

**This NEESPI Science Advisory Panel (NSAP) Meeting was convened on
February 24, 2006 during the 1st NEESPI Science Team Meeting,
February 22-24, 2006, IIASA, Laxenburg, Austria**

First part of the Panel Meeting was held jointly with NSCC and then separated after item 2 of the agenda had been discussed.

1. Reports on the discussions held during the Science Team Meeting on:

1a. Outstanding issues of Carbon and Land Use Discussion.

Rapporteurs' Report (Presented by Amber Soja)

1b. Integration studies in NEESPI

Rapporteurs' Report (Presented by Dennis Lettenmaier)

Rapporteurs' reports are attached separately to the NEESPI Agenda.

Actions: None, see however, item 3

2. Focus Research Centers

2.1. Topical Focus Research Centers.

Background. Initially, seven NEESPI Focus Research Centers were envisioned. Six of them already have been established:

- *Center for Cold Land Processes and Arctic Coastal Studies*
- *Center for Water System Studies*
- *Center on Atmospheric Aerosol and Air Pollution Studies*
- *Center for Land Use Studies*
- *Center for Biogeochemical Cycle Studies*

and two of them, *Center for Land Cover Studies* and *Center for Integration of the NEESPI Results and Modeling Studies* are still in perspective.

Discussion was focused on the last, so far missing, *Center for Integration of the NEESPI Results and Modeling Studies* and how NEESPI could proceed with its establishment. It was recognized that:

- Projected Focus Research Center for Integration of the NEESPI Results and Modeling Studies (or two of them deeply interacting) can be established in Europe (Hadley Centre for Climate Prediction and Research, Met Office, Exeter, UK or Max Planck Institute for Meteorology, Hamburg, Germany) and/or in the United States (in GFDL and/or NCAR, with contribution of existing and forthcoming NEESPI projects in Universities of Washington, New Hampshire, Alaska, Princeton University, and Georgia Institute of Technology).
- At present, NSAP does not see a candidate for such Center inside the NEESPI domain.
- The current operational mode as a distributed consortium of scientists for integration studies could be an extremely risky option.

Conclusion. NSAP believes that it can delay for a while the establishment of the *Center for Integration of the NEESPI Results and Modeling Studies* (but, not for a long time). Attempts to establish this Center will continue and advice and possibly future support from ESSP on this issue will be researched (see also, item 3.2.2).

2.2. Regional Focus Research Centers

During offsite discussions as well as at the NSAP meeting it was suggested to strengthen the research structure with Regional Focus Research Centers.

The following FRCs were suggested by the leadership of the Russian and Chinese Academies of Sciences:

- *Regional FRC in Moscow, Russia* with major research foci on the Arctic and boreal forest studies in Russia (TBC) and
- *Regional FRC in Beijing, China* with research foci on the drylands regions of eastern and central Asia

Action item. Our colleagues from RAS and CAS in collaboration with Roshydromet (Russia), CMA (China), and academic and non-academic institutions of Kazakhstan, Kyrgyzstan, Mongolia, Uzbekistan and other countries of eastern and central Asia will formulate the detailed agenda and areas of responsibility for these Centers.

The following FRCs were discussed (proposed) by the members of the Science Team (pending support from the leadership of National Academies of Sciences and, in Russia and China, appropriate branches of the National Academies of Sciences):

- *Regional FRC in Sopron, Hungary* with research foci on the NEESPI studies in Eastern Europe. One of such focuses (proposed by Prof. Csaba Mátyás, University of West Hungary) could be the studies of agricultural and forest ecosystem production processes at the western forest, forest-steppe, and steppe margins in changing climate, but other focuses will emerge when more regional research groups join this FRC.
- *Regional FRCs in Vladivostok and Krasnoyarsk* with research foci on the Far Eastern and Siberian Sectors of the NEESPI domain respectively.

Action items.

- NSAP supports an initiative of the Institute of Environmental Sciences, University of West Hungary, Sopron, Hungary to establish a National NEESPI Coordination Center with a perspective (if funds will be available) to expand it towards the Regional Focus Research Center for the Eastern European part of the NEESPI domain. First contacts with Romanian and Ukrainian colleagues indicate that this initiative meets with international support.
- Contacts with the Far Eastern Branch of RAS, CAS, and our Japanese colleagues will continue to formulate the foci and interaction scheme for the NEESPI FRC in Vladivostok (on the basis of FEB RAS).
- Taking into account a large volume of international work [within the NEESP Initiative as well as with other Earth scientists from European Union and Japan] conducted by the Forest Institute of the Siberian Branch of the Russian Academy of Sciences, it is considered feasible to establish a Regional FRC on the basis of this Institute pending approval of the Institute and the SB RAS leadership.

