Developing Silvicultural Strategies for the Northern Region

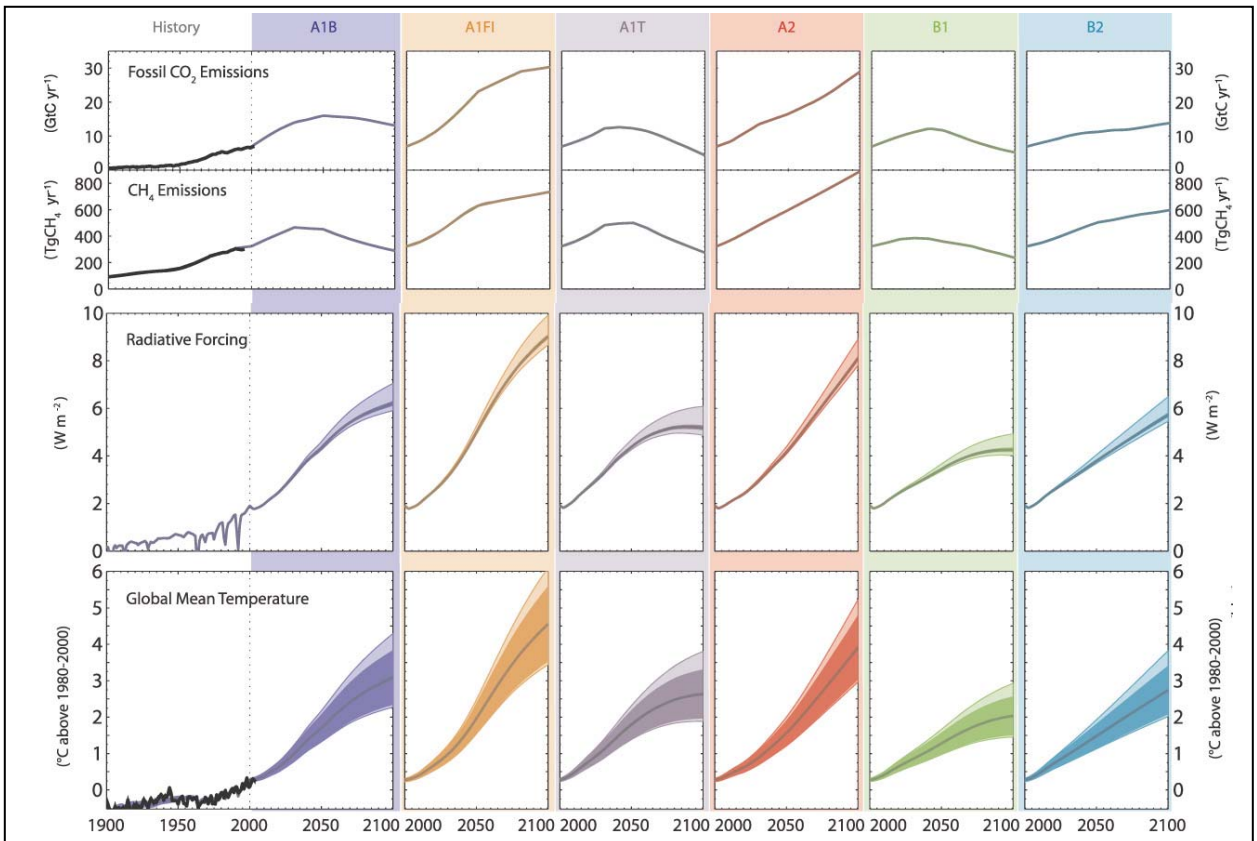
Developing Silvicultural Strategies for the Northern Region

What silvicultural strategies may be helpful or necessary in sustaining our regional forests in the face of climate change?

Information on Climate Models and Emission Scenarios

Emissions Scenarios

The Intergovernmental Panel on Climate Change (IPCC) developed emissions scenarios that outline possible developments in future events and the emissions associated with those events. The maps of projected climate created for this workshop use many of the emissions scenarios developed by the IPCC, including the B1, A1B, A1fi, and A2 scenarios, which represent a range of future greenhouse gas emissions (see figure).



Emissions scenarios used by the IPCC (Modified from IPCC: Climate Change 2007 The Physical Science Basis. Fig 10.26)

Climate Models

Climate predictions rely on the use of complex models to represent the different components of the climate system (atmosphere, hydrosphere, biosphere, etc.) and their interactions. Assumptions about future levels of carbon dioxide and other greenhouse gases (i.e., emissions scenarios) can be used in the models to gain insight into the potential response of the climate system to future conditions. While climate models provide an immense amount of information and are consistently improving, there are still limitations in the ability of these models to make predictions of the future climate. Importantly, there is greater certainty associated with the results of climate models at global scales, and confidence in the results decreases at smaller scales (e.g., continental and regional scales).

