



AsiaFlux Updates

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FLUXNET Conference 2017, June 7-9, 2017
UC Berkeley

Asia: as a unique environment

Rapid economic and population growth

Fossil fuel CO₂ emission

Land use change

(deforestation, afforestation)

Environmental Changes

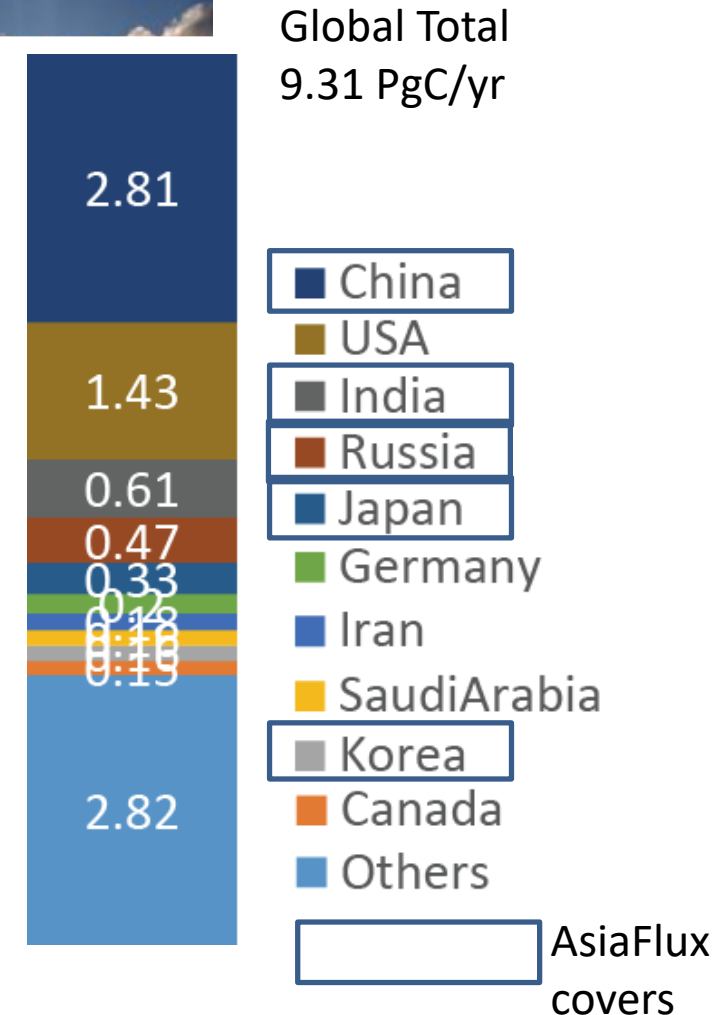
Climate Change, Pollution

Potential hotspot of GHG budget change

Peatland and fire in SE Asia

Rice paddy (CO₂, CH₄ etc.)

Warming, desertification



Top 10 Industrial CO₂ emission
(Year 2014; PgC/year)

[Source CDIAC]

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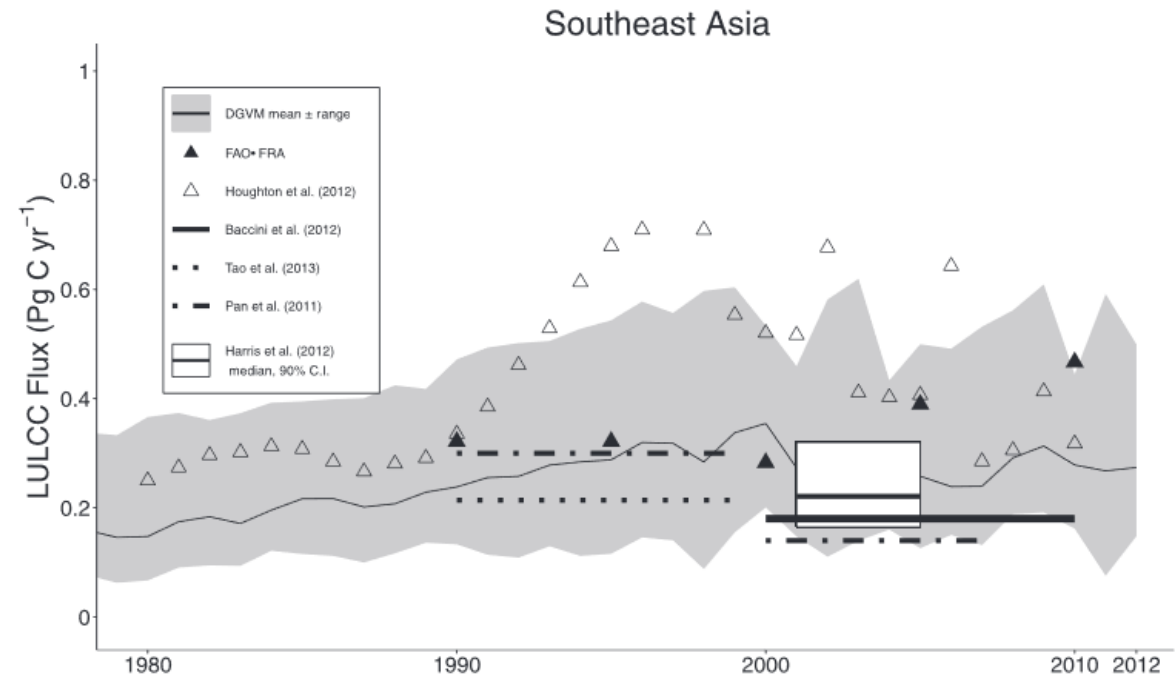
Potential hotspot of GHG budget change

Peatland and fire in SE Asia

Rice paddy (CO₂, CH₄ etc.)

Warming, desertification

Land Use Change net CO₂ flux in SE Asia



[Calle et al. 2016; ERL]

