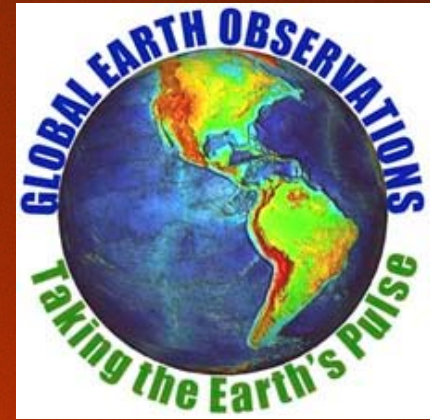
“SEEING BEYOND the MAJORITY”

OR

*“FORESIGHT with INSIGHT
based on HINDSIGHT”*



GROUP ON
EARTH OBSERVATIONS



GEOSS Vision

*“ To provide the Right Information
to the Right People,
at the Right Time,
to make the Right Decisions ”*



Between the Idea & Reality

Is Our Planet Fragile or Robust?

- G. Philander -



1. Global Trajectory

“ The path in which the Earth is headed and plans/actions that shape the course of such path ”

2. Worldview

“ The framework of ideas and beliefs through which one interprets the world, i.e., world outlook ”

3. Sustainable Development

“ Development that meets the needs of the present without compromising the ability of future generations to meet their own needs ”

4. Stewardship

“ Privilege and responsibility to take care of our natural resources to ensure that they are sustainably managed for current and future generations ”

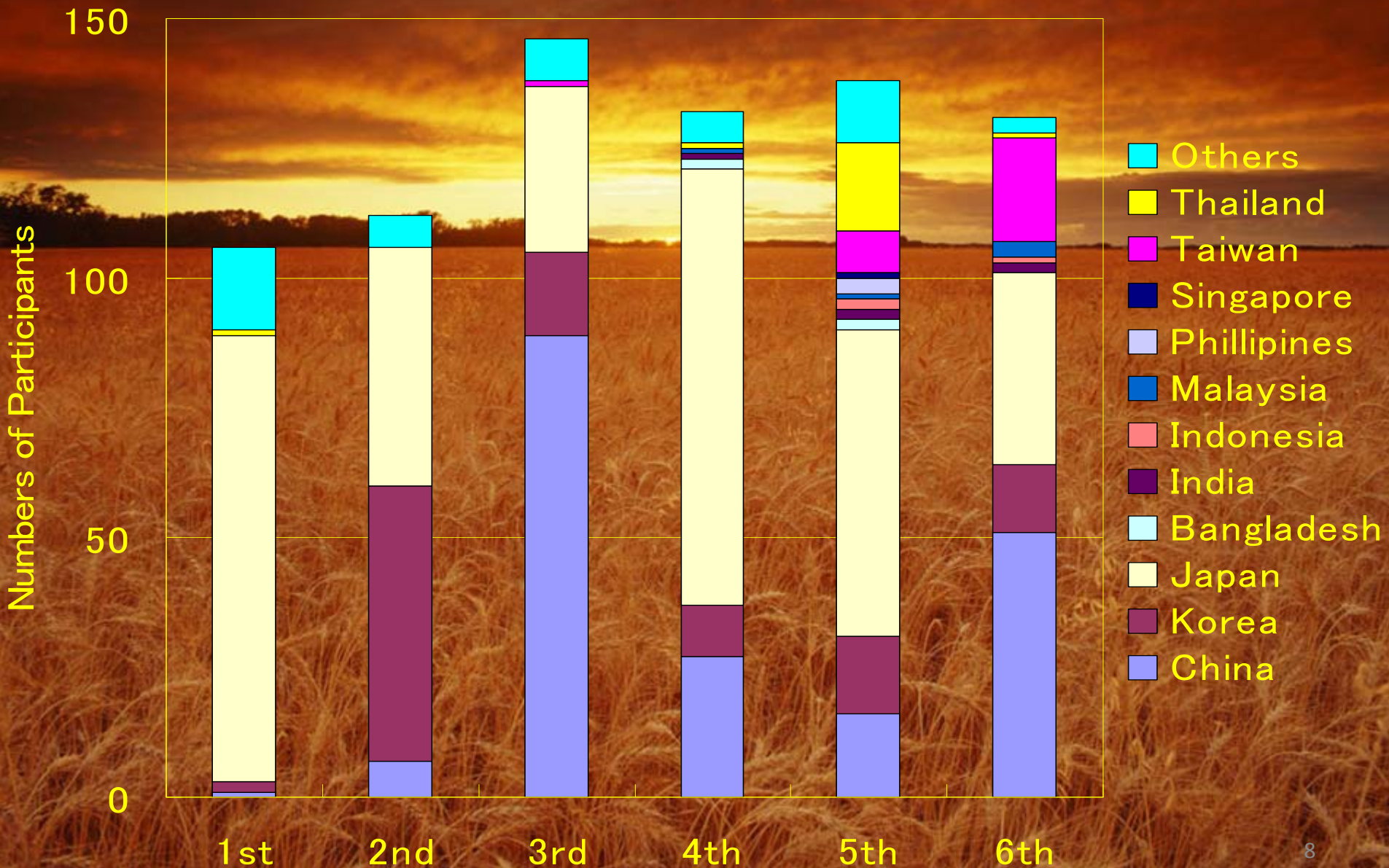
“ASIAFLUX” *is a regional research network bringing together scientists from university and institution in Asia to study the exchanges of carbon dioxide, water, and energy between terrestrial ecosystems & the atmosphere across daily to inter-annual time scales*

