

CREST HIRES Summer 2016 Research Project  
Theme\Group : Land Processes and Water Resources

Trends in water, wind and solar resources over recent decades and connections  
with climate forcings and variability:

# Climate change and implications for precipitation and river flow

**Mentors:**

**Dr. Nir Krakauer**

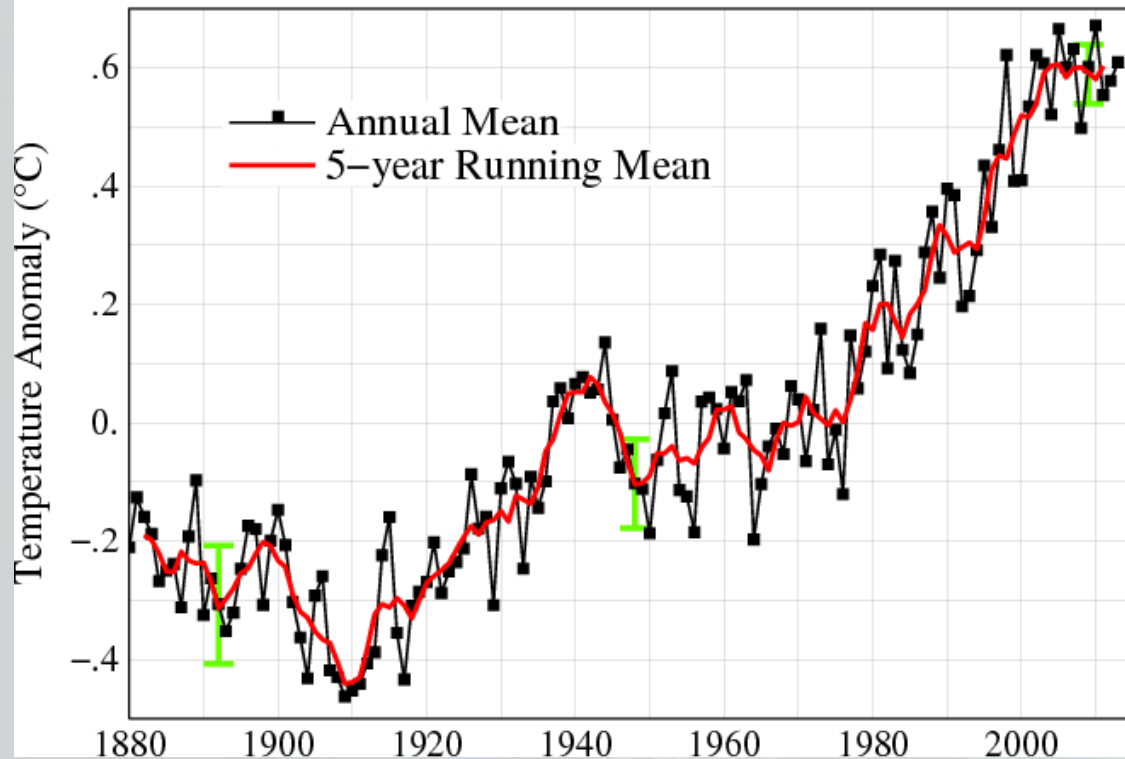
**and**

**Behzad Asadieh**

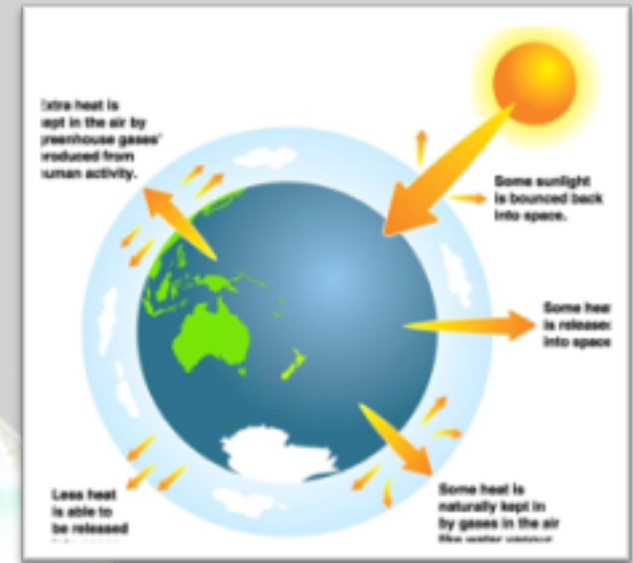
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## Global Land–Ocean Temperature Index