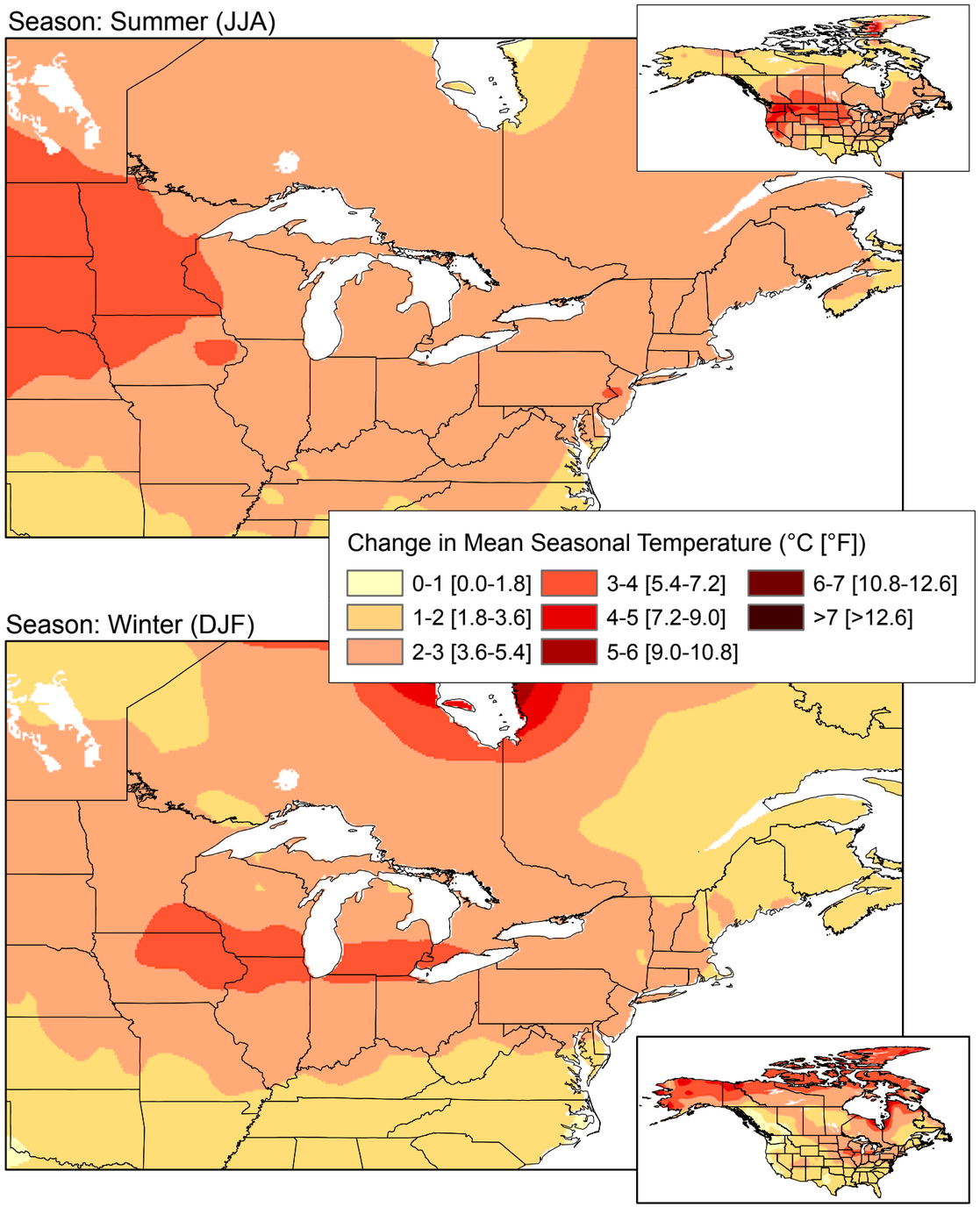
The regional projected climate maps that we will use for this workshop were developed using downscaled data (global data that is used in regional models to estimate future climate at a finer resolution)) from many atmosphere-ocean general circulation models (AOGCMs):

- CSIRO: Commonwealth Scientific and Industrial Research Organization, Atmospheric Research, Australia
- MIROC: Center for Climate System Research (University of Tokyo), National Institute for Environmental Studies, and Frontier Research Center for Global Change, Japan
- HadCM3: Hadley Centre for Climate Prediction and Research/Met Office, UK
- PCM: Parallel Climate Model, National Center for Atmospheric Research, USA
- GFDL: National Oceanic and Atmospheric Administration/Geophysical Fluid Dynamics Laboratory, USA