***** NSCC separates

3. After NSCC members left, two major topics were discussed at the 1st NSAP Meeting:
 - i. Integration of existing and future NEESPI projects.
 - ii. Milestones for the next 3-4 years.

3.1. Background. In the NEESPI Science Plan (mostly, Chapter 5), a major idea for integration of the NEESPI studies was as follows:

The Science Team builds a suite of models within three scales (local, regional, and global) that address the major research questions of NEESPI (<http://neespi.org>). These should be Land Surface Models and, following the mainstream of these models development, these will be hydrological models with a strong vegetation (biogeochemical) block, human dimension block (land use), cryospheric block (peculiarity of the NEESPI region), and land-atmosphere interaction block (soil-vegetation-atmosphere transfer models of different levels of complexity). On top of these models should be regional climate model(s) all together well

fed with input data from in-situ and remote sensing instrumentation *and* subgrid models that allow incorporation of the local scale process studies that might generate biogeochemical feedbacks on larger-scales. Various impact models linked to the above model suite should address various practical societal needs from biodiversity concerns and human health issues to long-term local, regional, and nationwide planning. All together, these models should, thereafter, be able to contribute to GCMs and/or their generalization, Global Earth Models as well as to secure integrated assessment modeling on different scales including local level with an explicit mechanism for incorporating and addressing stakeholders' (decision-makers) questions and concerns regarding global change as applied to Northern Eurasia, its regions, and for the interests of the major societal and economic activities.

Now, having at hand real projects designed and funded in response to the NEESPI scientific objectives, it is the time to (a) develop an implementation plan for the Initiative integration and ((b) outline missing links within the network of the NEESPI funded projects in order to fill in the gaps in a timely manner.

3.2. Integration issues.

3.2.1. NSAP recognizes that the first set of projects, which can serve as the base for future integrative studies within the NEESPI region, has been launched with support of NASA, EU, The Russian Academy of Sciences, and The Japanese Ministry of Environment. Due to restrictions of the individual projects' funding and specific research objectives, not a single one of these projects could alone claim to be a cornerstone of NEESPI. But, together they have already accumulated a sufficient critical mass to initiate a snowball effect that leads toward integrative processes among the NEESPI projects (cf., Appendix 1). NSAP recommends a further expansion of the studies within these projects to blend them together (or even to urge the PIs of these projects to submit joint proposals) with an objective to secure seamless corroboration among the large-scale integrative projects' input and deliverables. Principal investigators of other NEESPI projects are recommended to use (or anticipate using) output of the NEESPI integrative projects and actively seek opportunities to complement and/or enhance these projects. This recommendation does not impose restrictions on new clusters of studies that are currently insufficiently presented among the NEESPI projects but listed among the NEESPI science goals.

3.2.2. NSAP recognizes another (so far missing) component of linking the NEESPI integration process to the GCMs and GEMs. There are only a few Research Centers where such type of work could be initiated in a competitive manner and NSAP recommends to NSCC to further "work" with these Centers and individual groups to make this linking happen in practice.

Action items. 1. *NSAP strongly recommends to NEESPI Project Leaders to seek close connections with the NEESPI integrative projects complementing and adding value to their output.*
2. *A working group on data integration has been organized at the meeting to foster efforts of interdisciplinary integration of the NEESPI projects' input and output (Leads: Gershenzon, Groisman, Leptoukh, Razuvaev, and Zhai).*

3.3. Milestones.

Most of the NEESPI projects have been funded separately on an individual merit basis and some of the investigators joined the Team with their projects already funded. At the pilot stage of NEESPI, a majority of projects did not press forward upon the integration theme at all. For different parts of the NEESPI domain, they promised (and will deliver) a better understanding of the land cover/land use change, improvements in cold land hydrology and/or the carbon budget, address the biodiversity issues, data collection, remote sensing products calibration, etc. At the same time,

a significant number of funded interdisciplinary projects covering various aspects of NEESPI became a reality. Recognizing the above and that

- a unique role for NEESPI in the international arena is the *integration* which other programs do not do, or have, and
- the integration will gradually evolve and that Integration Proposals will come as NEESPI moves further along with the topical science,

NSAP is concerned with the question: what could be done towards integration in the next 3 to 4 years (one funding cycle)? Therefore, NSAP tasks the FRCs and the Data Working Group (composed from the leaders of Science and Data Support Centers) to focus on core science topics for integration working between and/or among the disciplines. It was suggested that initial integrative workshops organized by these Centers and the Group be held in approximately an 18-month time frame when opportunities arise- and that two champions be asked to take the lead on each one. The first such workshop will be held in Fairbanks, Alaska in early April 2006 and will address the cold land processes theme in the NEESPI region. Some more of the above-mentioned workshops are suggested to be held in conjunction with the ongoing ESSP Meeting (November 2005, Beijing, China) and the Fall AGU Meeting (December 2006, San-Francisco, USA).