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Climate Change, Pollution

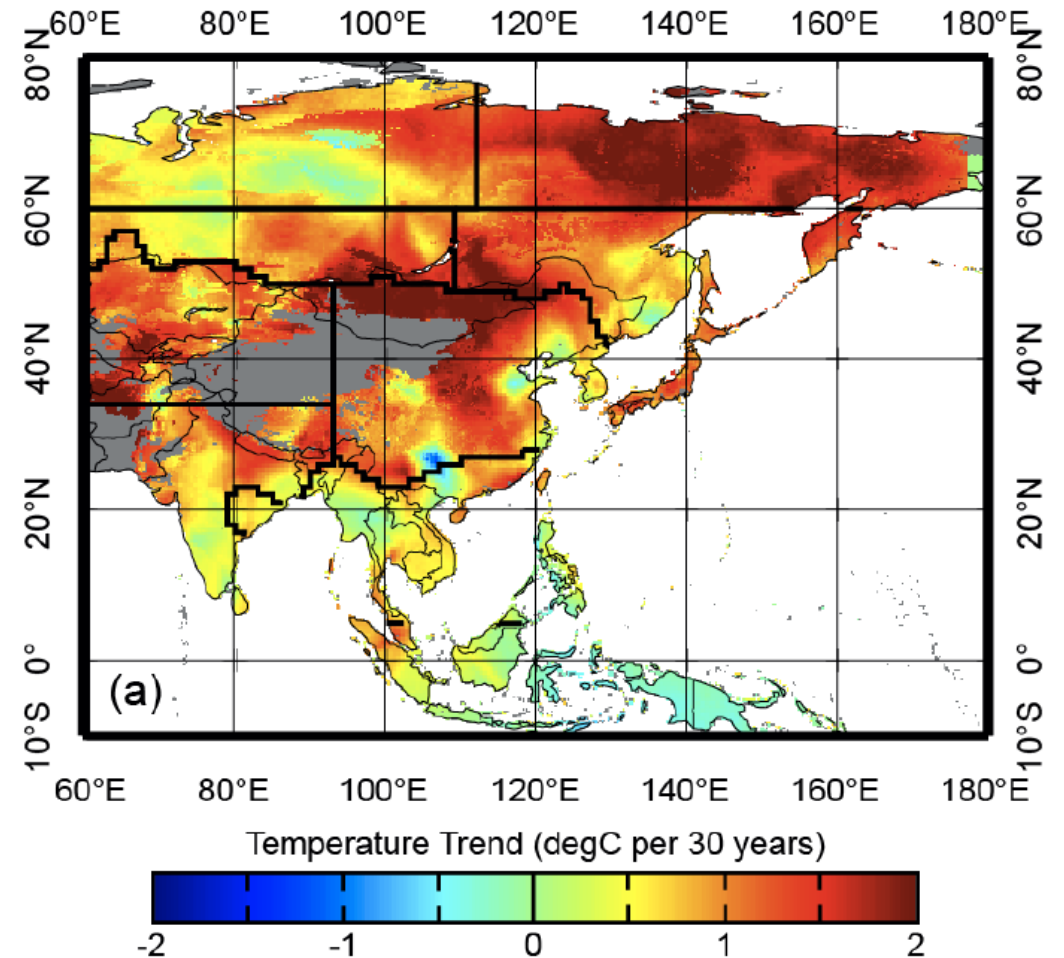
Potential hotspot of GHG budget change

Peatland and fire in SE Asia

Rice paddy (CO₂, CH₄ etc.)

Warming, desertification

Growing Season Temperature Changes for 1982-2011.



[Ichii et al. 2013; RS]

Asia: as a unique environment

Rapid economic and population growth

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Environmental Changes

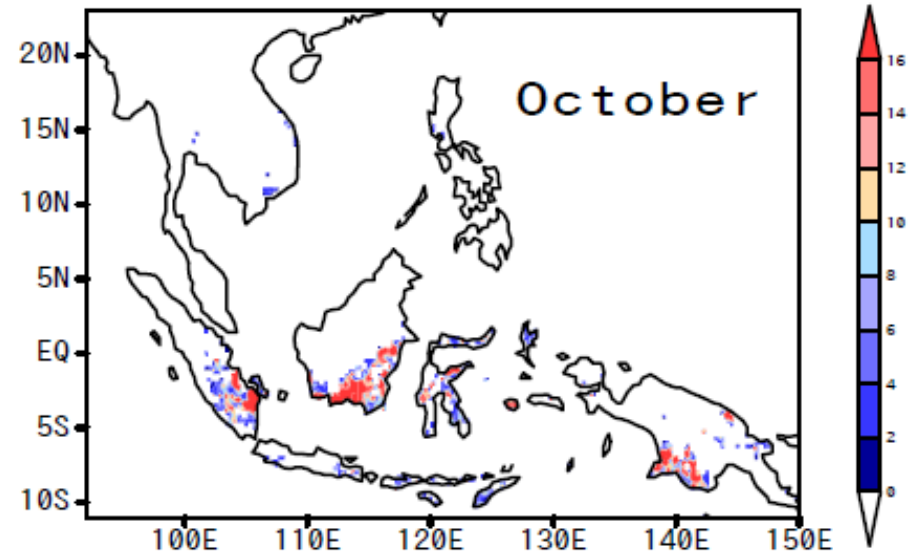
Climate Change, Pollution

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Warming, desertification



MODIS Fire Count
September, 2015

AsiaFlux as a regional monitoring network



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Welcome to AsiaFlux website!

AsiaFlux is a regional research network bringing together scientists from universities and institutions in Asia to study the exchanges of carbon dioxide, water vapor, and energy between terrestrial ecosystems and the atmosphere across daily to inter-annual time scales.

For more details, please refer to the following article: [About AsiaFlux](#)

[www.asiaflux.net]

AsiaFlux Organization

(2014 – present)



Chair:
Dr. Akira Miyata
(NIAES, Japan)



Vice-Chair:
Prof. Sheng-Gong Li
(CAS, China)



Vice-Chair:
Dr. Nobuko Saigusa
(NIES, Japan)

Regional Networks



Unique Feature: Involving many regional networks
 No big funding (voluntary basis)
 Importance of capacity building

JapanFlux have been operating many flux monitoring sites in Japan and other countries, and have been leading the research in this field in Asia.

ChinaFlux

Other regional flux networks since its establishment in 2002. With the rapid development of ChinaFLUX, many new flux sites have been set up in China in recent years, which greatly enhanced the intensity of flux research not only in China but also in Asia.

KoFlux

127° 39' 10" E	of Korea				
39° 44' 42.4" N	Gimsa, Jeonlabukdo, Republic of Korea	Rice paddy	2011	2011	2012
126° 51' 8.9" E					

ThaiFlux

at Maeklong	
(5) Sugarcane plantation at Nakhonpatom	
(6) Dry dipterocarp forests (2007)	
(7) Dry Dipterocarp forests (2007)	
(8) Rice (rain-fed) at Sukothai	
(9) Rice (irrigated) at Pitsanulok	
(10) Casava plantation at Nakorn Ratchasima	
(11) Rubber plantation at Chachengsao	

AsiaFlux Activities

- International joint project
- Workshop
- Training course

International Project: From CarboEastAsia to CarboAsia

A3 Foresight Program: CarboEastAsia (2007-2012)

[PIs: Prof. Joon Kim (Korea), Prof. Guirui Yu (China), Prof. Takashi Hirano (Japan)]

- China, Korea, Japan collaboration
- Many Joint Seminars
- Special Issues (Biogeosciences, J. For. Res)

Biogeosciences

An interactive open-access journal of the European Geosciences Union

| EGU.eu | EGU Journals | EGU Highlight Articles | Contact | Imprint |

Special issue

CarboEastAsia

Editor(s): G. Wohlfahrt, J. Chen, J. Kim, Y. Guirui, and T. Hirano

Download citations of all papers: [Bibtex](#) [EndNote](#) [Reference Manager](#)

05 Nov 2010

Soil CO₂ efflux of a larch forest in northern Japan

N. Liang, T. Hirano, Z.-M. Zheng, J. Tang, and Y. Fujii
Biogeosciences, 7, 3447-3457, doi:10.5194/bg-7-

27 Sep 2010

A data-model fusion approach for upscaling ground remote sensing and flux footprint modelling
B. Chen, O. Ge, D. Fu, G. Yu, X. Sun, S. Wann, and

J For Res (2013) 18:1-3

DOI 10.1007/s10310-013-0389-y

EDITORIAL

Lessons learned from CarboEastAsia: carbon and water cycles in East Asian terrestrial ecosystems

Joon Kim · Takashi Hirano · Guirui Yu ·
Shenggong Li · Koji Tamai



FORWARD-LOOKING COLLABORATIONS & PROGRESSES

PHASE I 2007-2010

Kickoff Meeting and 1st Seminar of CarboEastAsia¹
10 Nov - 1 Dec 2007
Beijing, China

Strategic planning and establishment of sub-programs: SP1, Interdisciplinary joint field investigation; SP2, Networking flux measurements; SP3, Model development, validation, scaling and integration; and SP4, Seminar and science meetings.

