Moisture based agro-climate indices across the Canadian Prairies under a changing climate

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Research Questions

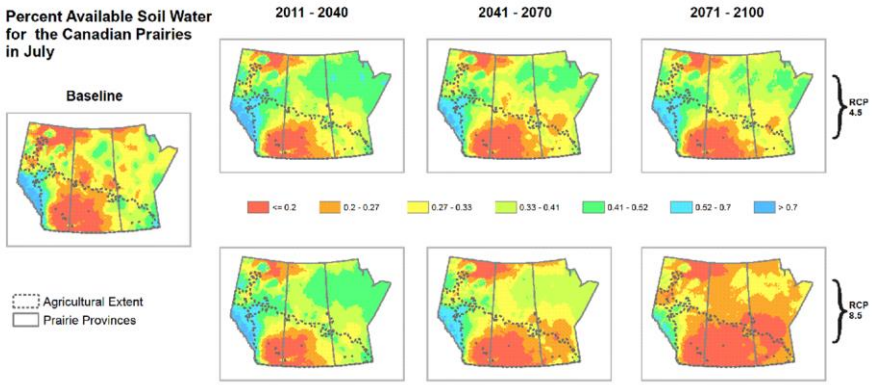
- Will the Canadian Prairie agricultural space remain suitable and support the production of cool season crops under climate change?
- Is there a likelihood that the current agricultural zone for cool season crops will shrink or expand under climate change?

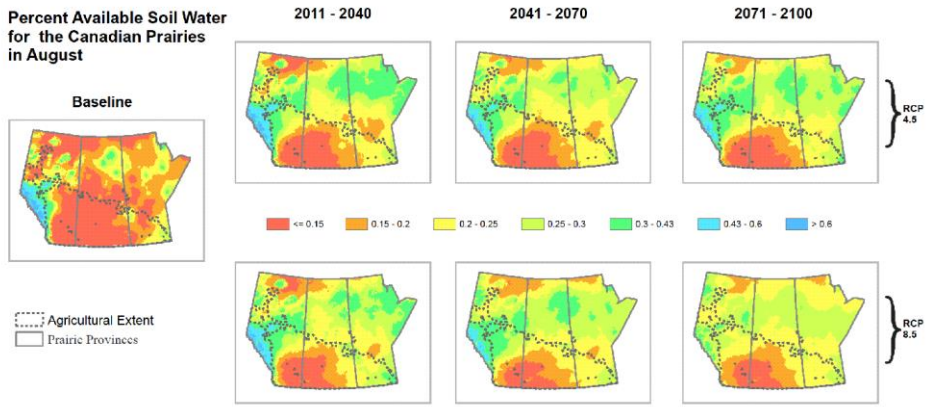
Methodology

We calculated water 3 moisture-based indices under the present and future climate scenarios for peak summer:

1. Available Water Content as a fraction of the total Water Holding Capacity.
2. Crop Water Stress calculated as the normalized ratio of actual to potential evapotranspiration: (CWS) = 1-(AET/PET), and
3. Climate Moisture Index (CMI), (P-PE) for determining water requirements for crop growth and irrigation.

