

Regional Ecosystem Dynamics and Climate Feedbacks

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Regional Ecosystem Dynamics and Climate Feedbacks Questions

- (1) How will interactive responses of disturbance regimes, ecosystem structure/function, and successional pathways to future climate variability and change influence regional ecosystem dynamics?
- (2) How will projections of regional ecosystem dynamics affect regional energy and water feedbacks to the climate system?
- (3) How will projections of regional ecosystem dynamics affect regional CO₂ and CH₄ feedbacks to the climate system?

Tasks

- (1) Couple model of fire regime (ALFRESCO) with model of ecosystem structure and function (DVM-DOS-TEM), incorporate information from empirical studies, and conduct retrospective analysis of the coupled model framework;
- (2) Apply the coupled model for future scenarios of climate and analyze changes in ecosystem function/structure at the regional scale;
- (3) Analyze water and energy feedbacks among the applications;
- (4) Conduct factorial experiments for future scenarios of climate change and evaluate effects of climate and disturbance on estimates of CO₂ and CH₄

Primary Support for this Research

Identifying Indicators of State Change and Predicting Future Vulnerability of Alaska's Boreal Forest (funded by DoD SERDP)

Modeling Objective: Develop models that can **forecast landscape change** in response to projected changes in climate, fire regime, and fire management.

Integrated Ecosystem Model for Alaska and Northwest Canada (funded by USGS and Alaska Landscape Conservation Cooperatives)

To develop a conceptual framework for integrating important components of an ecosystem model for Alaska and Northwest Canada including: fire, vegetation dynamics/succession, biogeochemistry permafrost dynamics, and hydrology.

Primary Support for this Research (cont.)

Alaska Land Carbon Assessment (funded by USGS)

Objectives are to assess: 1) the amount of C stored in ecosystems of Alaska 2) the capacity of Alaska ecosystems to sequester C, and 3) evaluation of the effects of the driving forces such as climate and wildfire that control ecosystem C balance.

Permafrost Carbon Network (funded by NSF)

Address the question “What is the **magnitude, timing, and form** of the permafrost carbon release to the atmosphere in a warmer world?” through synthesis by linking biological C cycle research in the permafrost region with well-developed networks in the physical sciences focused on the thermal state of permafrost.

Morning Session (Friday, 20 February 2015): Progress and Future Directions of Climate Feedbacks Research

8:30 – 8:50 Climate Change and the Permafrost Carbon Feedback – Ted Schuur

8:50 – 9:10 Projections of Climate and Vegetation Change – Scott Rupp

9:10 – 9:30 Consequences for Carbon Feedbacks – Helene Genet

9:30 – 9:50 Consequences for Water/Energy Feedbacks – Eugenie Euskirchen

9:50 – 10:10 Coffee Break

10:10 – 10:30 Future Directions for Climate Feedbacks Research – Dave McGuire

10:30 – 11:00 Discussion of Future Directions for Climate Feedbacks Research

11:00 – 11:15 Overview of Proposal Development – Roger Ruess

11:15 – 12:00 Theme highlights and directions – Other Theme Leaders

12:00 – 1:30 Lunch