Climate Model: HADCM3 Emissions Scenario: B1

Change in Mean Seasonal Temperature
2070-2099 vs. 1961-1990

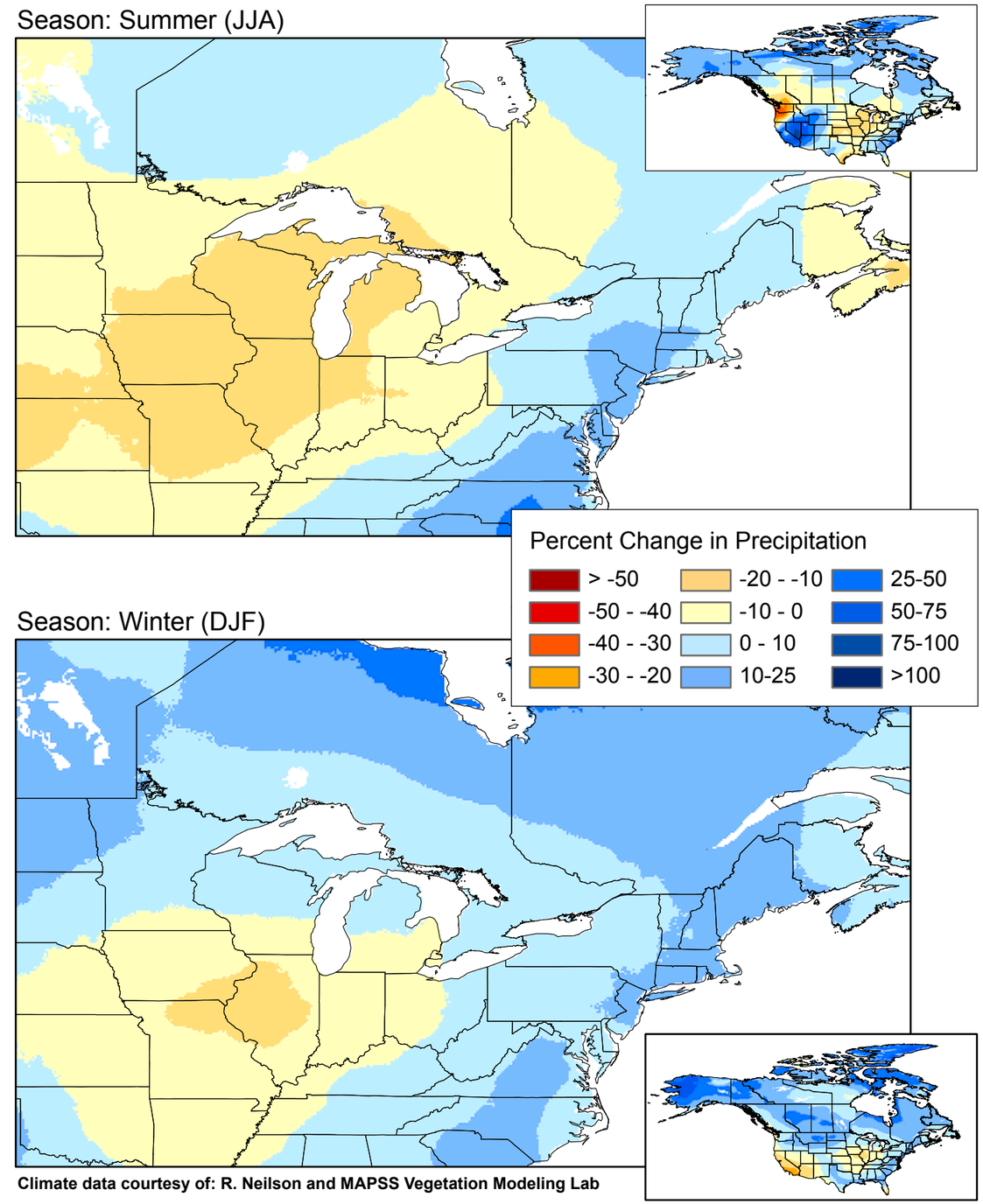
Season: Summer (JJA)



Season: Winter (DJF)

Percent Change in Precipitation
2070-2099 vs. 1961-1990

Season: Summer (JJA)



