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Data sharing with JapanFlux and AsiaFlux (Monitoring networks of energy, water vapor, and carbon dioxide fluxes)

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AsiaFlux is a regional research network for monitoring and studying the exchanges of carbon, water and energy between terrestrial ecosystems and the atmosphere. AsiaFlux collects data on canopy micrometeorology, radiation budget, energy budget, fluxes of carbon dioxide and water vapor over terrestrial ecosystems, as well as soil environments such as vertical profiles of temperature, moisture, and heat flux in the soil. The network was established in 1999, following the establishment of FLUXNET (global network), and other regional networks such as CarboEuro -Flux (Europe) and AmeriFlux (USA). Under the umbrella of AsiaFlux, there are several national or regional networks, such as JapanFlux (Japan), ChinaFlux (China), KoFlux (South Korea), ThaiFlux (Thailand). Here I would give some examples of sharing of data among JapanFlux and related research communities. I also discuss several problems that should be solved to encourage collaboration among different observational networks.

Currently, most scientists involved in JapanFlux are aware that effective interdisciplinary approaches with data-sharing will bring us a variety of attractive scientific idea, hypothesis, and interpretation, which we could never obtain only by CO2 flux data. The scientific significance of interdisciplinary approach to global environmental study is: (1) to deepen our comprehensive understandings on ecosystems, which essentially consist of physical, chemical, and biological processes that could be observed by various technological ways developed by different study areas; and (2) to generalize our understandings of ecosystems into global, continental and regional phenomena. This is quite essential for studying interaction between climate and terrestrial ecosystem processes.

A few common features are observed to successful cases of data-sharing and interdisciplinary collaboration, such as: (1) not only data-users but also data-providers can gain the merit of data-sharing; and (2) data-users and data-providers can communicate regularly and exchange their ideas with each other. Three example cases are shown as follows.
[1] Collaboration among micrometeorologists, hydrologists, ecologists, atmospheric chemists, remote sensing and modeling scientists, who are working together at a particular site in order to understand the ecosystem comprehensively. In this case, data-providers are able to gain other members' data and use them to deepen their own studies.
[2] Collaboration for inter-site comparisons. In this case, data-providers may be able to join with the multi-site analyses and contribute as one of co-authors in the synthesis paper.
[3] FLUXNET synthesis studies. So far, about 250 flux-sites (data-providers) provided their own data to create a dataset. Then data-providers who wish to study using the datasets submitted their research proposals. When the committee approved the proposal, the first author would take the lead to accomplish the proposed study.

In order to encourage data-sharing and synthesis studies among JapanFlux and related communities, first of all, it is necessary to reduce routine-tasks of scientists for maintaining

observational sites and data quality control. At present, most data-providers have serious difficulty in finding their time to work for data-sharing. Secondly, it is also quite essential to grow the number of scientists who promote original studies using not only their own data but also datasets provided by other sites and other study areas. This is because the most attractive datasets may be created simultaneously with the most up-to-date interdisciplinary studies.

Keywords: Data sharing, Terrestrial ecosystem, Fluxes of energy, water vapor, and CO2, Monitoring network