# Scientific Data Analysis Application

## *CU Capstone Project*

**Group of 6 senior computer science students working to create a python based data analysis web application.**

Project Sponsor: Brian Bonnlander

*Visualization and Enabling Technologies Section*

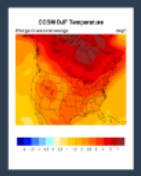
- Hannah Keller
- Seongmin Choi
- Robert Crimi
- Connor Guerrieri
- Bo Han
- Hannah Thomas

Boulder

### *Reproducibility without expertise*

"Many users of climate model outputs need to make decisions on how or whether to respond to climate change, in some cases within institutions where the reality or importance of climate change is not universally acknowledged."

*Committee on a National Strategy for Advancing Climate Modeling*



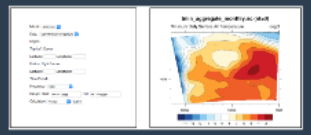
### *Project Goal*

Create a web application that allows users to easily and intuitively:

- Create visual data workflows
- Reproduce workflows
- Automate scientific expertise
- Access intermediate workflow results
- Utilize multiple analysis languages

### *Tool Research*

### *First Attempt*



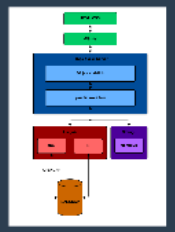
### *Second Attempt*

DEMO

Thank You

### *Final Design*

### *Architecture*



- Nodelink
- Pyutilib.workflow
- NCL
- R
- MongoDB

### *Next Steps*

- Implement other steps
  - Unit Conversion
  - Thresholds
  - Download
- Load existing workflow
- Delete step
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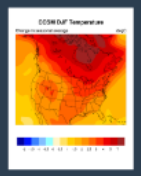

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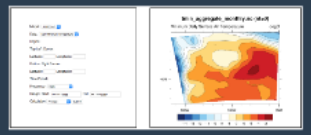

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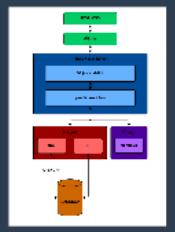

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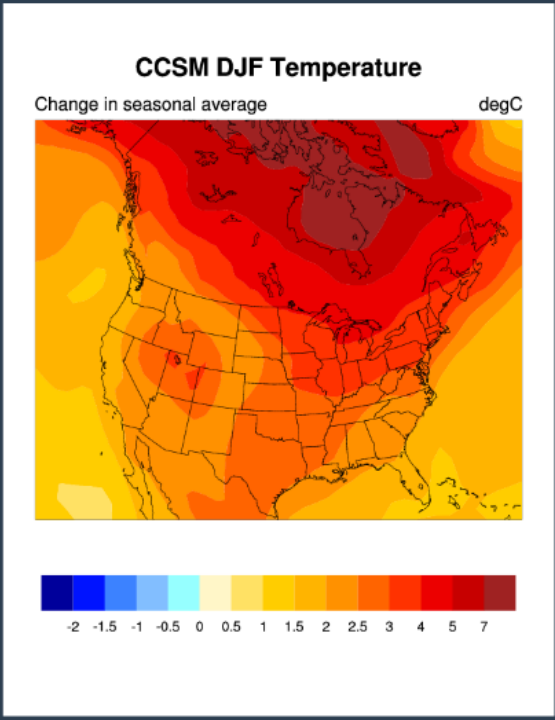