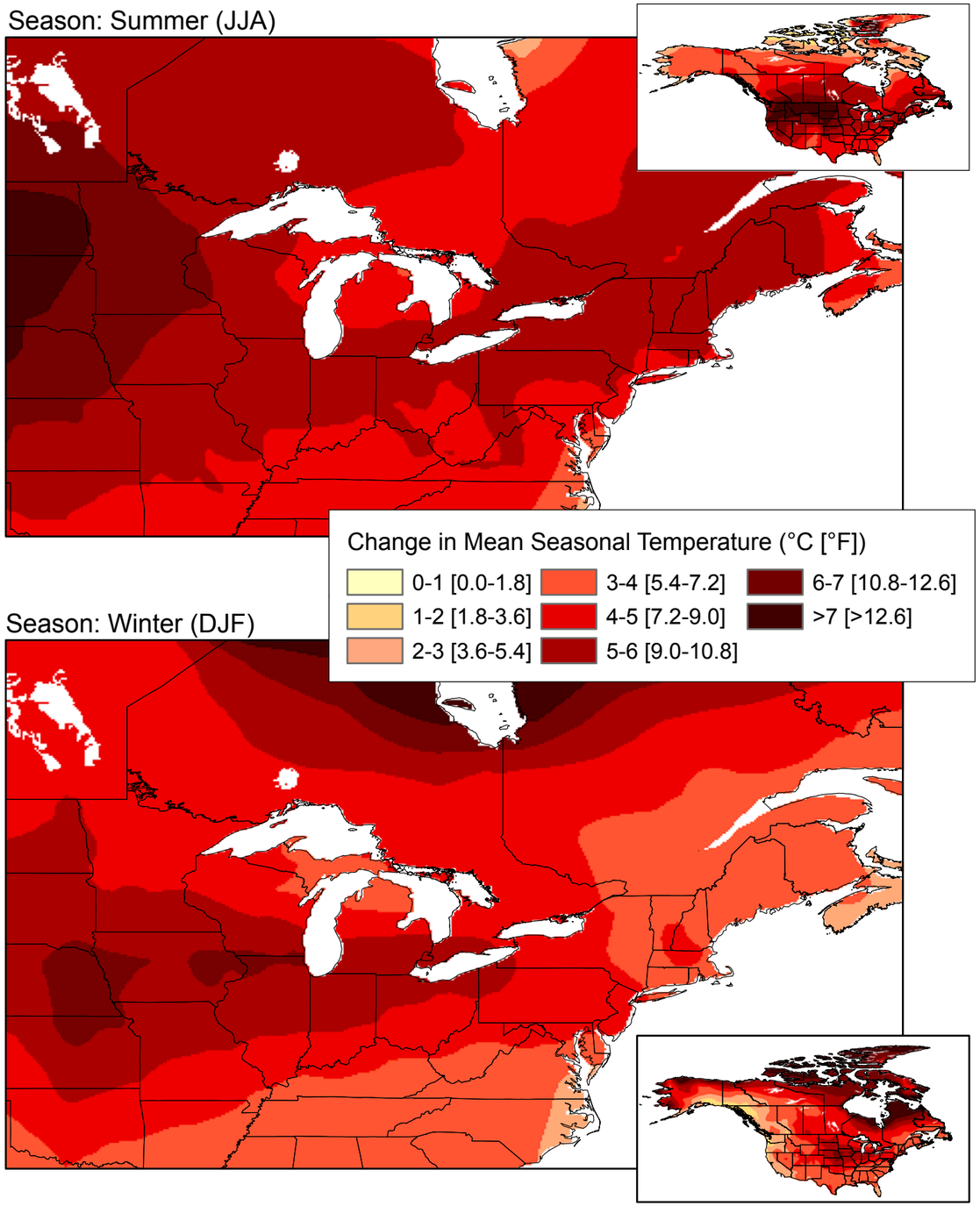
Season: Winter (DJF)

