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AsiaFlux Newsletter

Contents

Report on the 4th Synthesis Workshop, FLUXNET 2002

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The Forth Synthesis Workshop, FLUXNET 2002, was held on 20-22 June 2002 at the Palazzo del Popolo Conference Center in Orvieto, a small town in the central of Italy. The first workshop was kicked off in 1995 at Lathuile, Italy, followed by the second workshop in 1998 at Polson, Montana, USA, and the third in 2000 at Marconi, San Francisco, USA. The main focus of workshop has been the long-term monitoring of fluxes through flux sites all over the world. Researchers presented various data to discuss flux measurement methods, the factors of seasonal flux variation and inter-annual changes, and the underestimation of night-time CO_2 flux during calm periods. These discussions have been summarized and published as articles or reviews. With accumulating flux data, increased number of operating sites and the data obtained with new measurement methods, the workshop focused on the following issues.

1. Can eddy flux data of carbon and water exchange be used to constrain fluxes computed with biophysical, biogeochemical and inversion models?

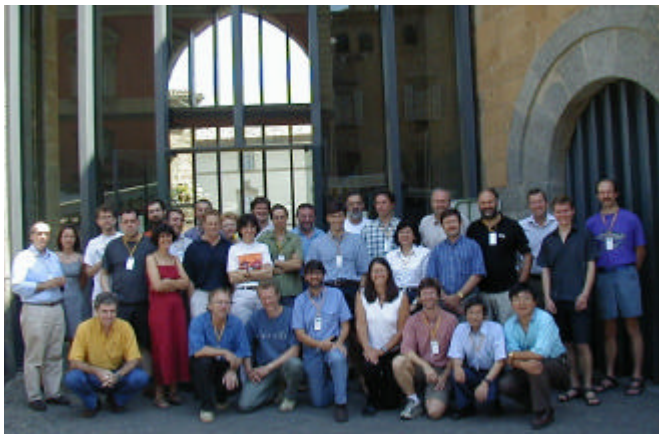
2. Models produce estimates of NPP, towers produce estimates of NEE. Chambers, understory eddy flux systems and isotopes have the potential to produce the information that can be used to test models. How well do they do so? What are the biases, errors and pitfalls with these methods?

3. At the last workshop, tropical forests, savanna and northern wetland ecosystems were not represented. These ecosystems are affected by drought, high and low temperatures and water tables. With new data we ask: how these ecosystems respond to environmental perturbations?; do they respond in similar or different manners than temperate ecosystems?

4. The future of flux networks will involve clusters of towers in regions to ask questions about stand age and disturbance. To what degree does stand age and disturbance affect the use of functional types when modeling and parameterizing fluxes?

5. With very long data sets accumulating, what biophysical factors are producing year-to-year variability in fluxes? Do they vary by climate and functional type?

Representing AsiaFlux, Yamamoto presented the results of the flux measurement carried out by the research group of AIST at Takayama and Tomakomai sites, Japan, Sakaerat site, Thailand, and BukitSoeharto site, Indonesia. We discussed differences between the tropical and temperate forests under the climate conditions of East Asia, and compared our results with the data of the tropical forest in Brazil presented by Nobre of Brazil. Valentini of Italy presented a case study of mapping CO_2 distribution for the whole Europe by applying neural network theory on data measured at several regions in Europe. Law of USA provided an overview on variation of carbon stocks and fluxes with stand age using both measured data and multi-year modeling results. Bowling and Baldocchi of USA presented the method to separate the soil respiration from the plant respiration and photosynthesis, using the measured forest CO_2 flux under leaf canopy with the eddy correlation method and the data of stable carbon isotope ratio inside and outside the forest, and discussed the potential of their method.



Participants at the Orvieto Fluxnet workshop

More than fifty researchers from Europe, North and South America, Japan, and Australia gathered at the Palazzo del Popolo Conference Center, which is a renovated historical building, constructed in medieval times, as can be seen in the photograph taken at the conference. Under the very high temperature, over 30 degrees Celsius, we took 30 minutes walk around the small town located on the tableland surrounded by cliffs higher than 100-meter. We realized the reason why the successive Popes took refuge at a church in the town. They might think that the geological position would make it easier to defend them from enemies. As the conference was proceeding while the 2002 FIFA WORLD CUP KOREA-JAPAN was taking place and Italian team lost the game against Korean team and Brazil and German teams kept on winning, people enjoyed talking about the games at the coffee breaks after having had hot discussions about the current state of the flux research. We would like to express our gratitude to Prof. Valentini and other staff for their excellent contribution to the workshop in the impressed historical building, and for giving us an opportunity to enjoy delicious food at a wonderful restaurant. In closing, we hope that the fifth workshop will be held in Sweden on June 2004 with further great success.