1st Workshop on Data Processing & Synthetic Analysis
19-21 Feb 2008
Seoul, Korea

CarboEastAsia data requirement and database establishment, Collaboration with other A3 "Ecology" program. Call for research proposal for 1st CarboEastAsia special issue.

1st Field Campaign^{2,3}
7-17 July 2008
Fujiiyohda, Japan

Inter-comparison of eddy flux calculation and Q1/Q4 procedures of three flux networks. Inter-comparison experiment of soil respiration measurement at Fujiiyohda site.

2nd Seminar on ACTS with 7th AsiaFlux Workshop^{4,5}
17-19 Nov 2008
Seoul, Korea

"Re-thinking Global Change Science: From Knowledge to Policy" AsiaFlux Workshop's CarboEastAsia special session: Asian Carbon Tracers Society (ACTS) - From Implications to Applications. Preparation of 1st special issue.

2nd Workshop on Integrating Field Observations, Remote Sensing, and Modeling^{6,7}
18-20 Feb 2009
Tsukuba, Japan

Focused on SP2 (Net-working flux measurements) and SP3 (model development, validation, scaling and integration)

3rd Field Campaign & ChinaFLUX Training Course^{8,9}
7 July - 1 Aug 2009
Beijing, China

Explicitly building and promoting the communications among young scientists: field excursion to Halbe Station, training on long-term flux observation & data processing.

2nd Seminar with 8th AsiaFlux workshop^{10,11}
27-29 Oct 2009
Sapporo, Japan

"Integrating Cross-scale Ecosystem Knowledge: Bridges and Barriers" AsiaFlux Workshops CarboEastAsia special sessions: Bridges between ecosystem observation and remote sensing; Barriers in Flux measurements; Global biogeochemical cycle; Interfaces between carbon science and society.

3rd Workshop on Upscaling and Synthetic Assessment of Carbon Cycling in Asia^{12,13}
12-15 Jan 2010
Beijing, China

Processing research progress by SP2 and SP3 on two major themes: (1) Inter-comparison of carbon fluxes in different ecosystems in East Asia and (2) Upscaling and synthetic assessment of carbon fluxes in East Asia.

3rd Field Campaign on Soil CO₂, Non-CO₂, Trace Gases¹⁴
3 June 2010
Seoul, Korea

Evaluating sub-programs. Establishing new sub-programs: SP4, Networking of Soil Respiration measurement; SP5, Networking flux measurements for Non-CO₂ trace gases. Report on 1st special issue in Biogeosciences. Improving fair-use policy of CarboEastAsia database. Planning for the 2nd phase.

Joint Symposium with HESS II
22-25 June 2010
Tokyo, Japan

CarboEastAsia sessions with 2nd International Conference on Hydrology Driven Earth System Science to Society (HESS II), AsiaFlux/FLUXNET, GOWGLASS, and LandFlux-EVAL. Establishing practical protocols and frameworks to promote effective collaborations among research communities of hydrological modeling, field observations, remote sensing in the framework of sustainability science.

1st CarboEastAsia Special Issue in Biogeosciences (BG)

Our efforts on interdisciplinary approach for understanding biogeochemical-ecological interactions have produced a special issue in BG. The two-stage publication process enabled every discussion paper and interactive comments to remain permanently archived and individually citable (www.biogeosciences.net).

During Phase I, a total of 42 papers were published in Biogeosciences (18), Asia-Pacific Journal of Atmospheric Sciences (4), Ecological Research (2), Remote Sensing of Environment (1), Journal of Geophysical Research (1), Nonlinear Process in Geophysics (1), Acta Ecologica Sinica (1), Journal of Plant Research (1), and others (13).

The main topics included in these publications are: advection, Asian monsoon, biosphere models, carbon and water cycle, catchment water balance, cloud effect, drought, ecosystem production and respiration, eddy covariance technique, evapotranspiration, ecophysiology, heterogeneity, leaf nutrient, litter decomposition, mapping, methane exchange, modeling, MODIS, net radiation, nocturnal boundary layer, organic carbon sequestration, parameter optimization, quality control, remote sensing, scale dependency, uncertainty, and understory ET.



<http://www.carboeastasia.org/>

International Project: From CarboEastAsia to CarboAsia

APN (Asia-Pacific Network): CarboAsia (2013-2016)

[PI: Dr. Akira Miyata]

Expansion of CarboEastAsia to cover whole Asia.

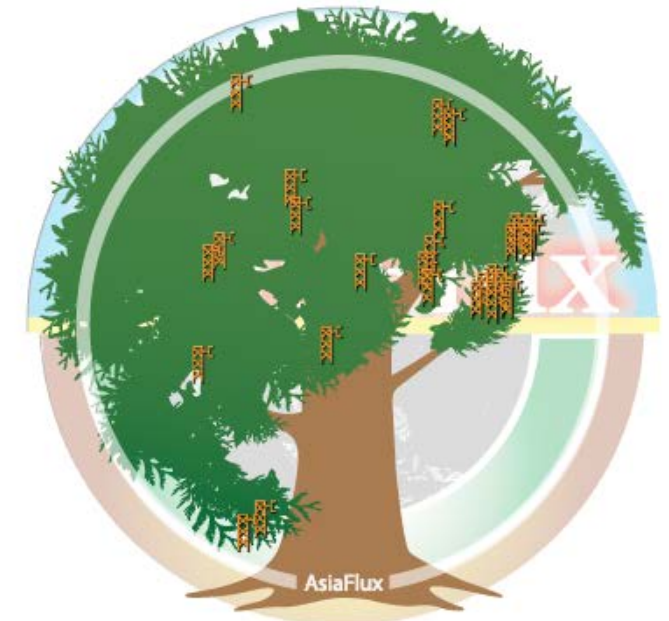
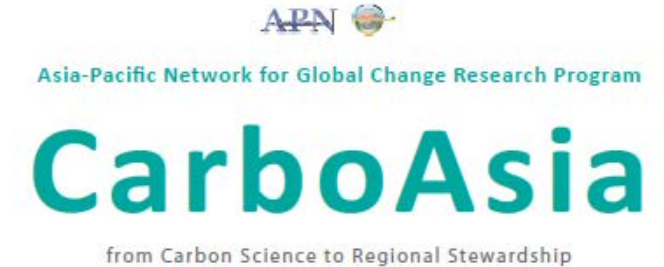
In particular, **tropical/subtropical forests and cropland**

Data integration & synthesis

- Expansion of AsiaFlux Database
- The first AsiaFlux report on the Asian carbon budget and implications for the global carbon cycle
(We are working...)