Climate data courtesy of: R. Neilson and MAPSS Vegetation Modeling Lab

Climate Model: HADCM3 Emissions Scenario: A2

Change in Mean Seasonal Temperature
2070-2099 vs. 1961-1990

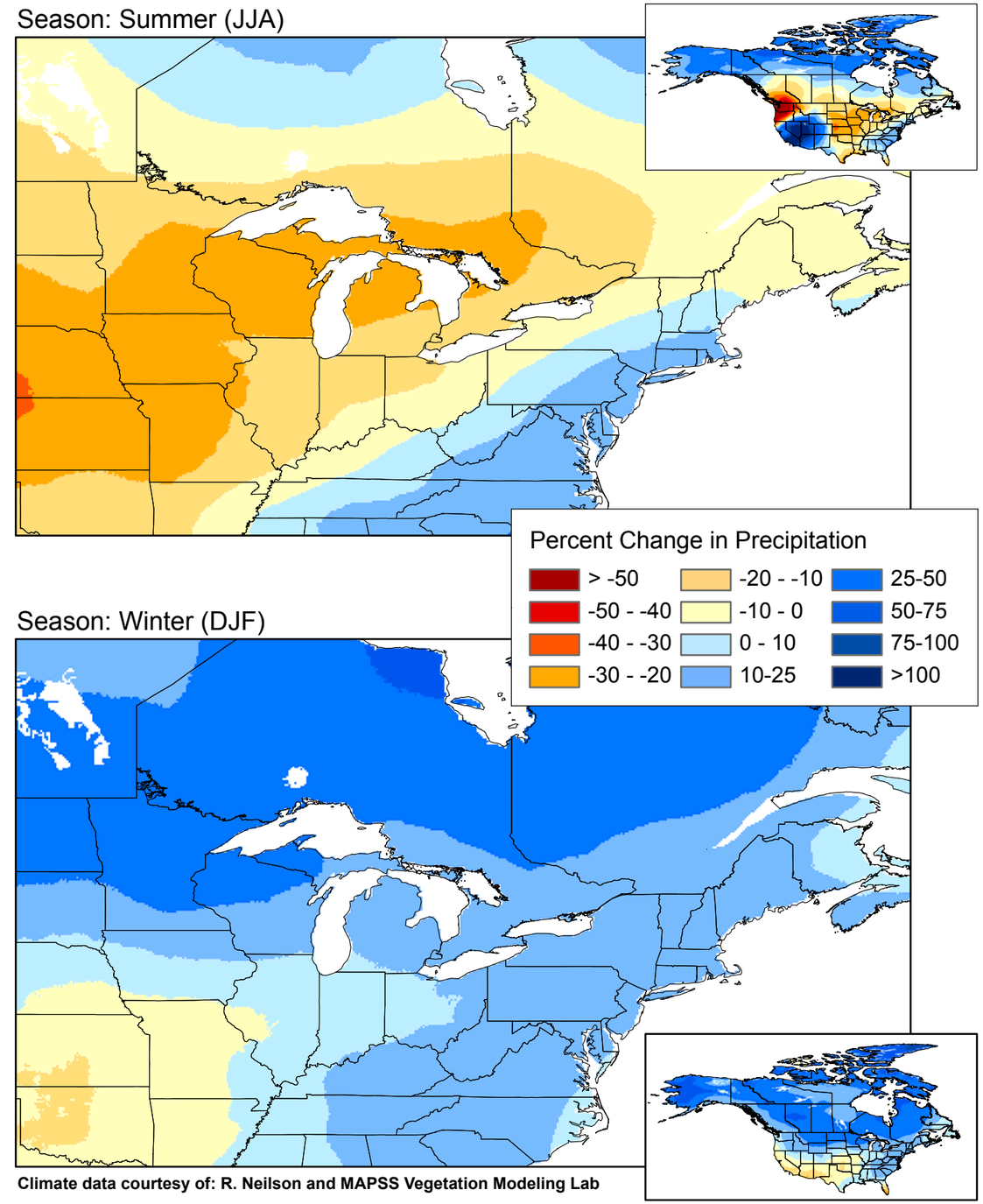
Season: Summer (JJA)



Season: Winter (DJF)

Percent Change in Precipitation
2070-2099 vs. 1961-1990

Season: Summer (JJA)



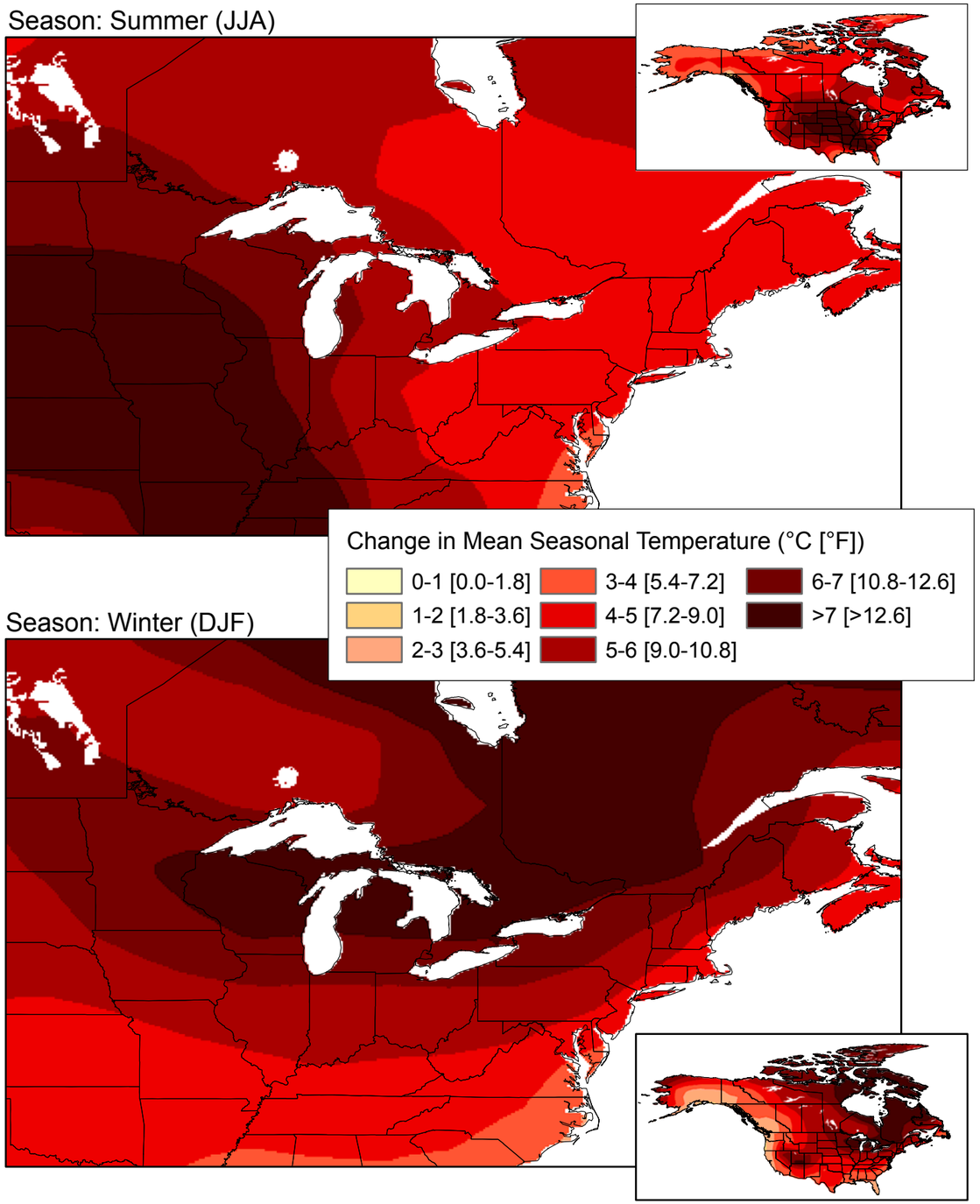
Season: Winter (DJF)

