


AGU Fall Meeting 2009

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Location: Poster Hall (Moscone South)

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Carbon and Water Dynamics in the Mongolian Plateau during the 21st Century

Y. Lu¹; Q. Zhuang¹; G. Zhou²; A. Sirin³; J. M. Melillo⁴

1. Purdue University, West Lafayette, IN, United States.
2. Institute of Botany, Chinese Academy of Sciences, Beijing, China.
3. Institute of Forest Sciences, Russian Academy of Sciences, Moscow, Russian Federation.
4. The Ecosystems Center, Marine Biological Sciences, Woods Hole, MA, United States.

The Mongolian Plateau is dominated by grassland ecosystems. It frequently experiences droughts and is underneath permafrost in the north. Its complex responses of plant carbon uptake and soil carbon release to climate change could greatly affect the global carbon cycle during the 21st century. Here we combine spatially-explicit information on vegetation, soil, topography, and climate with a process-based biogeochemistry model to assess the carbon responses for the past and this centuries. While the region acted as a C sink of 31 Tg C yr⁻¹ in the 1990s as model suggested, under the future climate conditions, this regional sink will likely decline. This is primarily due to (1) the increase of C uptake stimulated by rising temperature and fertilization effects of rising atmospheric CO₂ concentrations does not keep with the enhancement of carbon release from soils and (2) the increasing air temperature tends to dry up soils, in turn, limiting plant carbon uptake. A large inter-annual and spatial variability is resulting from complex soil thermal and moisture dynamics as consequences of differential change rates of air temperature and precipitation in this unique region.

Contact Information

Yanyu Lu, West Lafayette, Indiana, USA, 47906, [click here](#) to send an email

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