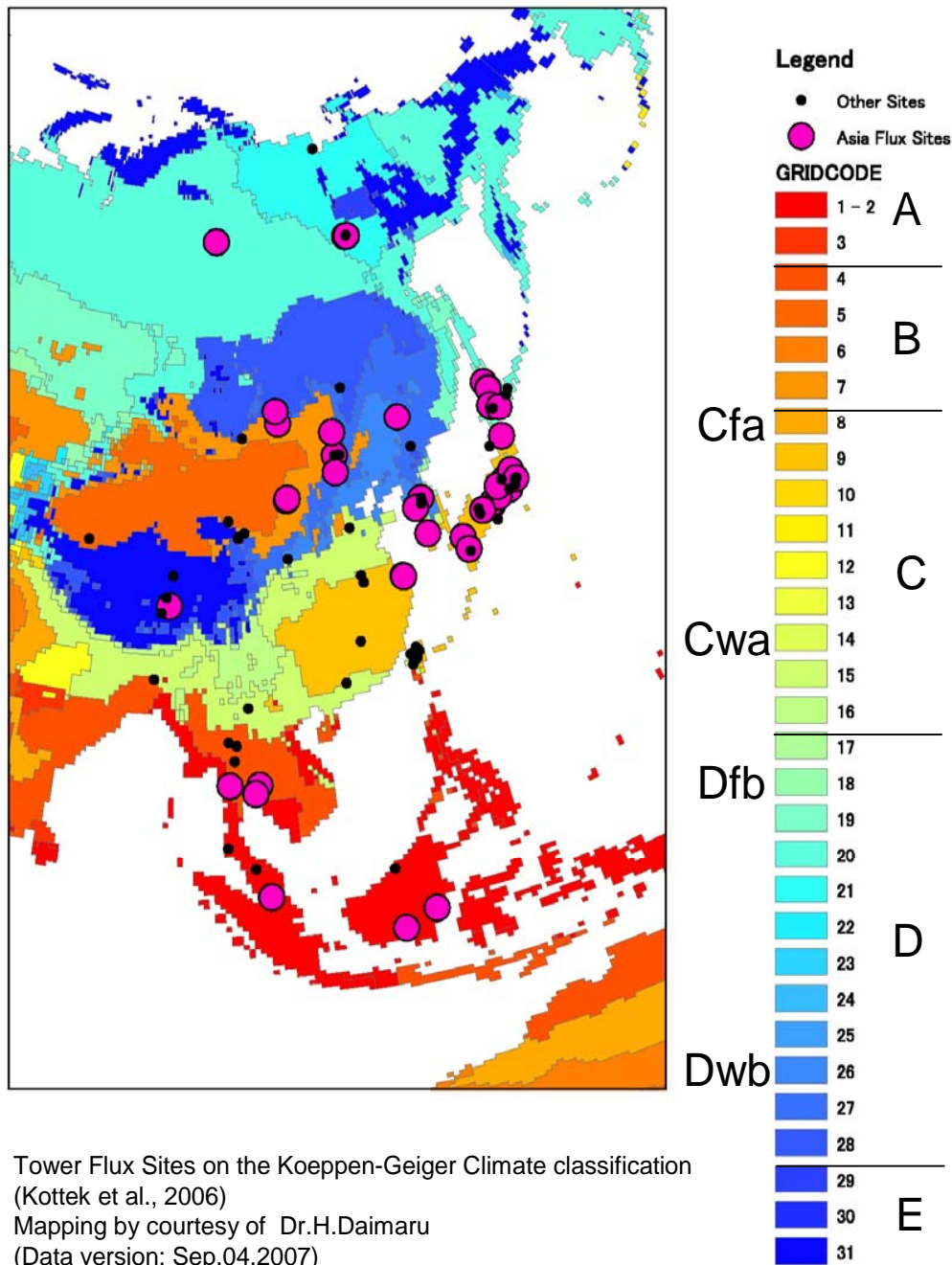
Our Mission is *to understand and predict changes in Earth’s environment, particularly Asian regions; and conserve and manage natural resources to meet Asia’s economic, social, and environmental needs*