Capacity development and networking

- Activate national/regional networks
- Cultivate next generation scientists

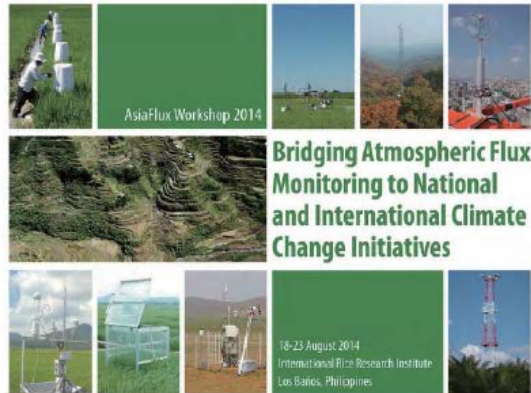


Integration and syntheses of terrestrial ecosystem flux data
in tropics/subtropics and croplands in Asia
by activating regional tower-based observation networks

Recent Activities

The AsiaFlux Workshop 2014

Bridging Atmospheric Flux Monitoring to National and International Climate Change Initiatives (IRRI, Los Baños, Philippines, Aug. 2014)



The AsiaFlux Workshop 2015

Challenges and Significance of Ecosystem Research in Asia to Better Understand Climate Change (IITM, Pune, India, Nov. 2015)

Joint Conference
AsiaFlux Workshop 2015 and ISPRD TC WG VIII/3: Weather, Atmosphere and Climate Studies on "Challenges and Significance of Ecosystem Research in Asia to Better Understand Climate Change"



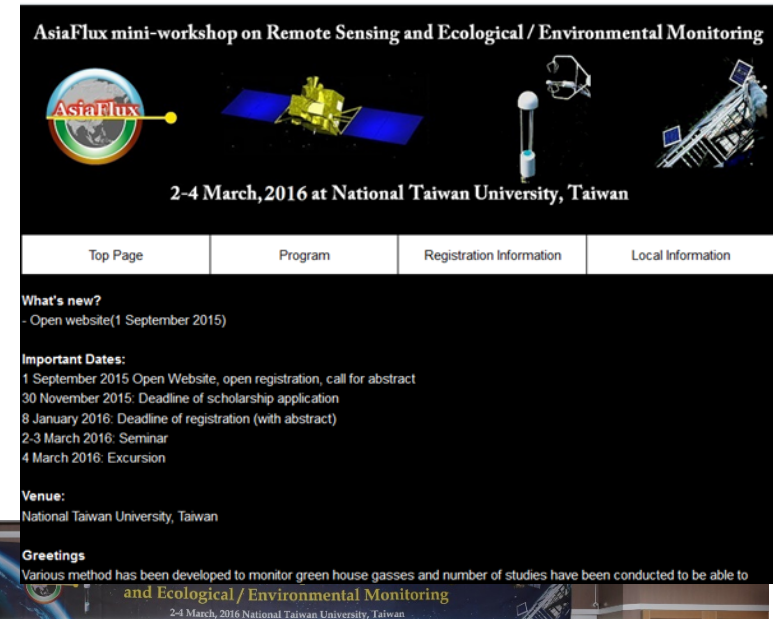
22-29 November 2015, Indian Institute of Tropical Meteorology, Pune, India

Top Page	Sessions & Abstract	Registration Information	Local Information	Business Opportunity
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October 15. Please register from here if you are planning to join us. Please kindly transfer the amount by October 2015)
Please register from here. (10 July 2015)

The AsiaFlux Mini Workshop

Remote Sensing and Ecological Environmental Monitoring (NTU, Taipei, Taiwan, Mar. 2016)



Training Courses

AsiaFlux training and seminar
on methane flux and carbon cycle
(Mymensingh, Bangladesh, Feb. 2014)



AsiaFlux training & seminar
on tropical ecosystem monitoring
(Cat Tien National Park, Vietnam, Dec. 2014)

AsiaFlux

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NCT: Nam Cat Tien Forest

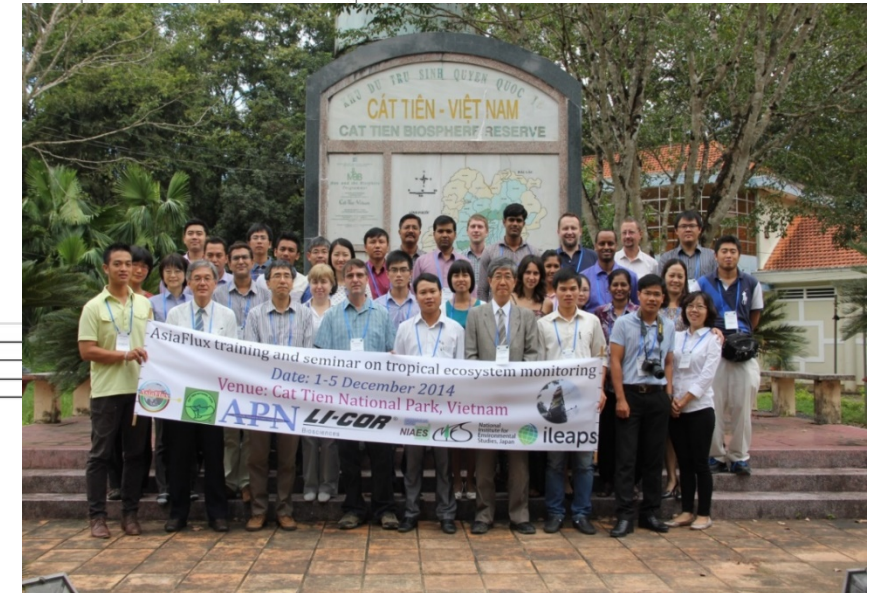
Observation Period and Data Availability

Measurement Period	December 2011 to present
Measurement frequency	Continuous



General site detail (Updated 12 September 2012)

Site name	Nam Cat Tien Forest
AsiaFlux site code	NCT
Location	Vietnam
Position	11° 20' 28.9" N, 107° 24' 3.0" E
Elevation	156 m above sea level



Forthcoming Event: AsiaFlux WS 2017 in Beijing



**Aug 14-16:
Training Course**

**Aug 17-18:
AsiaFlux WS**

**Aug 19:
Field Excursion**

**June 30:
Training Course
Application**

**July 20:
Abstract Submission**

- ▶ Welcome Letter
- ▶ Important Dates
- ▶ Organizing Committee
- ▶ Plenary Speakers
- ▶ Date and Venue
- ▶ Registration
- ▶ Programme
- ▶ Visa Application
- ▶ Accommodation
- ▶ Sponsorship & Exhibition
- ▶ Contact Us

The joint conference of AsiaFlux Workshop 2017 and the 15th Anniversary Celebration of ChinaFLUX to be held in Beijing, China, on August 17-19, 2017.

The tentative thesis of AsiaFlux Workshop 2017 is "Linking ecosystem flux measurements and carbon management to global change". This workshop features will discuss the scientific challenges on flux measurement and monitoring, couplings cycles of carbon, water and nitrogen, upscaling approaches for regional carbon budget, as well as ecosystem carbon/water management.

As one of important partners of FLUXNET and AsiaFlux, ChinaFLUX will greet the coming 15th Anniversary since 2002. During this joint conference, a series of celebration will be organized for the 15th Anniversary of ChinaFLUX.