Climate data courtesy of: R. Neilson and MAPSS Vegetation Modeling Lab

Climate Model: MIROC Emissions Scenario: A2

Change in Mean Seasonal Temperature
2070-2099 vs. 1961-1990

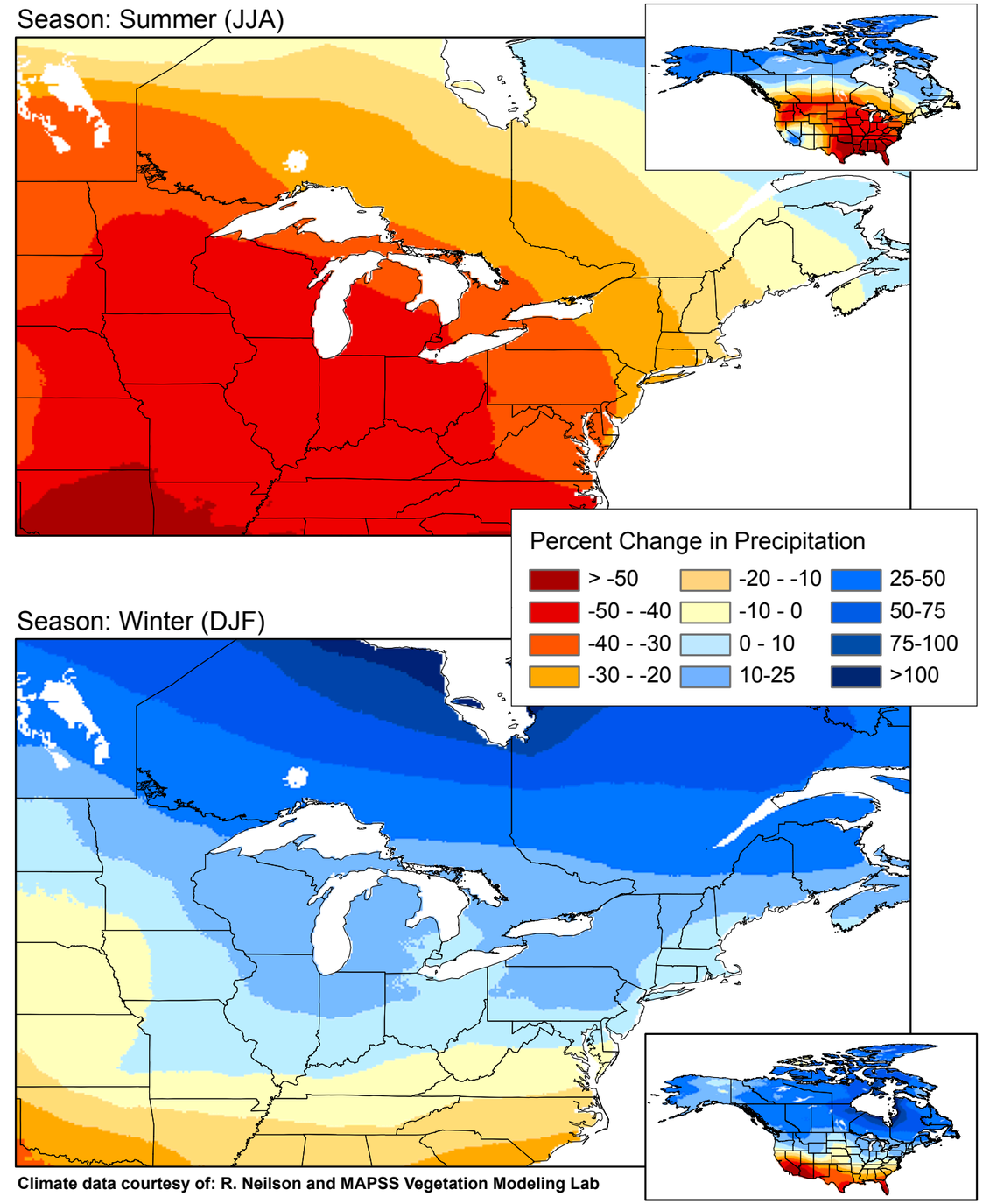
Season: Summer (JJA)