"ASIAFLUX" History

- 1999. 9. : Established
- 2000. 3. : Launched the "ASIAFLUX Website"
- 9. : 1st International Workshop (*Sapporo, Japan*)
"Advanced Flux Network and Flux Evaluation"
- 2002. 1. : 2nd Int. WS (*Jeju, Korea*) "KOFLEX"
- 2003. 12. : 3rd Int. WS (*Beijing, China*) "CHINAFLUX"
- 2005. 8. : 4th Int. WS (*Fujiyoshida, Japan*)
- 2006. 8. : 1st AsiaFlux "Training Course" (*Tsukuba, Japan*)
- 2006. 11. : 5th Int. WS (*Chiang Mai, Thailand*)
"JAPANFLUX" and "THAIFLUX"
- 2007. 7. : 2nd AsiaFlux "Training Course" (*Seoul, Korea*)
- 2007. 10. : 6th Int. WS (*Taoyuan, Taiwan*)
- 2008. 11. : 7th Int. WS (*Seoul, Korea*)
"ASIAFLUX's 10th Anniversary Celebration!"

ASIAFLUX WORKSHOP





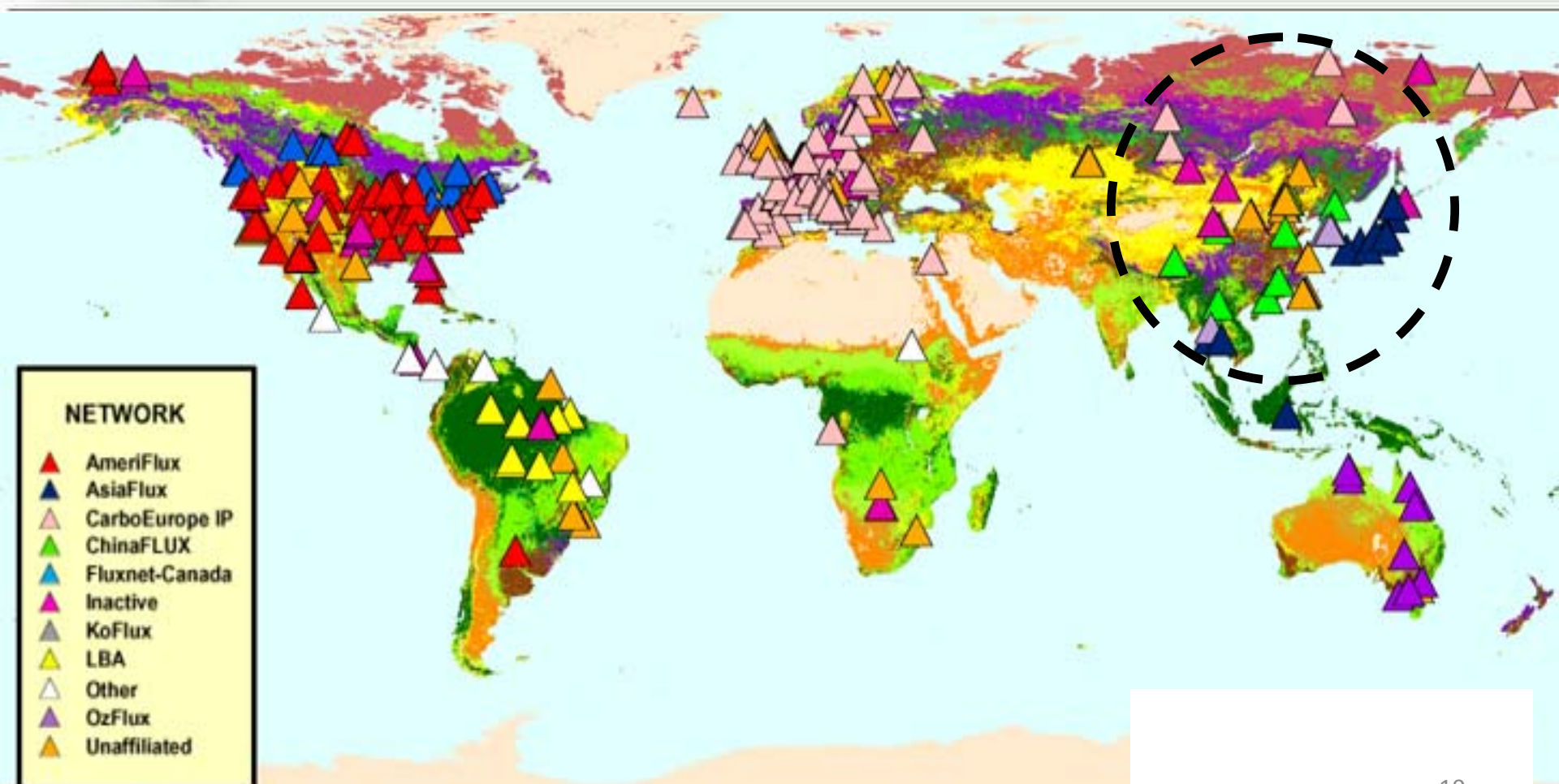
Tower Flux Sites on the Koeppen-Geiger Climate classification (Kottek et al., 2006)
 Mapping by courtesy of Dr.H.Daimaru
 (Data version: Sep.04,2007)