🕒 Date & Venue

- Training Course: August 14-16, Institute of Institute of Geographic Sciences and Natural Resources Research
- AsiaFlux Workshop 2017: August 17, Beijing International Convention Center
- The 15th Anniversary Celebration of ChinaFLUX: August 18, Beijing International Convention Center
- Field Excursion: August 19, Yucheng site

🕒 Important Dates

- **March 05, 2017:** Open for Registration & Abstract submission
- **June 30, 2017:** Deadline for training course application
- **July 20, 2017:** Deadline for ONLINE registration & Abstract submission
- **July 20, 2017:** Deadline for field excursion

🕒 Organizers



🕒 Co-organizers



<http://asiaflux2017.csp.science.cn/dct/page/1>

AsiaFlux Activities

- International joint project
- Workshop
- Training course

Issues: a. Joint project is mainly for travelling, and most of actual measurement are voluntary-basis.
(= site observation is based on site PI's funding)

AsiaFlux data status

- Registered site
- Data availability
- Contribution to FLUXNET2015

AsiaFlux Registered Sites [Site-Registered]

107 sites



US Dept of State Geographer
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
© 2016 Google

Google Earth

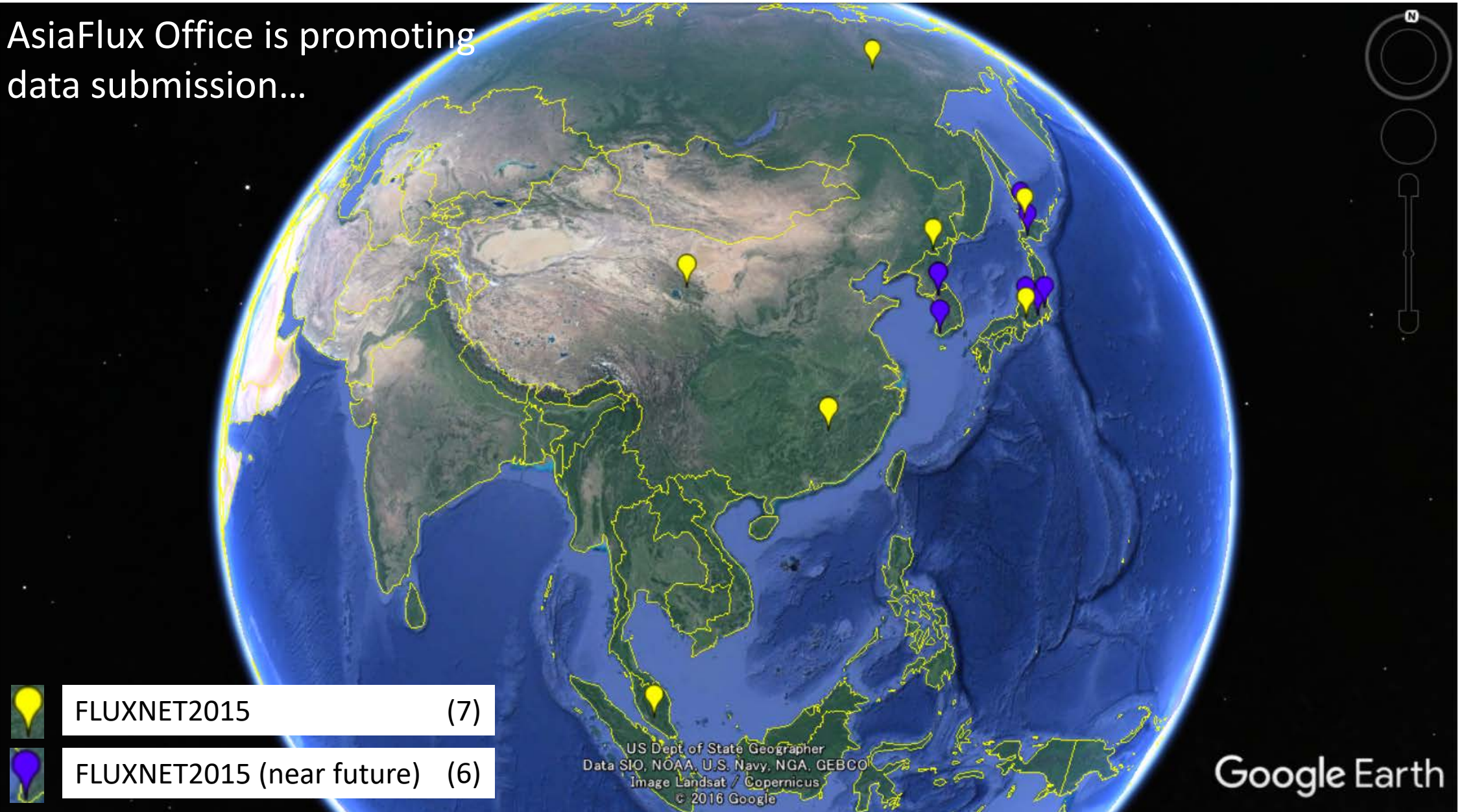
AsiaFlux Registered Sites [Data on AsiaFlux DB]

36 sites



AsiaFlux Contribution to FLUXNET2015

AsiaFlux Office is promoting data submission...



AsiaFlux data status

- Registered site
- Data availability
- Contribution to FLUXNET2015

Issues: a. Not many sites data publically available.

- Voluntary basis, No strong obligation
- Publication first
- Little experience in data sharing?

Situation is slightly changing.. (personal feeling by KI)

Scientific Progress

- Site data synthesis
[Yu et al. 2014 PNAS; Kondo et al. 2017 AgForMet]
- Data-Model Intercomparison (MIP)
[Saigusa et al. 2013; Ichii et al. 2013; J. For. Res.]
- Data-driven CO₂ fluxes, top-down vs bottom-up synthesis
[Ichii et al. 2017; JGR-biogeosci]
- SE Asia network
[Hirano et al.]

Synthesis of AsiaFlux data

High carbon dioxide uptake by subtropical forest ecosystems in the East Asian monsoon region

Guirui Yu^{a,1}, Zhi Chen^{a,b,1}, Shilong Piao^{c,d}, Changhui Peng^{e,f}, Philippe Ciais^g, Qiufeng Wang^a, Xuanran Li^a, and Xianjin Zhu^a

^aSynthesis Research Center of Chinese Ecosystem Research Network, Key Laboratory of Ecosystem Network Observation and Modeling, Institute Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China; ^bUniversity of Chinese Academy of Sciences, Beijing 100049, China; ^cDepartment of Ecology, College of Urban and Environmental Science, and Key Laboratory for Earth Surface Processes of the Ministry of Education, Peking University, Beijing 100871, China; ^dLaboratory of Alpine Ecology and Biodiversity, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, China; ^eDepartment of Biology Sciences, Centre for Forest Research, University of Quebec at Montreal, Montreal, QC H3T 2B4, Canada; ^fState Key Laboratory of Forest Ecology and Management, Institute of Forest Ecology and Environment, Beijing Forestry University, Beijing 100081, China; ^gCentre for Global Change Research, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China

[Agricultural and Forest Meteorology 232 \(2017\) 623–634](#)

[Yu et al. 2014 PNAS]

