Close Window

Proof

Print

CONTROL ID: 1196217

TITLE: Quantifying the dynamics of land cover and land use, hydrology and biogeochemistry in northern Eurasia

PRESENTATION TYPE: Assigned by Committee (Oral or Poster)

CURRENT SECTION/FOCUS GROUP: Global Environmental Change (GC)

CURRENT SESSION: GC16. Regional Climate Impacts 7. Environmental, Socio-economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System: The Role of Remote Sensing and Integrative Studies

AUTHORS (FIRST NAME, LAST NAME): Qianlai Zhuang[1], Jerry M Melillo[2], David W Kicklighter[2], John M Reilly[3], Andrei P Sokolov[3], Yongxia Cai[3], Anatoly Shvidenko[4], Nadja Tchebakova[5], Elena PArfenova[5], Andrey Sirin[6], Shamil Maksyutov[7], Anna Peregon[8], Guangsheng Zhou[9]

INSTITUTIONS (ALL): 1. Earth & Atmospheric Sciences, Purdue University, West Lafayette, IN, United States.
2. Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA, United States.
3. Massachusetts Institute of Technology, Cambridge, MA, United States.
4. International Institute of Applied Systems Analysis, Laxenburg, Austria.
5. V.N. Sukachev Institute of Forest, Siberian Branch of the Russian Academy of Sciences,, Krasnoyarsk, Russian Federation.
6. Institute of Forest Science, Russian Academy of Sciences, Moscow, Russian Federation.
7. : National Institute for Environmental Studies, Tsukuba, Japan.
8. CEA Centre de Saclay, Laboratoire des Science Du Climat et de l'Environnement, Gif-Sur-Yvette Cedex,, France.
9. Institute of Botany, Chinese Academy of Sciences, , Beijing, China.

SPONSOR NAME: Qianlai Zhuang

ABSTRACT BODY: In recent decades, the largest increase of surface air temperature and related climate extremes have occurred in northern Eurasia. This temperature increase and extreme climate are projected to continue during the 21st century according to climate models. The changing climate could affect landcover and the biogeochemical cycles in the region. These changes in biogeography and biogeochemistry, in turn, will affect how land use evolves in the future as humans attempt to mitigate and adapt to future climate change. Regional land-use changes, however, also depend on pressures imposed by the global economy. Feedbacks from future land-use change will further modify regional biogeochemistry and climate. Using a suite of linked biogeography, biogeochemical, economic, and climate models, we explore how six future climate projections may influence vegetation distributions, carbon stocks and fluxes of carbon dioxide and methane, and economic activity in northern Eurasia during the 21st century. Preliminary results indicate a northern shift of biomes such that, in the absence of land use, tundra areas in the region will decrease whereas steppe areas will increase and areas of temperate forests will increase in response to climate change. The biomes shift leads to new economic opportunities that have different land-use change consequences on terrestrial carbon dynamics in the region than would be predicted in the absence of biome shifts. In the presentation, we will also present the progress on how radiative forcing will change due to changes of albedo, evapotranspiration, and fluxes of carbon dioxide and methane resulting from changes of land use and land cover in the region.

(No Image Selected)

(No Table Selected)

INDEX TERMS: [0315] ATMOSPHERIC COMPOSITION AND STRUCTURE / Biosphere/atmosphere interactions, [0439] BIOGEOSCIENCES / Ecosystems, structure and dynamics, [0414] BIOGEOSCIENCES / Biogeochemical cycles, processes, and modeling, [0428] BIOGEOSCIENCES / Carbon cycling.