Present Situation of the Flux Observations in Asia

- Number of sites: 111 (68)*
 Number of sites listed in the AsiaFlux web page: 45 (39)*
 * currently continuing
- Climate: Tropical (14), Arid & Semi-Arid (5), Temperate (44), Boreal (7), Cool-Temperate (41)
- Vegetation, Topography, Instrumentation, Analysis tech. method... under investigation (to keep data compatibility and consistency for synthesis analysis and to expand observation network to the unrepresented areas.)



Integrating Worldwide CO₂ Flux Measurements



Eddy Covariance CO₂ Flux

$$F_{\text{CO}_2} = \int_0^h \left[\frac{\overline{\partial \rho_{\text{CO}_2}}}{\partial t} \right] dz + \left(\overline{w' \rho_{\text{CO}_2}'} \right)_h + \int_0^{h-} w(z) \frac{\overline{\partial \rho_{\text{CO}_2}}}{\partial z} + \int_0^h u(z) \frac{d \overline{\rho_{\text{CO}_2}}}{dx} dz$$

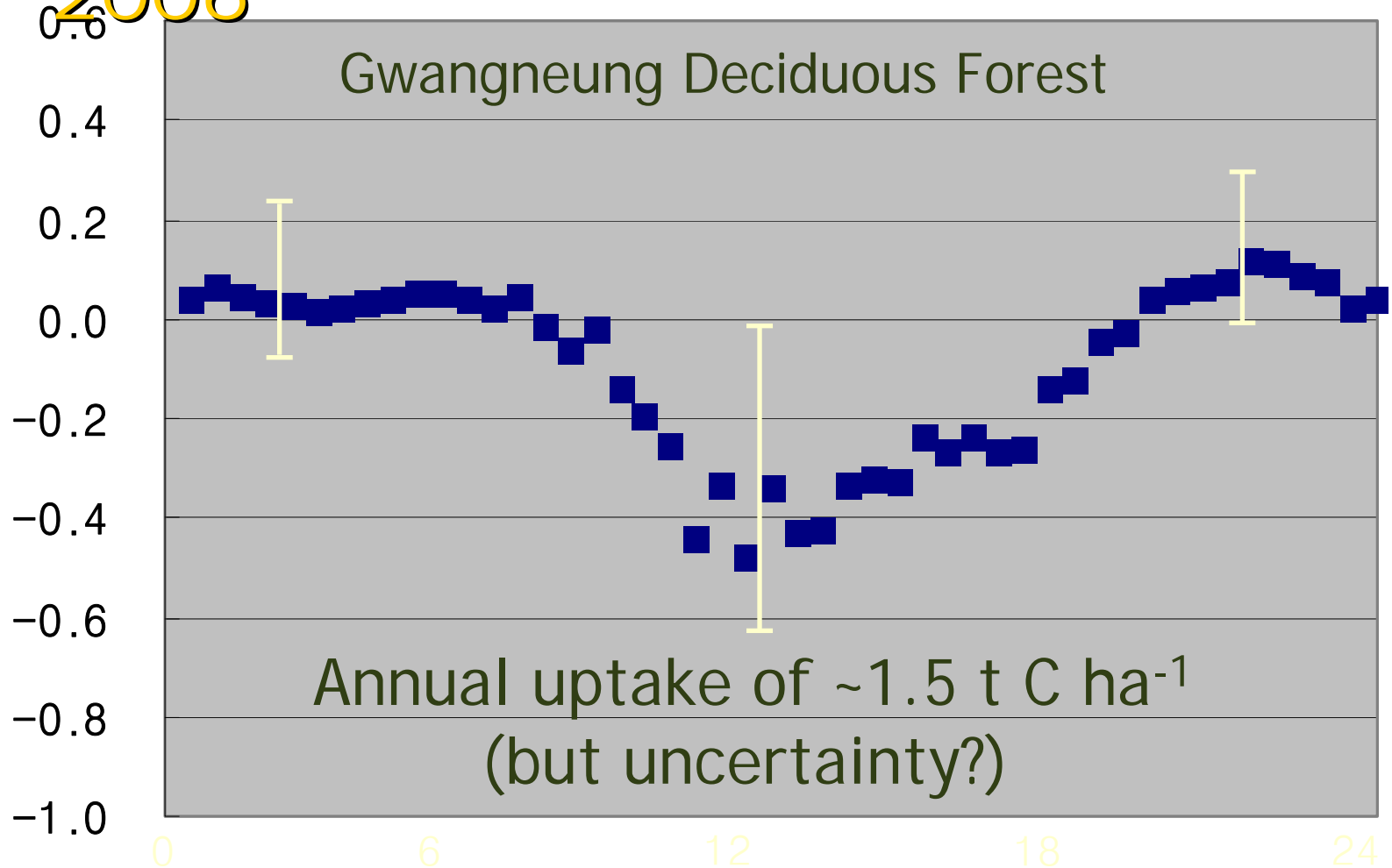


Net Ecosystem Exchange (NEE) of CO₂ for Summer

2006

Gwangneung Deciduous Forest