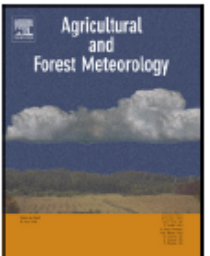


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Agricultural and Forest Meteorology

journal homepage: www.elsevier.com/locate/agrformet



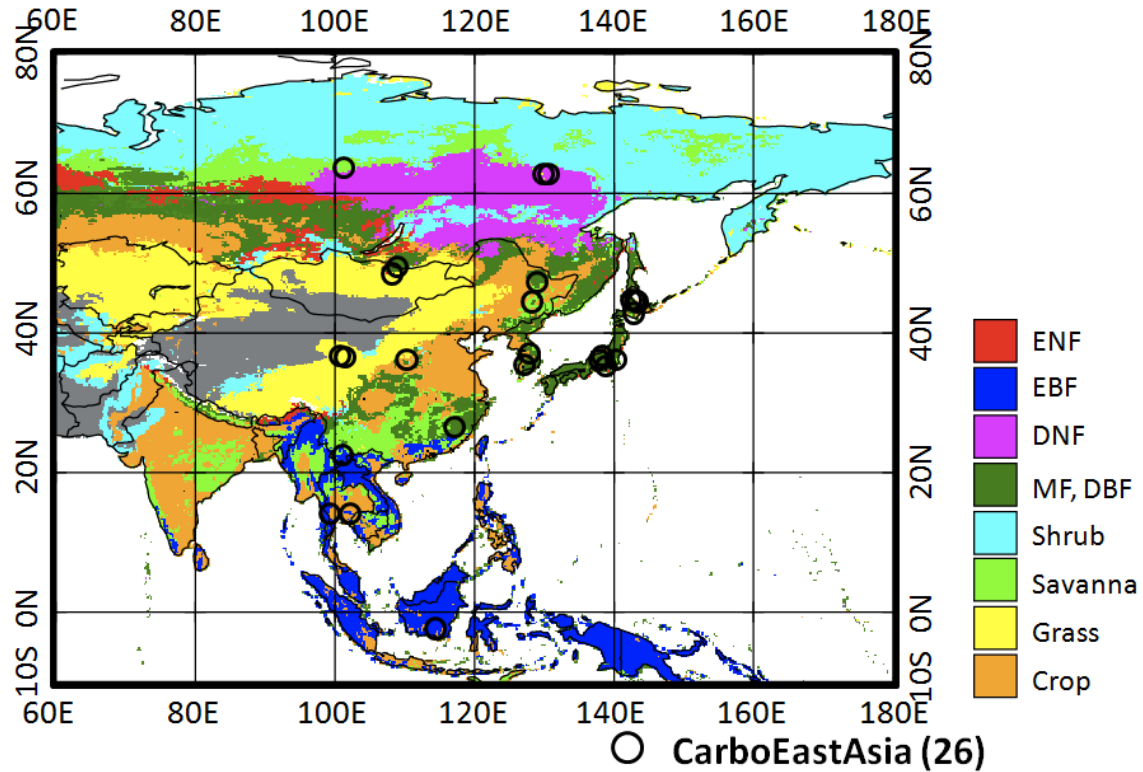
Comprehensive synthesis of spatial variability in carbon flux across monsoon Asian forests

Masayuki Kondo^{a,*}, Taku M. Saitoh^b, Hisashi Sato^a, Kazuhito Ichii^{a,c}



[Kondo et al. 2017 AgForMet]

Evaluating ecosystem models with AsiaFlux data



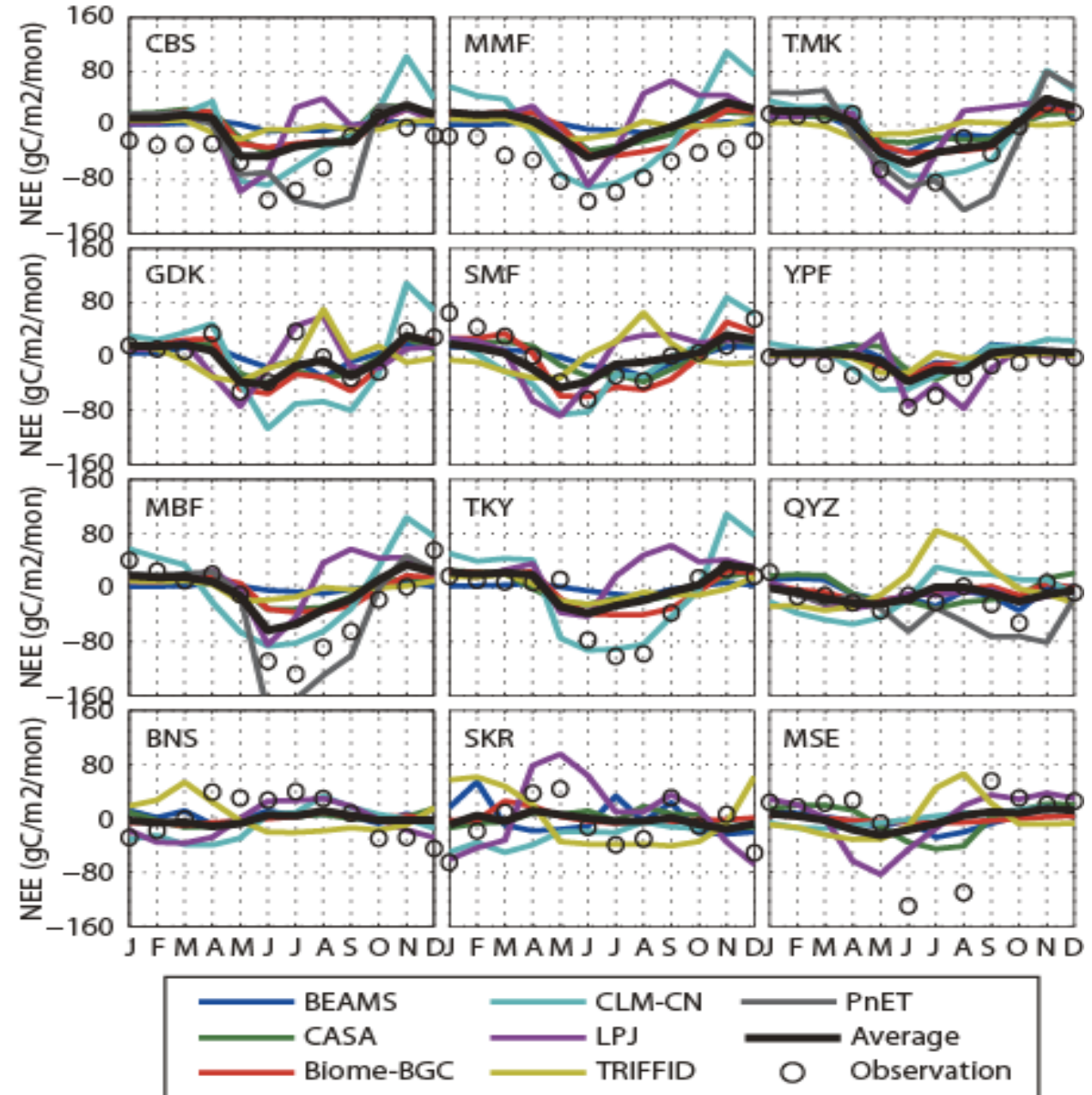
Terrestrial Carbon Cycle Models (8)