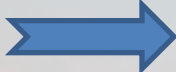


[http://data.giss.nasa.gov/gistemp/graphs\\_v3/](http://data.giss.nasa.gov/gistemp/graphs_v3/)



Global mean temperature:  
**≈ 0.8 °C** increase since 1901  
(IPCC – R4)

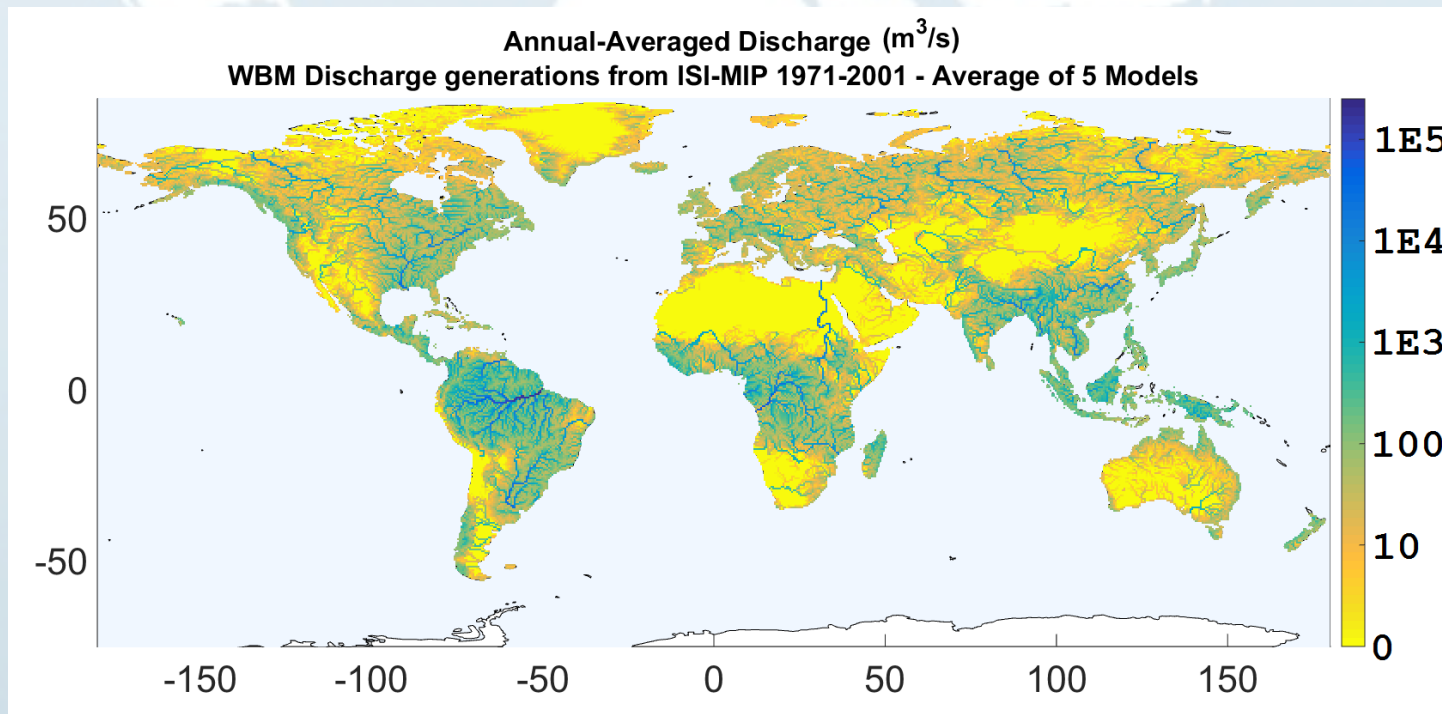
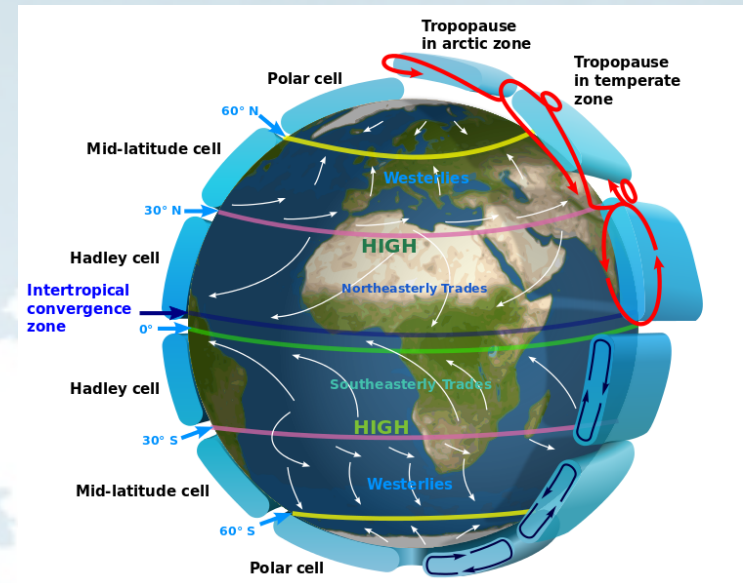
Clausius-Clapeyron equation

