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TITLE: Agroclimatic potential in central Siberia in an altered 21st century climate

PRESENTATION TYPE: Poster Requested

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

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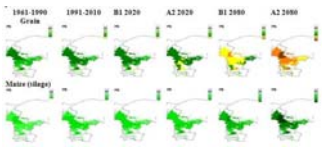
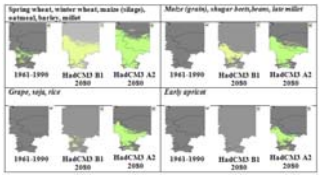
Title of Team:

SPONSOR NAME: Amber Soja

ABSTRACT BODY: Humans traditionally cultivated steppe and forest-steppe on fertile soils for agriculture. Forests are predicted to shift northwards in a warmer climate and be replaced by forest-steppe and steppe ecosystems. We analyzed climate change impacts on agriculture in south-central Siberia believing that agriculture in traditionally cold Siberia may benefit from warming. Simple models determining crop range and regression models determining crop yields were constructed and applied to climate change scenarios for various time frames: pre-1960, 1960-1990, 1990-2010 from historical data and for 2020 and 2080 from HadCM3 B1 and A2 projections. From 50 to 85% of central Siberia was predicted to be climatically suitable for agriculture by the end of the century, and only soil potential would limit crop advance and expansion to the north. Crop production could increase twofold. Future climatic resources in Siberia would provide potential growth for a variety of crops that previously did not exist on these lands. Traditional Siberian crops could gradually shift as far as 500 km northwards (about 50-70 km per decade) within suitable soil conditions, and new crops, nonexistent today, may be introduced in the dry south that would necessitate irrigation. Agriculture in central Siberia would likely benefit from climate warming. Adaptation measures would sustain and promote food security in a warmer Siberia.



Crop yields (c ha -1) for grain and maize silage for historic and future periods (Hadley Center climate change scenarios) in central Siberia.
Grain: 1. beyond the area; 2. <5; 3. 5-10; 4. 10-15; 5. 15-20; 6. 20-25; 7. 25-30; 8. > 30.
Silage: 1. beyond the area; 2. <100; 3. 100-200; 4. 200-300; 5. 300-400; 6. 400-500; 7. >500.



Potential climatic range (green) of traditional and new crop (italic) species in central Siberia in 2010 and HadCM3 B1 and A2 2080 climates.

(No Table Selected)

INDEX TERMS: [0315] ATMOSPHERIC COMPOSITION AND STRUCTURE / Biosphere/atmosphere interactions, [0402] BIOGEOSCIENCES / Agricultural systems, [1626] GLOBAL CHANGE / Global climate models, [1632] GLOBAL CHANGE / Land cover change.