BEAMS, Carnegie-CASA, PnET

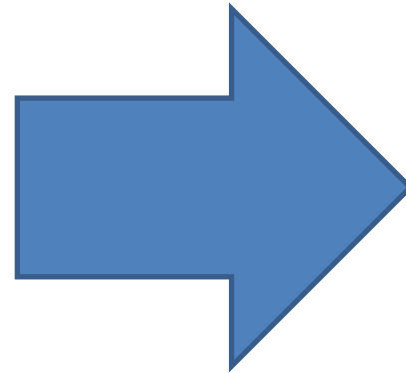
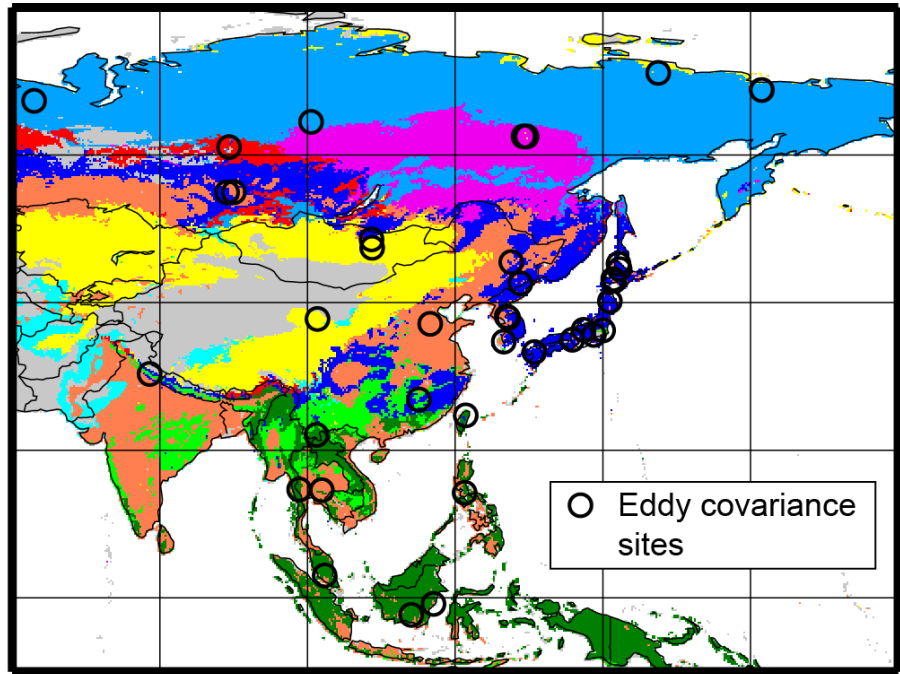
Biome-BGC, CLM-CN3.5, VISIT

LPJ, TRIFFID

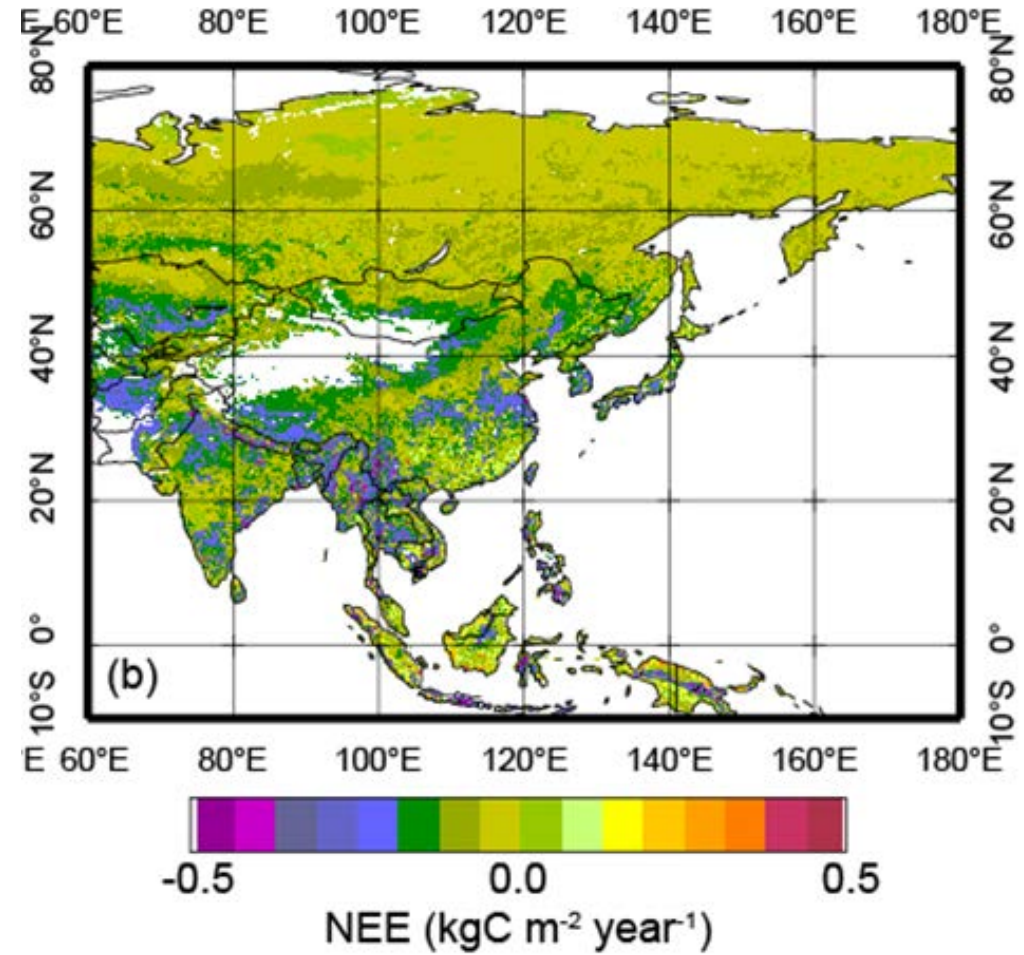
Consistent Driver for 1901-2010



Data-driven estimation of CO₂ fluxes in Asia



+ MODIS products
+ ML (SVR)



AsiaFlux + other (FFPRI, European DB etc.)