mg CO₂ m⁻² s⁻¹



Measurement Support & Standardization

A portable flux measurement system using closed-path gas analyzer developed. Field tests have been conducted in coniferous forest site in Fujiyoshida.

- For inter-comparison
- Serve as a standard system for the newly established sites.
- Provide guidelines on observation priority recommendations in measurement & calibrations and data processing, QA/QC



A portable flux measurement system

Quantum sensors comparisons at Fujiyoshida site, Japan. Arrayed sensors are LI-190SA (Licor, USA), IKS-27 (Koito, Japan), PAR-01 (Prede, Japan), PAR Lite (Kipp&Zonen, the Netherlands) and ML-020P (Eko, Japan). Laboratory tests are also made.

AsiaFlux Training Courses

AsiaFlux Training Course 2007 on Micrometeorology

- Theory and Practice of CO₂ Flux Measurement -

Date: Tue.17 July - Thu.26 July 2007

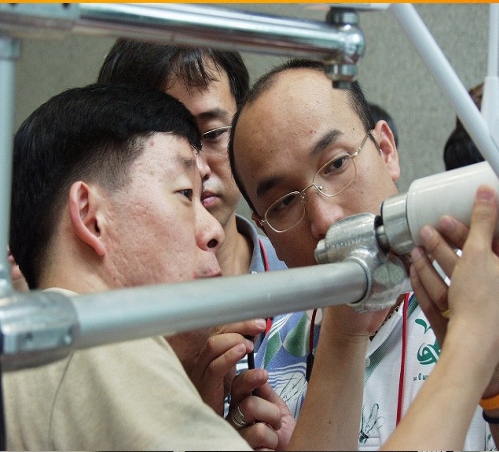
Venue: NICEM Seoul Natl Univ & Yonsei Univ, Korea