Long-Term Measurement of CO_2 Flux over a Larch Forest in Northeastern China

Nobuko SAIGUSA, Huimin WANG, Susumu YAMAMOTO
(National Institute of Advanced Industrial Science and Technology)

In May 2002, Yamamoto, Wang, and Saigusa visited the Northeast Forestry University, Harbin, China, with the engineer of Climatec Co.,Ltd. in Japan. We installed various flux measurement instruments at the research site in Laoshan, in cooperation with the Open Research Laboratory of Forest Plant Ecology of the university. The site is located in the plantation forest testing site of the Northeast Forestry University, stretching over the hilly terrain about 80 km away from Harbin. The area around the site, sloping gently toward the southward, is covered with Larch forest about 18 m in height.

The Northeast Forestry University has carried out several collaborative research projects on northern forests with the Hokkaido University, Japan. In 2000, the

National Institute of Advanced Industrial Science and Technology (AIST), Japan, joined in the research team and decided to make an agreement on collaborative research between Japan and China for implementing the integrated field studies on carbon circulation in the Larch forest stretching in the northeastern China. Now, many researchers and graduate students joined in the collaborative project to conduct studies on the measurement of the ecological functions of the photosynthesis and soil respiration in collaboration with the Hokkaido University, and on the measurement of the meteorological and CO_2 flux observation with AIST. For the latter field study, the flux tower was extended to 29 m from the original height of 20 m with an attached 9 m pole. The measurement parameters are as follows:

1.micrometeorological elements: short and long wave radiation (upward and downward), photosynthetic photon flux density (upward and downward over canopies, downward at three locations on the forest floor), air temperature, air humidity (in and over canopies), precipitation, and air pressure.

2. fluxes: sensible heat flux, latent heat flux, CO_2 flux (closed-path, eddy correlation method, at 29 meter height)

3. soil: soil temperature, water content, ground heat flux (two locations on the forest floor)

Researchers and engineers, who installed instruments at the site of Laoshan, in May, 2002

Since the fiscal year of 2002, a joint research project including Forestry and Forest Product Research Institute, FSC of the Hokkaido University and other research groups in and outside Japan, has started the quantitative examination on the circulation of CO_2 at the Larch forest in the northeastern China, the northern Japan (Tomakomai, Hokkaido), and the central Siberia, which have different meteorological and soil conditions. Although the forest widely distributing in a vast permafrost zone in the interior of Eurasian continent has global importance, it was difficult to carry out a long-term measurement on a large scale, because of the severe weather condition, and difficulties in the transportation and access. By overcoming those difficulties, we will accomplish the field studies on the comprehensive elucidation of carbon circulation in the Larch forest of the Eurasian continent.

"Biosphere-Atmosphere Interactions" Symposium in INTECOL VIII

Kentaro TAKAGI
(Field Science Center for Northern Biosphere, Hokkaido University)

"Biosphere-Atmosphere interactions" meeting was held on 14th August in Seoul, Korea, as one of the 70 symposia in International Congress of Ecology. This symposium was organized by Prof. J. Kim, Yonsei University, Korea, and Prof. W. Oechel, San Diego State University, U.S.A., and 15 scientists from AsiaFlux, CEOP and GAME projects participated to focus on: 1. Establishing for guiding, collecting, synthesizing, and disseminating long-term measurements of carbon, water & energy exchange in key ecosystems in the world; 2. Collecting critical new information to help define the current global carbon, water & trace gas budgets and enable improved future predictions; and 3. Enhancing our understanding of carbon, water & energy

Liang (CGER/NIES) at the " Biosphere-Atmosphere interactions" symposium in INTECOL VIII

fluxes, net ecosystem production, carbon sequestration and water resource management/application. In addition, there were 27 poster presentations in "Global climate change" session on the same day.