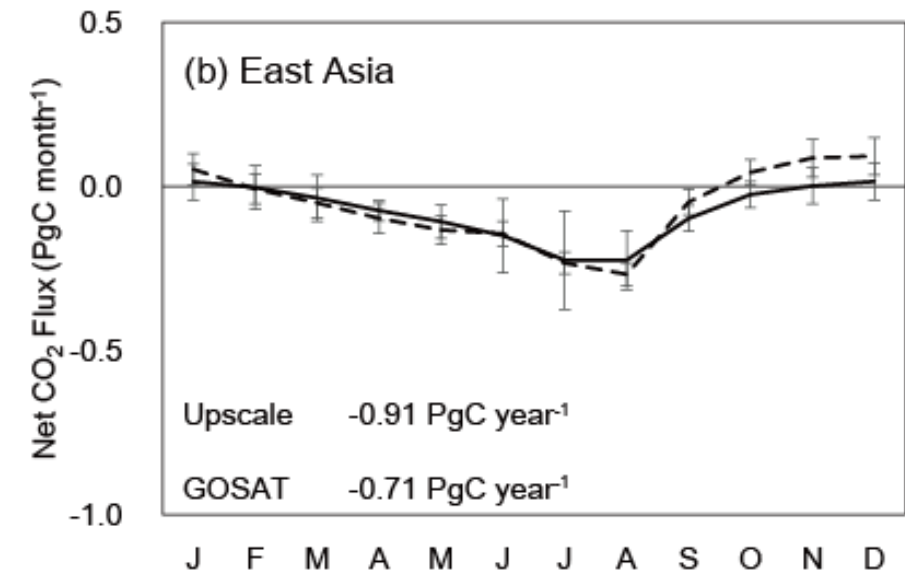
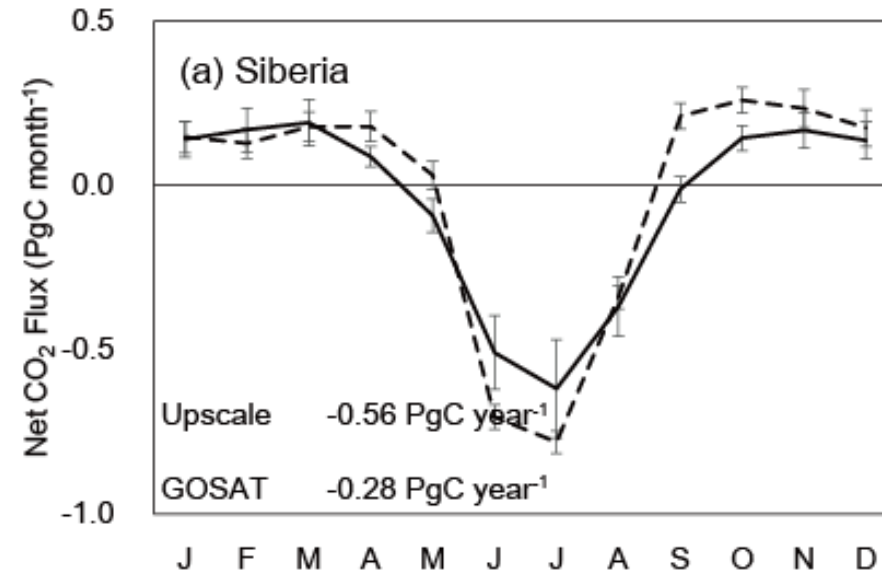
Consistent data processing [Ueyama et al. 2012]

[Ichii et al. 2017; JGR-biogeosci]

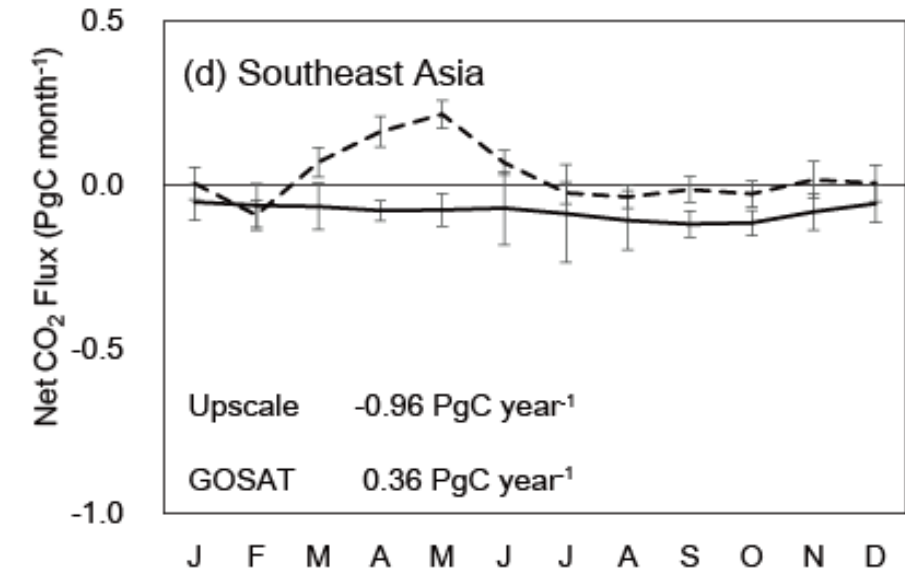
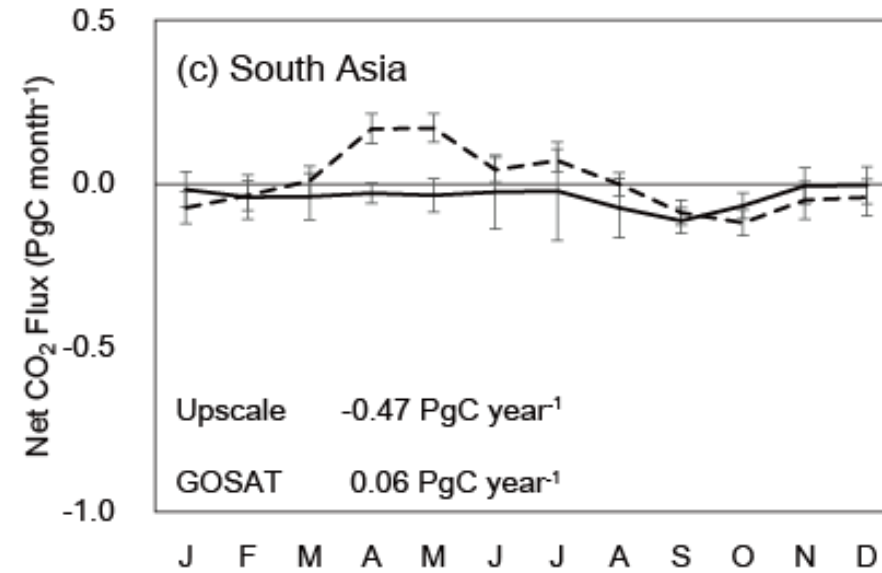
Data-driven estimation vs Topdown (GOSAT) estimation

Data-Driven (SVR) NEE in Asia
[Ichii et al. 2017]

GOSAT Inversion (NBP)
[Maksyutov et al. 2013]



AsiaFlux upscaling shows
closer seasonal variation with
GOSAT in Siberia/East Asia.



Gaps remain in S. Asia and SE Asia.

[Ichii et al. 2017; JGR-biogeosci]

Flux towers across tropical peatlands in SE Asia

- About 15 towers in Indonesia and Malaysia for CO₂, energy and CH₄ fluxes
- In intact peat swamp forest (PSF), drained PSF, logged PSF, burnt ex-PSF and young and mature oil palm plantations



Summary

AsiaFlux site summary:	107sites registered 36 site data in AsiaFlux DB (accessible) 13 site data to FLUXNET 2015 (7 sites done; 6 sites near future)
Issues:	Funding for international collaboration Long-term funding Maintaining existing sites
Scientific Outputs:	Cross-site synthesis Model comparison Upscaling (Data-driven estimation) Top-down vs bottom-up synthesis Network across SE Asia for environmental change detection