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



AsiaFlux Database under the Fair-Use Policy

8 February, 2007, AsiaFluxDB opened to the world

- Data format, Data policy, Downloading procedure

Data center: NIES/Japan, KMA/Korea, CAS/China

Data Groups: Micrometeorological Flux dataset,
Soil and Vegetation data

Data available from >16 sites in 2008

	A	B	C	D	E	F	G	H	I	J	K
1	Year	DOY	TIME	NEE	H	LE	USt	Rgs	Rn	PPFD	TPAR
2	YYYY	-	HHMM	micromol n	W m ⁻²	W m ⁻²	m s ⁻¹	W m ⁻²	W m ⁻²	micromol n	micromol n
3	2003	1	0	0.0	-3.9	0.0	0.0	0.0	-39.3	0.0	0.0
4	2003	1	30	0.0	7.9	-0.6	0.0	0.0	-45.4	0.0	0.0
5	2003	1	100	0.0	17.6	-1.2	0.0	0.0	-48.7	0.0	0.0
6	2003	1	130	0.0	13.4	-1.7	0.0	0.0	-49.5	0.0	0.0
7	2003	1	200	9999.0	9999.0	9999.0	9999.0	0.0	-47.0	0.0	0.0
8	2003	1	230	9999.0	9999.0	9999.0	9999.0	0.0	-45.8	0.0	0.0
9	2003	1	300	0.0	-3.9	-0.4	0.0	0.0	-32.3	0.0	0.0
10	2003	1	330	0.1	0.6	1.9	0.1	0.0	-33.3	0.0	0.0
11	2003	1	400	0.0	0.2	0.7	0.0	0.0	-41.8	0.0	0.0
12	2003	1	430	0.0	0.5	0.6	0.0	0.0	-40.7	0.0	0.0
13	2003	1	500	0.0	17.0	-0.5	0.0	0.0	-22.9	0.0	0.0
14	2003	1	530	0.0	-1.5	-0.2	0.0	0.0	-24.7	0.0	0.0
15	2003	1	600	0.0	-10.0	0.7	0.0	0.0	-34.1	0.0	0.0

"CarboEastAsia"

A3 Foresight Program

Capacity Building among
ChinaFlux, JapanFlux and KoFlux
to Cope with Climate Change Protocols by
Synthesizing Measurement, Theory and Modeling
in Quantifying and Understanding of Carbon
Fluxes and Storages in East Asia

Guirui Yu (Chinese Academy of Science, China)

Takashi Hirano (Hokkaido University, Japan)

Joon Kim (Yonsei University, Korea)

*“... **CarboEastAsia** is another exemplary programme for **capacity building** among ChinaFlux, JapanFlux and KoFlux to cope with climate change protocols by **synthesizing** measurement, theory and modelling...*

*Based on an agreement between the National Science Foundation of China (NSFC), Japan Society for the Promotion of Science (JSPS) and the Korea Science and Engineering Foundation (KOSEF), the ‘A3 Foresight’ programme supports joint research conducted by researchers in China, Japan and Korea. The three countries (A3) work as a consortium in advancing leading-edge research with the aim of establishing a top-level **research hub** in Asia, supporting the **GEOSS framework** ...”*

