

Discussion on outstanding problems in Carbon Cycle and Land Cover – Land Use Studies

Rapporteurs' report

Overview

First, there was a call for overarching clear goals so that we can clearly define where we are heading as individual and within the larger framework of NEESPI (not new science plan, maybe couple sentences).

Three reoccurring themes

Integration of processes, of investigations, and of policy (to include thought of relevant policy) and also there were question of the structure and funding of integration.

Consistently include **validation** of products that include a **statistical analysis of error** and inter-comparison of different methodologies and results (w/ error and potential reasons). For instance, compare top-down, bottom-up approach, each already containing estimates of error.

Synthesis – call for a small group that defines, promotes and advertises synthetic results around specific focal areas.

Other calls for data collection so that data not lost after researcher moves on.

Detailed comments/statements during the discussion follow below

Chris Shmullius, Friedrich-Schiller-Universität, Germany

Relative to Remote Sensing

- 1) Suggested an improved integration of methodology.
- 2) Recommended to foster validation between investigations.
- 3) Integration – How will it be funded?
- 4) Integration – How will it be structured? Geographically, thematically, human dimensions, watersheds?

Hank Shugart, University of Virginia

Much good news came from this meeting:

- RAS is eager to support NEESPI
- Association with iLEAPS, which is a rich program, and a good association for NEESPI.

Primary (personal-research-related) research questions are multi-scale, LCC, carbon and human associations.

NEESPI has been a new project and it has reached a point in its development that it needs to stand up and walk. Now it is ready to better define what it is walking towards, to better define its overarching research objectives. Individuals should be able to define the goals of their individual research projects and also define how individual projects fit within the larger overarching themes of NEESPI.

Anatoly Shvidenko, IIASA

- 1) We are missing accurate estimates of NPP and ecosystem NEP. Forest and wetlands are underestimated by about 15-20%. The 1000s of previous observations are flawed by the methodology.
- 2) Define the connections between science and policy.
- 3) Need for NEW regional models. Inventory-, process-, and big- models are not good enough. A hybrid model is necessary

Jim Elkins, NOAA

Offered measurements as a way to validate methodologies. For example, measurements of gases and fluxes from TransSiberian Railroad Experiment. (i.e. CO₂ from Radon), estimate CO₂ CH₄, HC, halocarbons. Expressed Hope for RAS support of research.

Chris Justice, University of Maryland

Many projects are underway. The challenge is for NEESPI to put together a small synthesis group that defines, promotes and advertises synthetic results (focal area specific). Then ... The existing gaps can be identified.

Susan Conard, USFS

- 1) Several studies have been ongoing that investigate small to large scales. They have much data but do not know what data is desired or where to share the collected information.
- 2) We need a better understanding of the physical processes underlying C / vegetation and C / permafrost so that we can make and understand climate change projections.

Anni Reissell, iLEAPS

Question: What is the current use of LUC, aerosols, cloud-climate data?

Pavel Groisman answered with some integrated studies

Dimitri Zamolodchikov, Forest Ecology and Production Center, RAS

Integration argument...

Each large scale C study promises to solve something. It is not enough without an integration between process and investigations. For example, bottom up and modeling studies should integrate and estimate integrated error.

Suggest an overarching report, from NEESPI Science plan to State-of-Science report.

Olga Krankina, Oregon State University

Synthesis issues. Carbon is the #1 basis but another suggestion is Land Cover mapping, which is the basis of many studies. Dr. Krankina invited input (supportive data) from the scientific community. She will be trying to validate and define errors.

Jianguo Qi, Michigan State University

Uncertainly in model-, processed-, flux-data, etc.

We need to validate both ground and RS data. On all studies, we need to include error bars, to define uncertainty statistically.

Then, we need inter-method comparative analysis, with defined error.

Unknown from auditorium

We need to better address inventories and sinks. Suggested retrospective analyses to address uncertainties, then we can better define potential climate differences.

Greg Greenwood, The Mountain Research Initiative, Switzerland

Large-scale products have some sort of policy rhetoric. But how are the data useful to a Global Government that does not exist? What does the research mean to real-world policy issues, to organize issues, end-to-end studies?

Anatoly Sukhinin, V.N. Sukachev Institute of Forest, RAS, Krasnoyarsk

We have 1 flux tower but with just 1, we may miss large-scale fires, and our results are only valid locally. Furthermore, we have 11 years of fire satellite data available for community use. Fire-induced LCC is here already and we have (to share) and welcome field investigation. Dr. Sukhinin suggested additional ground-truthing but indicated that funding would be needed for this to happen.

Martin Heimann, Max-Planck-Institut für Biogeochemie, Germany

Science projects are finite (few years) and the problems are long-term. It would be useful to have an accessible catalog of data that will be kept long-term (in-situ data).

Hank Shugart, University of Virginia – data sharing issues (project-, agency-, national).

Jim Elkins, NOAA

Are forests growing? Sinks?

CH₄ leveled.. why? Anthropogenic? Natural? Would be nice to have maps of marshes.

N, N₂O, C-N ratio is another important issue

Sergey Venevsky, UK Meteorological Office

CO₂ fluxes within global comprehensive data. Compared similar previously done work – downscale.

Shuguang Liu, USGS EROS

Need C change, fire history, active layer depth, soil/C respiration, species, hydrology

Anni Reissell, iLEAPS

Recognized that there are many classical problems with flux measurements, please help us define and deal with them. We need to address policy and iLEAPS is working on that..

Request NEESPI coordination to stress the regional to global impacts

Pavel Groisman, NEESPI Project Scientist, UCAR/NCDC

It is accepted that the NEESPI region is changing and the change is due to external forcings.

That is our motivator. Start with LCC, C change, now climate change and integration

Lots of uncertainties are difficult for policy-makers to deal with.

Anatoly Gitelson, UNL

30% error in remote and ground data. There are uncertainties in FPAR, LAI, LUE particularly.

Stressed the need for statistical studies that define errors.

Alexander Olchev, A.N. Severtsov Institute of Ecology and Evolution, RAS

Compare models (RS, development) of GPP NPP with other network data (i.e., eddy) to better define errors.