1 °K increase in temperature  7% increase in atmospheric water vapor content

# Hydrological Cycle

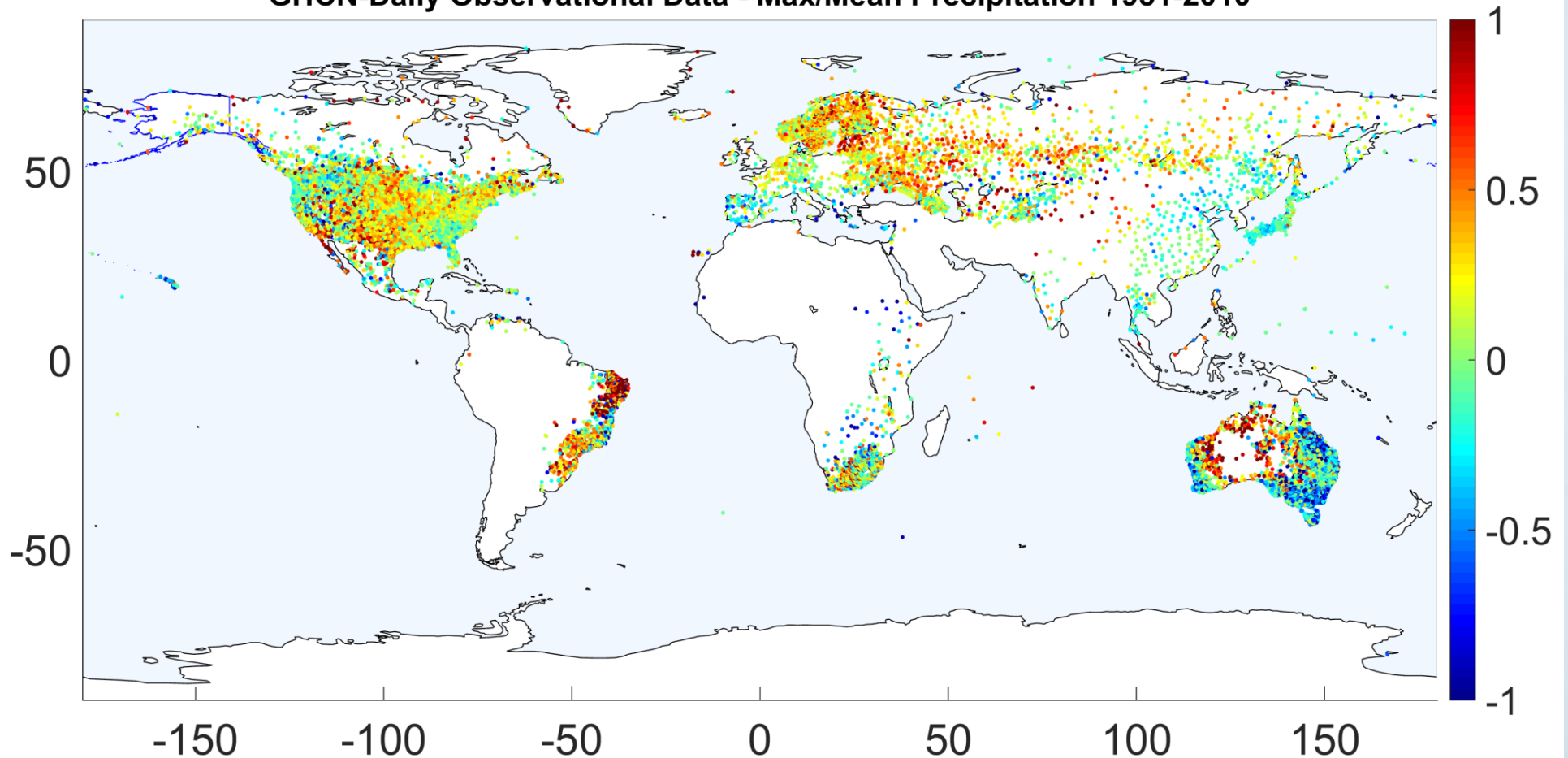


# Atmospheric Circulation



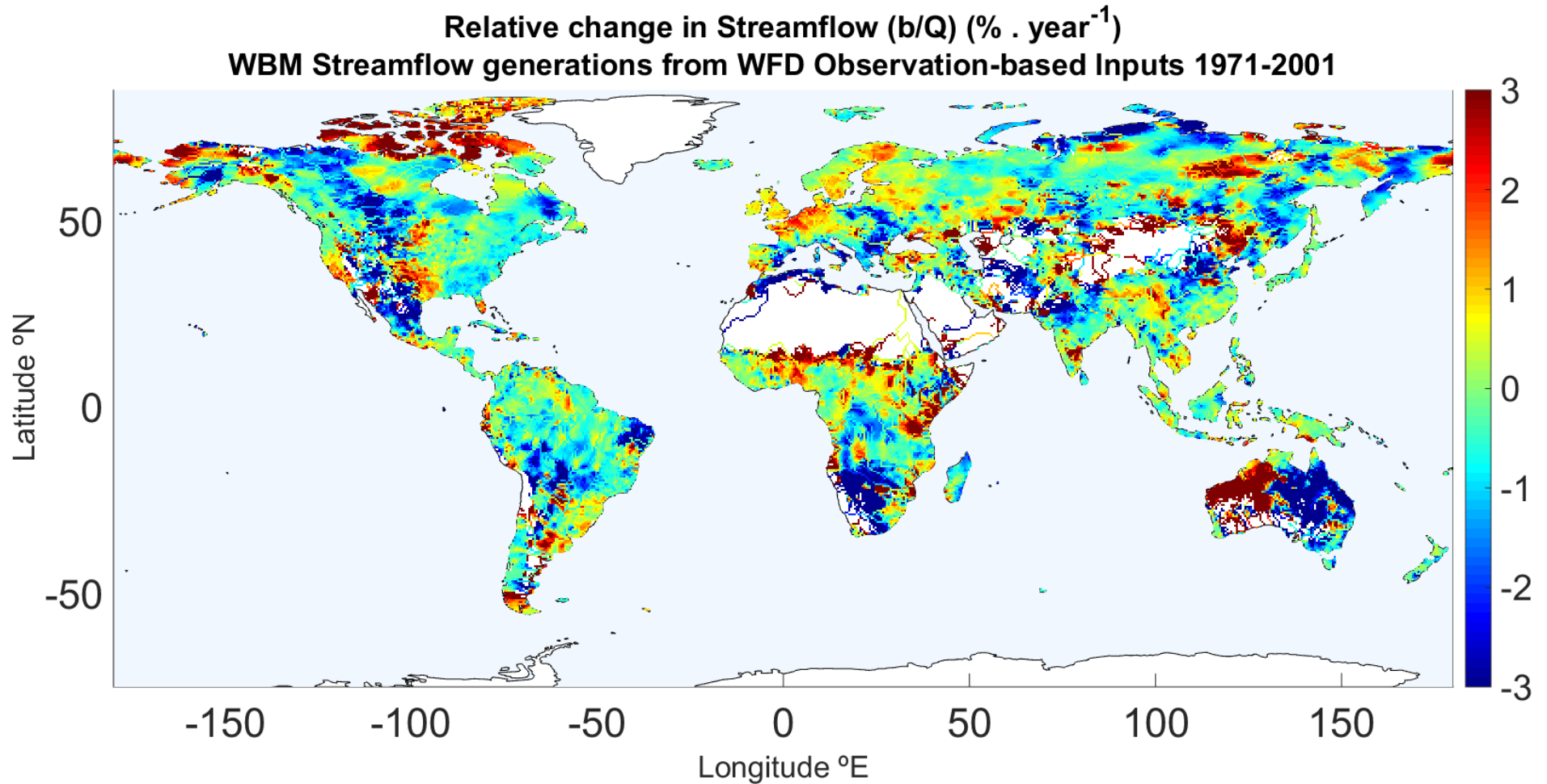
# Climate Change and Precipitation

Relative Change (b) in Annual-Averaged Daily Precipitation [Mean Precipitation](%.year<sup>-1</sup>)  
GHCN-Daily Observational Data - Max/Mean Precipitation 1951-2010