Season: Winter (DJF)

Percent Change in Precipitation
2070-2099 vs. 1961-1990

Season: Summer (JJA)



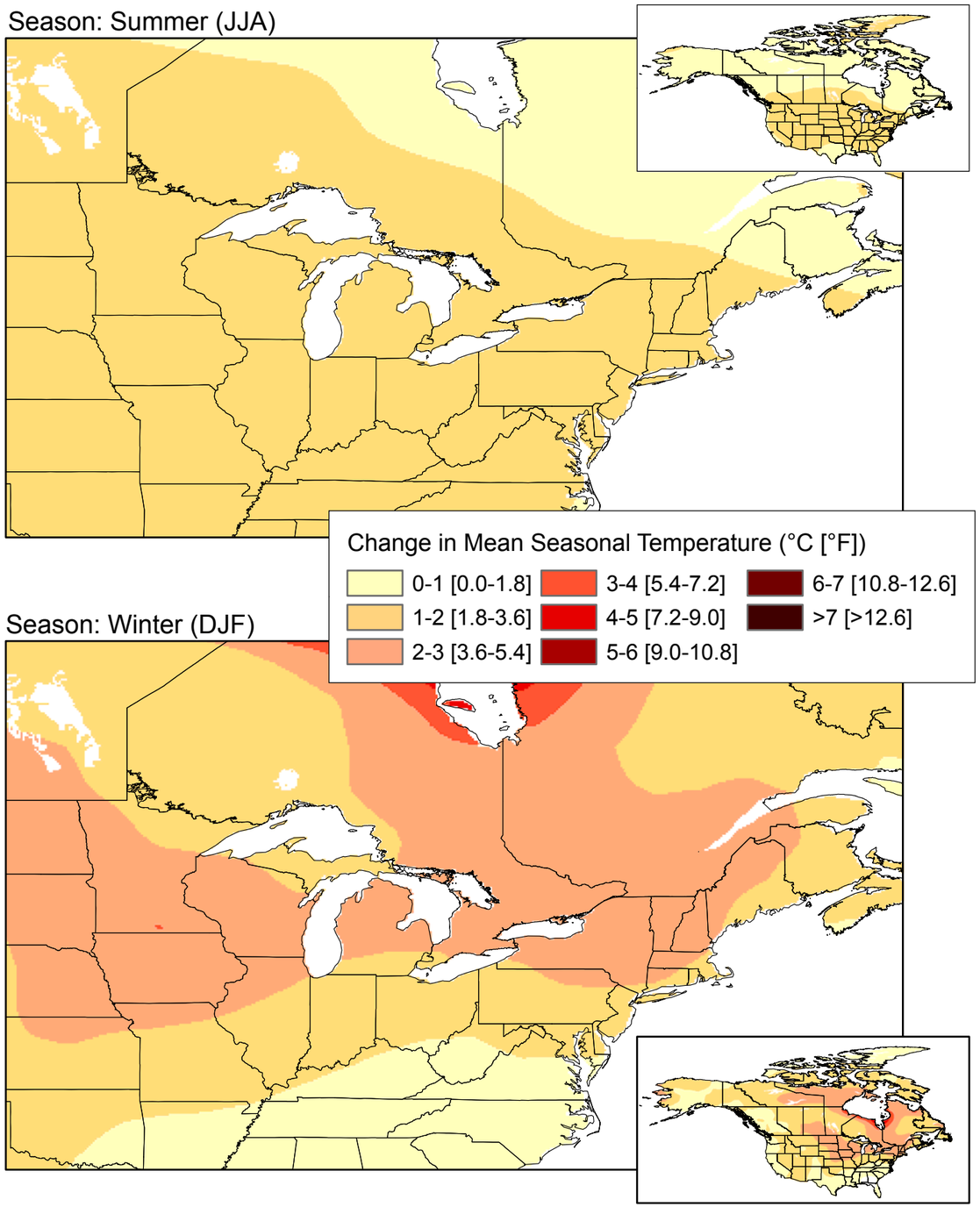
Season: Winter (DJF)