Action items.

1. *NSAP is seriously concerned with the problem of integration across the diversity of the NEESPI projects and while the recommendation is to first address the integration within the action items in Section 3.2, NSAP will continue keeping in mind the entire picture that should remain the focus of work.*
2. *NSAP is tasking the NEESPI FRCs and separately the Data Group to formulate intermediate (3 to 4 years) and long-term objectives achievable within the time frame of 10 years depending upon the available resources.*
3. *The NEESPI Project Scientist is tasked to organize the Integrative Working Groups' Meeting across all major NEESPI disciplines in summer 2007.*

NSAP will discuss the results of these Working groups' activity at its next meeting.

4. NEXT Steps and other items on the NSAP Agenda.

- 4.1. NEESPI Data Policy developed by the NEESPI Data Group and distributed at the Meeting has been accepted by the 1st NEESPI Science Meeting and sealed by NSAP with an addition formulated by the NSAP Member, Prof. Eric Wood, as follows: "NEESPI will resist all attempts to convert itself into a "gated community" regarding the data accumulated during the course of the NEESPI research. This means that the Initiative fully supports WMO Resolution 40 and similar recommendations of International Science Organizations related to unrestricted distribution and sharing for scientific purposes of the Earth Sciences Information".
- 4.2. After hearing the report of the NEESPI Project Scientist regarding the endorsement by the ESSP 1st Open Science Conference Organizing Committee of the NEESPI Poster Session, NSAP strongly recommends to the NEESPI community to participate in the Conference as a Group (indicating the NEESPI theme in their abstracts submitted to different parallel Sessions of the Conference).
- 4.3. Education theme was among the key topics at the 1st Science Team Meeting. As a result of supportive discussion, NSAP recommends coordinating education in the fields relevant

to the key areas of NEESPI and provided by the associated institutes and universities. NSAP further recommends strengthening the exchange of young students and researchers. Several initiatives (GLOBE; EduSERV; IMPRS; ENVIROMIS; "Aerospace" for Higher Education; and Joint Georgia Institute of Technology, USA and Beijing Normal University, China Educational Initiative on Land-Atmosphere Interactions) have been identified, where NEESPI might be able to leverage the existing educational resources. From that vantage, steps can be taken to identify additional NEESPI educational needs in the coming three years.

- 4.4. A set of workshops organized by the FRCs will be conducted in the next 18 months as well as the next Science Team meeting that will be held in due course in the second half of 2007.
- 4.5. Ideas were expressed during the NSAP Meeting to move (link) the NEESPI research closer to science policy / resource management issues (Kyoto Protocol, Resource Management, etc.). No decisions were made at that stage on this move.
- 4.6. NEESPI will seek further cooperation with well established projects that include (are included in, or partially overlap) the NEESPI domain (e.g., BALTEX-II, CarboEurope, Zotto, YAK-Aerosib, and some others). For example, mutual understanding has been established during this Science Team Meeting that a rich experience in hydrological modeling during the decade of studying the Baltic Sea Basin within BALTEX could be transferred to other Sea (Lake) Basins of the NEESPI domain while ongoing and projected activities in terrestrial ecosystem modeling might be of interest to our BALTEX colleagues.

Appendix. Currently active and/or newly funded Integrative NEESPI Projects

- Modeling the carbon dynamics of the Eurasian Boreal Forest
- Current climate changes over Eastern Siberia and their impact on permafrost landscapes, ecosystem dynamics, and hydrological regime
- Diagnosis and Prognosis of Changes in Lake and Wetland Extent on the Regional Carbon Balance of Northern Eurasia
- Quantifying CO₂ fluxes from boreal forests in Northern Eurasia: An integrated analysis of flux tower data, remote sensing data and biogeochemical modeling
- Permafrost dynamics within the Northern Eurasia region and related impacts on surface and sub-surface hydrology
- Understanding the role of changes in land use/land cover and atmospheric dust loading and their coupling on climate change in the NEESPI study domain drylands
- Northern Eurasian C-land use climate interaction in the semi-arid regions
- Contributions of changes in land use/land cover, water use, and climate to the hydrological cycle across the Central Asian States.
- Role of land cover and land use change in hydrology of Eurasian Pan-Arctic
- An integrated understanding of the terrestrial water and energy cycles across the NEESPI domain through observations and modeling
- Integrated Study for Terrestrial Carbon Management of Asia in the 21st Century Based on Scientific Advancements
- Siberia-II Earth System Science Cluster of Studies (SIB-ESS-C)