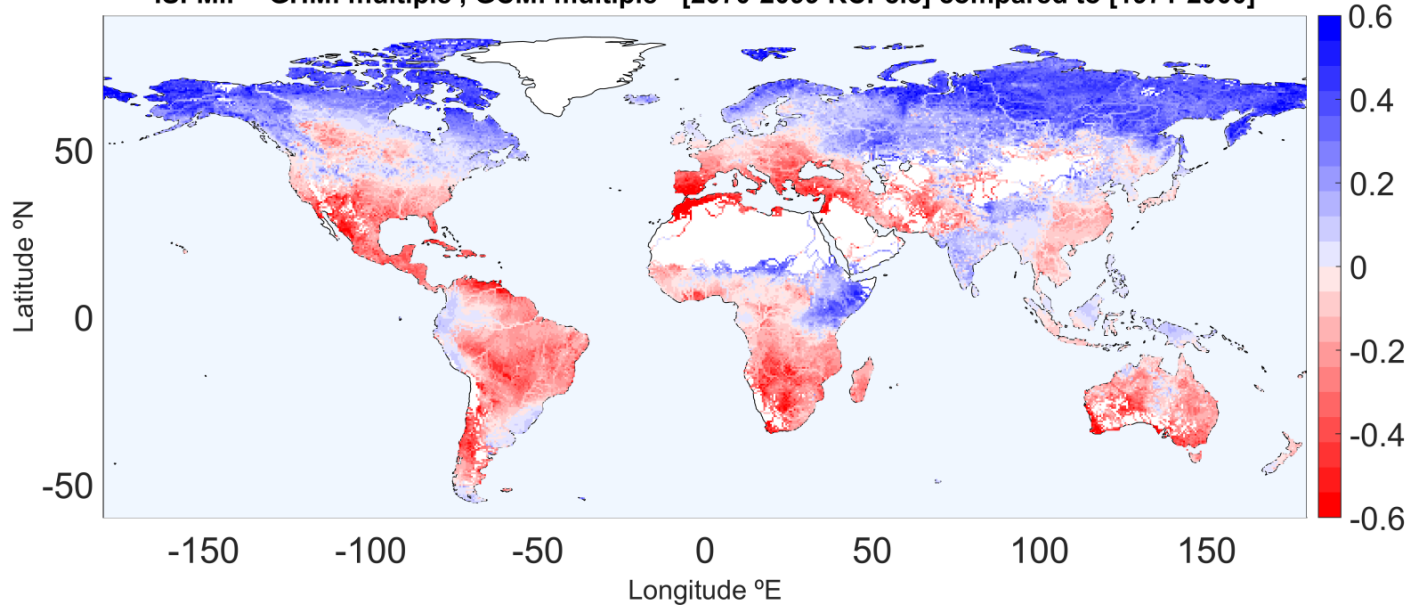


# Climate Change and Streamflow

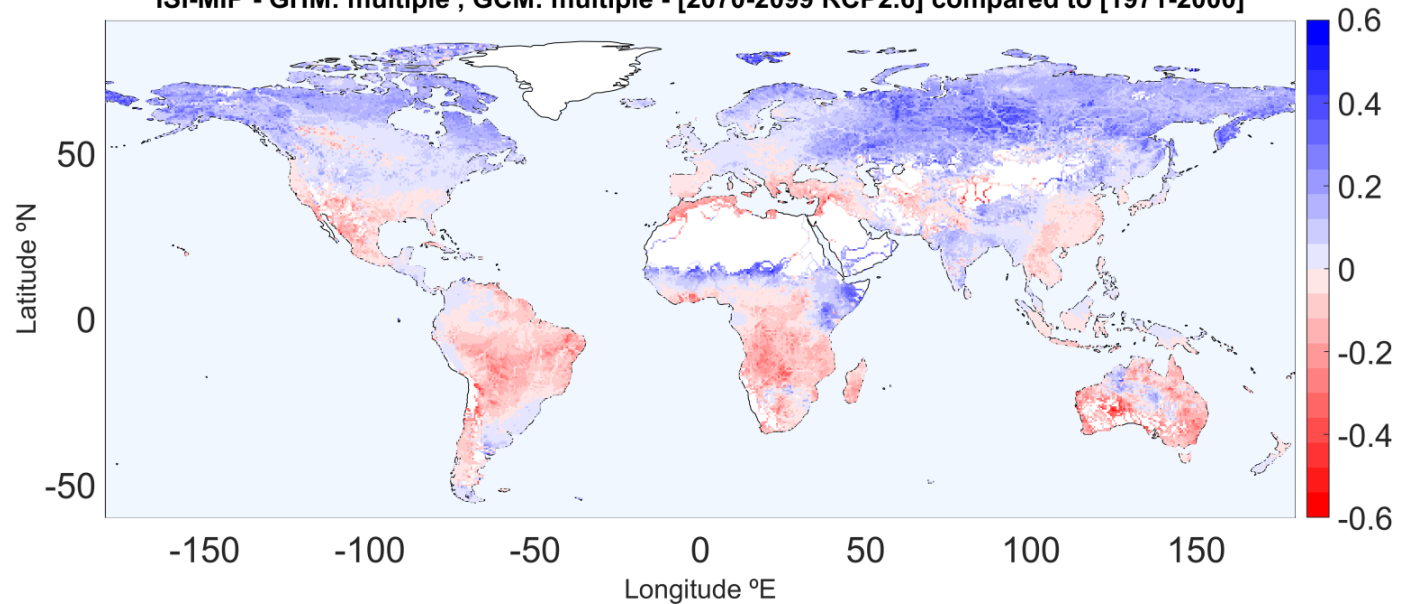


# Climate Change and Streamflow in the 21<sup>st</sup> Century

Normalized change in median of discharge - Multimodel average of GHMs and GCMs  
ISI-MIP - GHM: multiple , GCM: multiple - [2070-2099 RCP8.5] compared to [1971-2000]



Normalized change in median of discharge - Multimodel average of GHMs and GCMs  
ISI-MIP - GHM: multiple , GCM: multiple - [2070-2099 RCP2.6] compared to [1971-2000]



Project Objectives: Statistical analysis on available data to detect

- ❑ Trends in climate indices: Precipitation, Temperature, Streamflow
- ❑ Correlation between the climate indices

✓ Observational Data

✓ Climate Model Simulations

Computer Programing with MATLAB, Python

Location: Steinman Hall, ST-424



**Thank You**