Climate data courtesy of: R. Neilson and MAPSS Vegetation Modeling Lab

Climate Model: CSIRO Emissions Scenario: B1

Change in Mean Seasonal Temperature
2070-2099 vs. 1961-1990

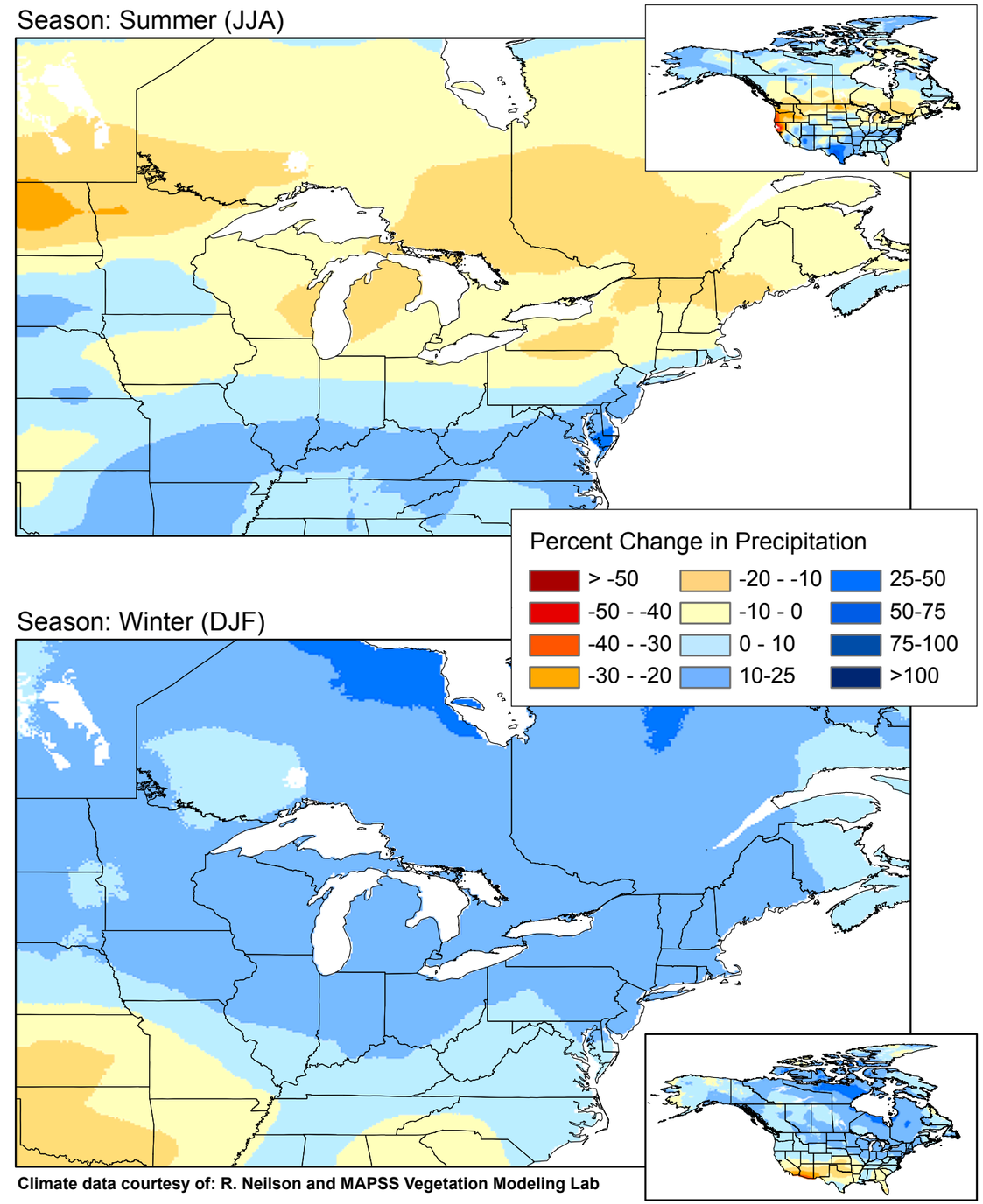
Season: Summer (JJA)



Season: Winter (DJF)

Percent Change in Precipitation
2070-2099 vs. 1961-1990

Season: Summer (JJA)



Season: Winter (DJF)

Climate data courtesy of: R. Neilson and MAPSS Vegetation Modeling Lab