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# Tool Research

## Web Frameworks

## Analysis tools

## Workflow Builders

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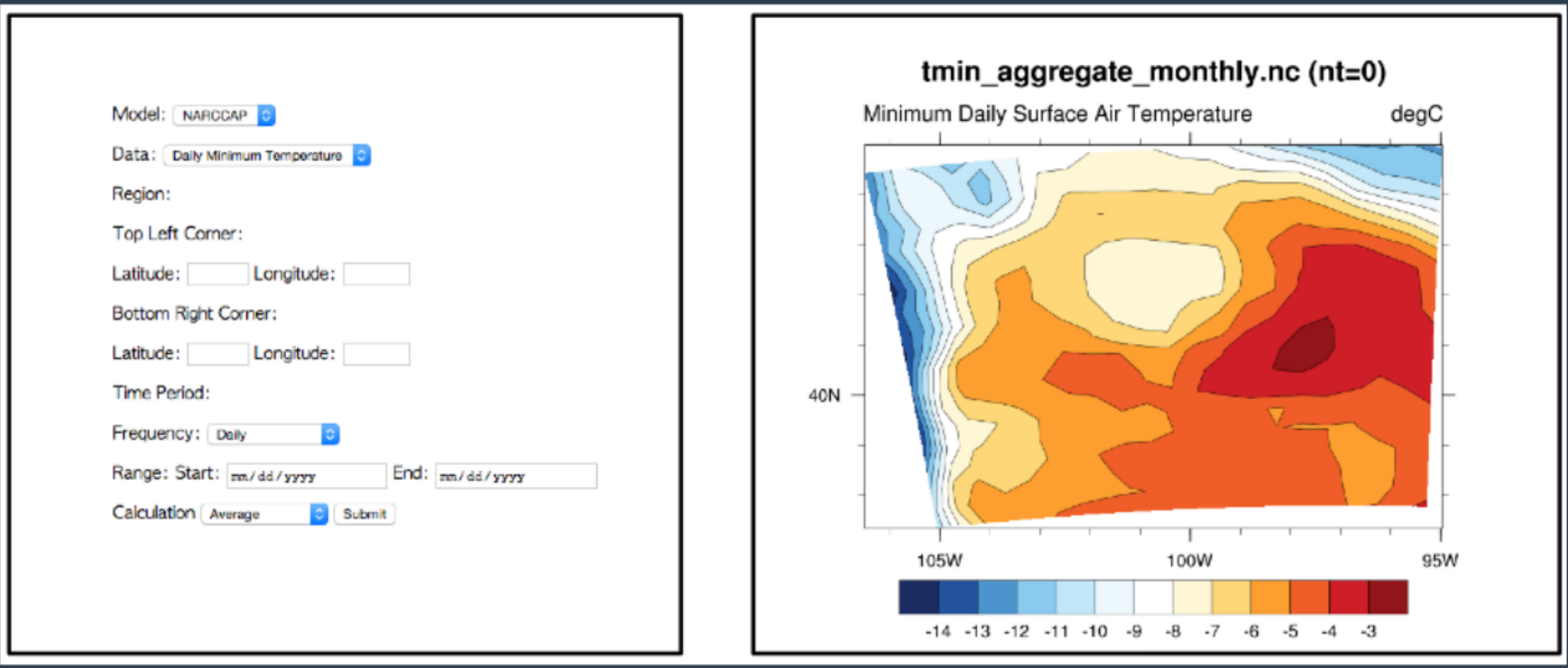
# First Attempt

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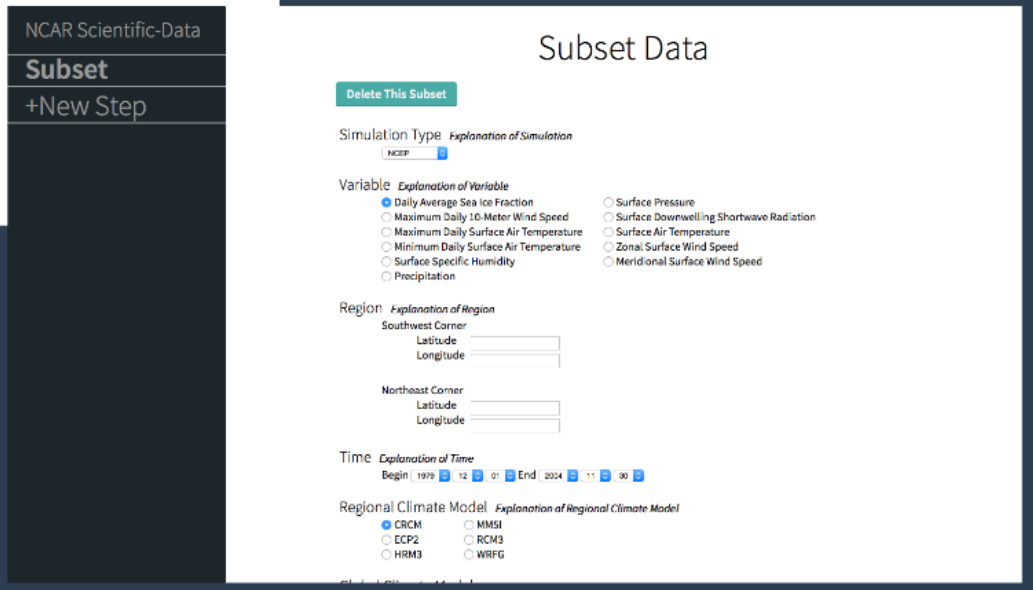


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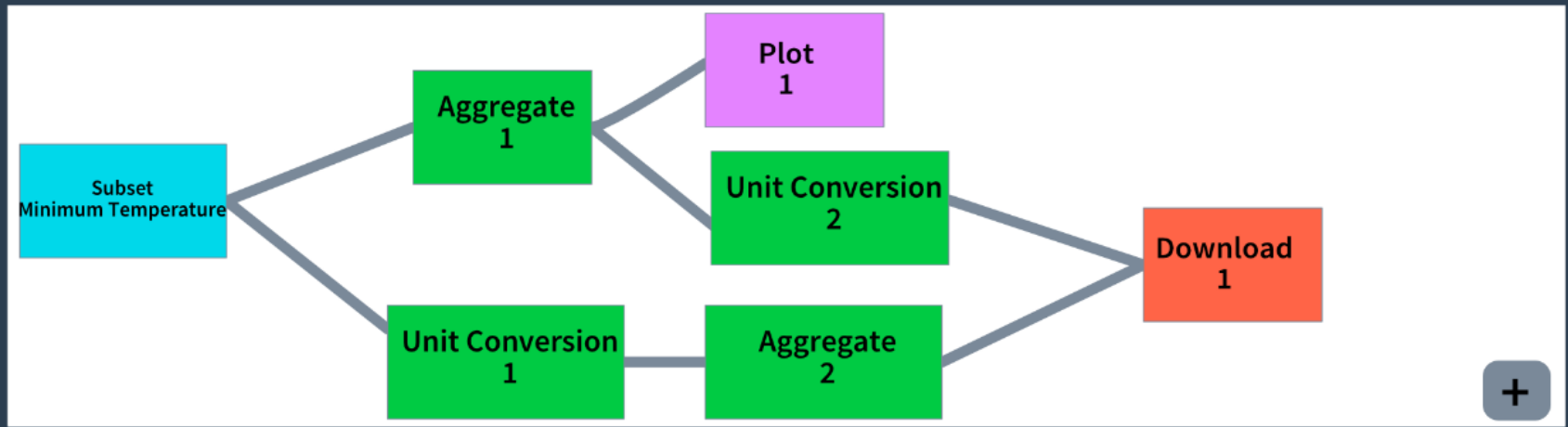
# Final Design