Oechel began this symposium, reporting regional scale flux observation by towers and an aircraft, and proposed establishing the Pacific rim Network. Valentini from University of Tuscia, Italy, reported the importance of the soil water status as a determining parameter of the soil respiration, using the efflux data obtained by EUROFLUX&CARBOEUROPE. J. Kim introduced a global monitoring project for water and energy cycle "CEOP" (Coordinated Enhanced Observing Period). CEOP aims to simulate and predict the global water and energy cycles and to provide an opportunity for a better qualitatively and quantitatively understanding of the multi-scale energy and water cycle processes of the monsoon systems as part of the Earth climate system, using integrated data sets obtained by observation, satellite remote sensing, and model outputs. For this purposes, CEOP has 33 reference sites in the world, comprehending GEWEX (Global Energy and Water Cycle Experiment) sites and other WCRP (World Climate Research Programme) monitoring sites. Some of the CEOP sites take part in AsiaFlux. Two other research results from GEWEX were reported by Yasunari and Sugita from University of Tsukuba, Japan. Yasunari reported the overall results of GAME project and Sugita reported the estimation of regional evapotranspiration rate by an ABL (Atmospheric Boundary layer) model, and the comparison with the GAME-ANN (Automatic Weather Station Network) data sets.

There were 6 reports from AsiaFlux activities. Yamamoto, AIST, Japan, presented the comparison of annual NEE values from 4 sites in AsiaFlux (2 sites in Japan and 2 sites in South-east asia). W. Kim, Yonsei University, introduced a flux observation project in tropical mixed land surface in Thailand. Inukai from NIES, Japan, introduced the projects promoted by Center for Global Environmental Research, NIES, and Toriyama and Liang from this institute presented the annual NEE value and the continuous measurement of soil respiration on a larch forest at Tomakomai Flux Research Site, respectively. Takagi, Hokkaido University, Japan, introduced a carbon cycle monitoring project in a northernmost of Japan and reported the behavior of the CO_2 in the snowpack and the transfer mechanism.

Kang, university of Montana, USA, reported the effect of the modification of cloud covers in MODIS-data on the estimation of the regional plant phenological activities. He suggested the modification of the satellite data provide more accurate plant phenological activities. Watanabe, from FFPRI, Japan, succeeded coupling a multilayered numerical model of surface physics with a diffusion model of the dynamics of size structure and self-thinning in a plant population. The model was tested using a data set of the 5-year size structure change in a cedar forest. The model result of the size distribution after the5-year simulation agreed well with that of the observed values not only for the ensemble mean but also for its variation with respect to plant size.

Many researchers from international projects, such as AsiaFlux, CEOP, and GAME took part in this symposium. Each project links each other and some observation sites belong to plural projects. However, several researchers suggested that data and information sharing is still insufficient. Finally, we finish this meeting, agreeing on enhancing information sharing and having an opportunity for discussing the plan to establish the Pacific rim Network.

Award of the Japanese Society of the Atmosphere Environmental Science to Susumu Yamamoto

Susumu Yamamoto, chairman of the AsiaFlux Steering Committee from the National Institute of Advanced Industrial Science and Technology was awarded a prize of the Japanese Society of the Atmosphere Environmental Science, on the 43rd annual meeting of the society, for his wide range of contributions to the field studies on flux such as development of measurement methodology on biosphere atmosphere interactions research.

—— A New Indonesia Monitoring Site ——

Information of the Palangkaraya operating site at Central Kalimantan, Indonesia, will be added to the Asiaflux website. This monitoring site has been set up by Hirano (Hokkaido Univ.) and others.

From the Secretariat

We quarterly publish AsiaFlux Newsletter, usually the end of March, June, September, and December. Kindly submit material for the newsletter three months before the publication date. Please send announcement of conferences, workshops and other meetings directly to the Secretariat by E-mail or floppy disk. The text may be modified according to the requirement of newsletter format.

Editor's Note

We conducted intensive biomass research of Sakhalin fir in last August.
Thanks for a lot of help from various cities in Japan (Tsukuba, Naha, Tokyo, Sapporo).
Heating systems are already working in my town.

The editor of AsiaFlux Newsletter No.3:
Kentaro TAKAGI
(Hokkaido University)

The editor of AsiaFlux Newsletter No.4 will be Tetsuya HIYAMA (Nagoya University).

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