***“CarboEastAsia”* Research Thrusts**

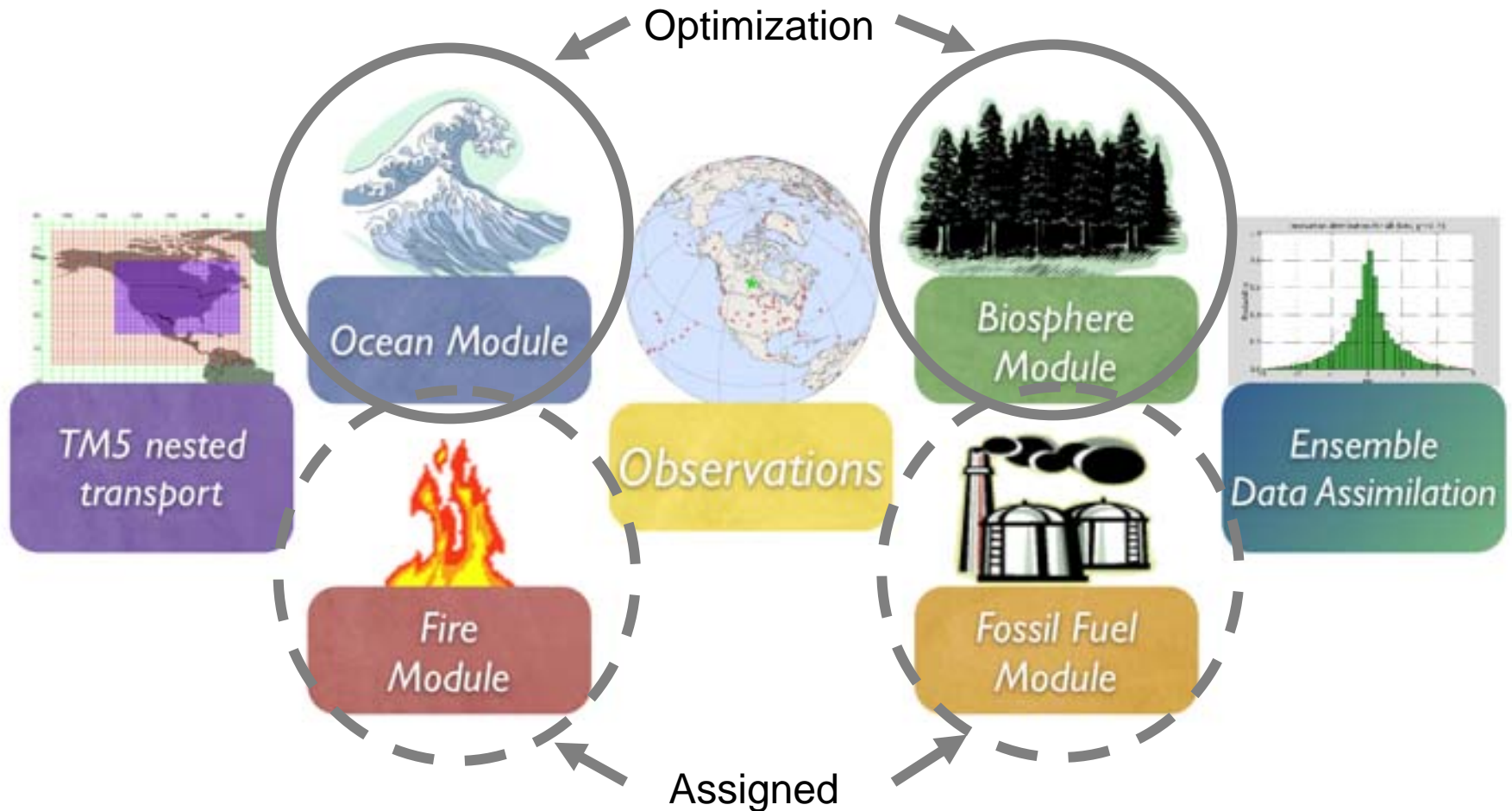
- Synthesis & Assessment -

1. *Identify* important mechanisms driving C-cycle
2. *Quantify* strength, variability, uncertainty of C sinks/sources
3. *Examine* functional types and spatial distribution patterns
4. *Develop* C-cycle models suitable to East Asia
5. *Evaluate* impacts of land use & CC on C-cycle
6. *Establish* database for regional estimates
7. *Provide* scientific insights to policymakers
8. *Assess* the role of East Asian C-cycle in a global context

"*ASIAFLUX*" Partnership

- Develop the next generation of global scientists with the skills and perspectives to effectively address complex global change issues in Asia;
- Develop and organize training and research workshops for young scientists on current global change themes; and
- Develop collaborative research projects focused on key regional issues in Asian regions

Asian version of “CarbonTracker” ?



$$F(x, y, t) = \lambda \cdot F_{\text{bio}}(x, y, t) + \lambda \cdot F_{\text{oce}}(x, y, t) + F_{\text{ff}}(x, y, t) + F_{\text{fire}}(x, y, t)$$

OUTLOOK

1. Validation and improvement of carbon modules
2. Better understanding of Asian carbon cycle in a global context
3. Building infrastructure for practical carbon tracking systems in Asia

**Join our 7th International
ASIAFLUX Workshop in Seoul
Korea, 19-21 Nov. 2008!**