Key Finding-1



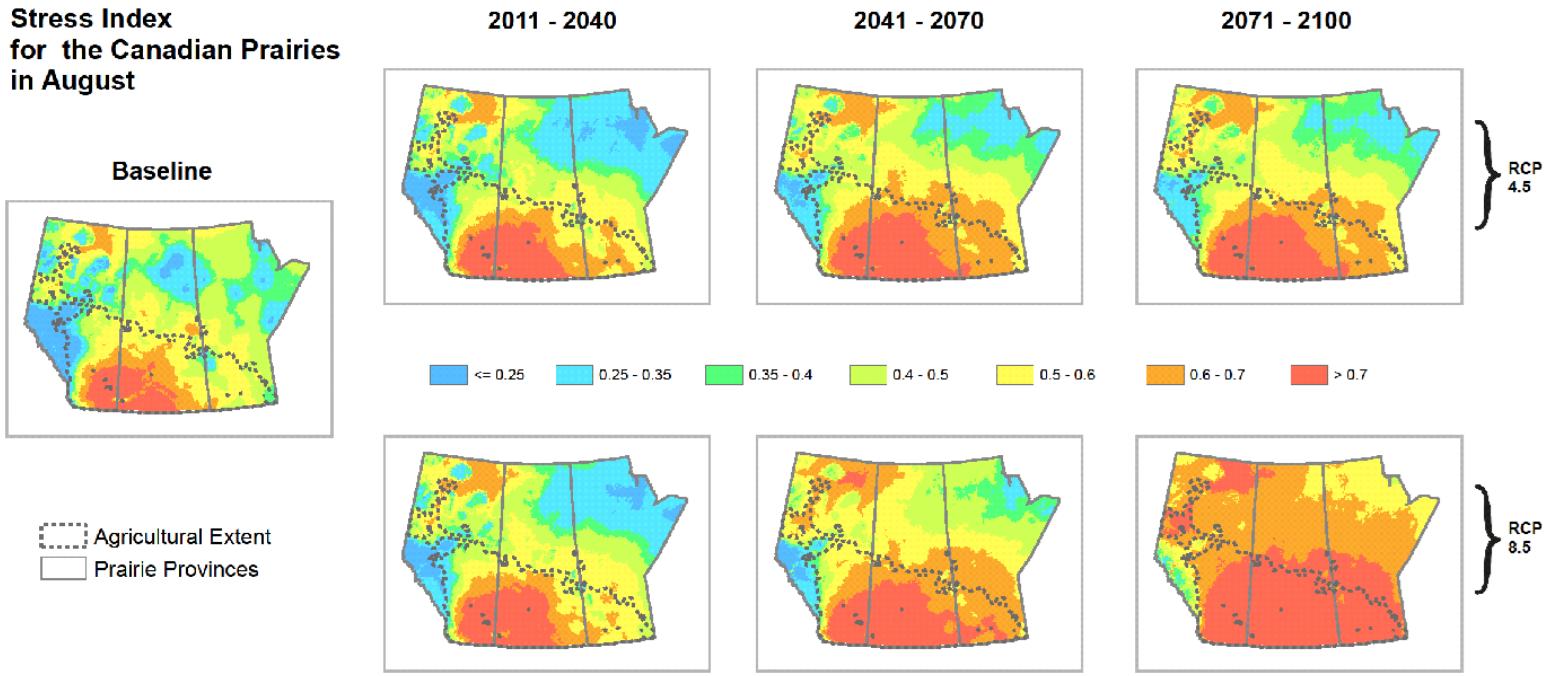


July

August

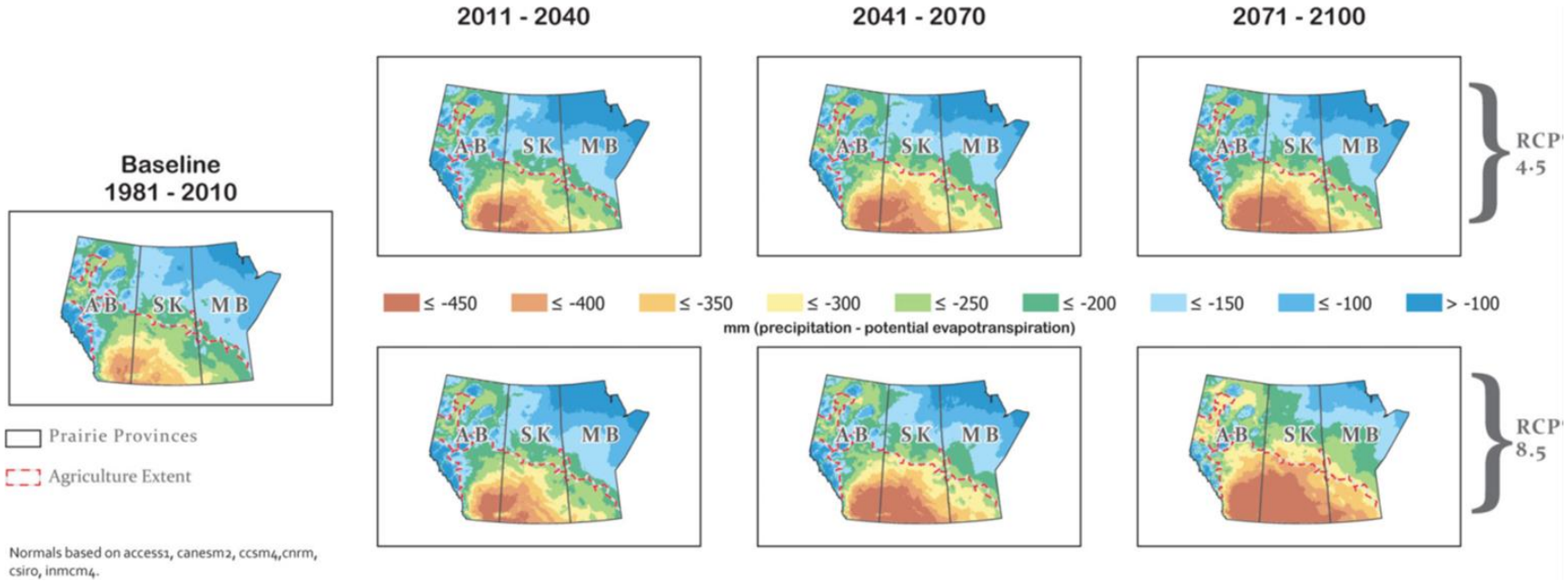
- Soil moisture depletion occurs early (July) under climate change. Occurs in August under present climate.

Key Finding-2



- Crop Water Stress expands to a large area under climate change for both emission scenarios.

Key Finding-3



- Water deficit expands to a large area especially under the high emission scenario.

Over all

- Results suggest that rain-fed agriculture will become riskier for cool season crops.
- Some management practices like seeding will require adjusting in future to take advantage of when moisture availability may be ample.