## Subset Data

Simulation Type *Explanation of Simulation Type*

NCEP

Variable *Explanation of Variable*

- Daily Average Sea Ice Temperature
- Maximum Daily 10-Meter Wind Speed
- Maximum Daily Surface Air Temperature


- Daily Average Sea Ice Temperature
- Maximum Daily 10-Meter Wind Speed
- Maximum Daily Surface Air Temperature


Region *Explanation of Region*

Southwest Corner

Latitude

Longitude

Northeast Corner

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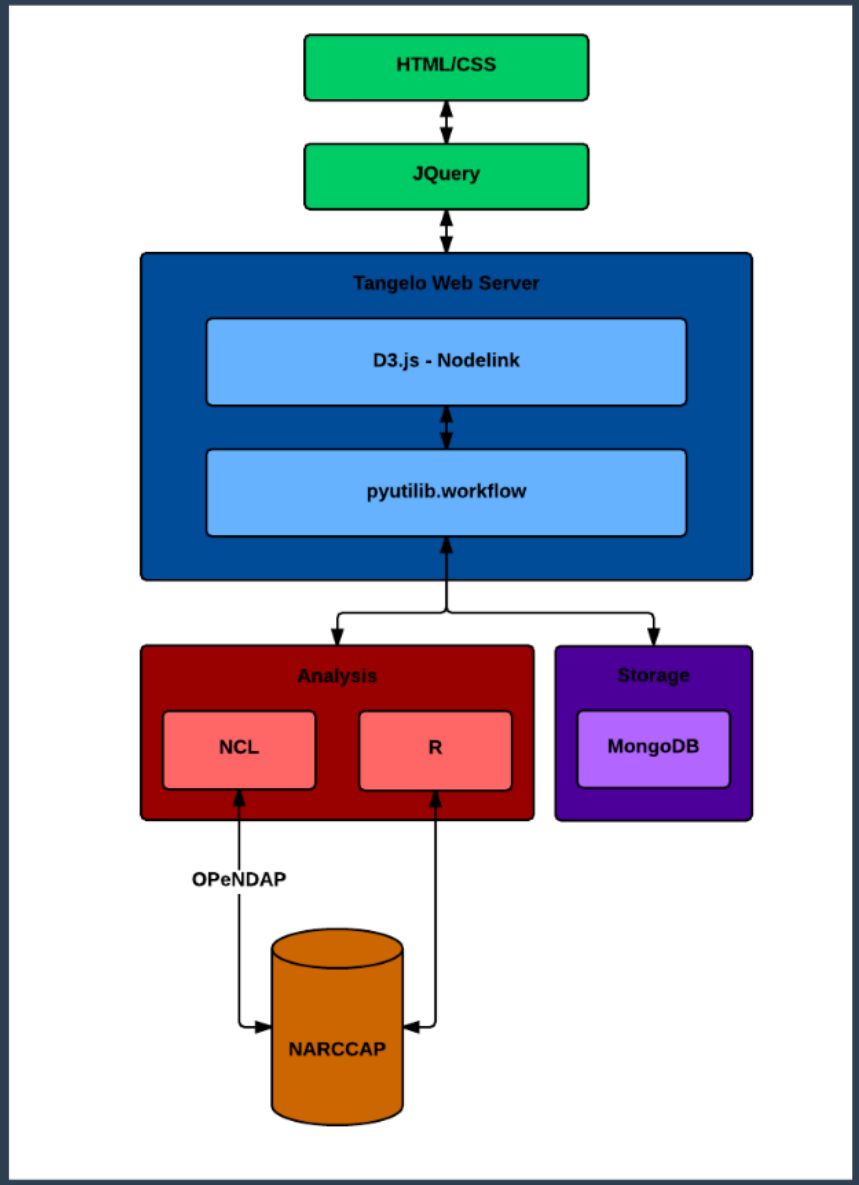
# Architecture

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# DEMO

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# Thank You

Hannah Keller
keller.hannah6@gmail.com

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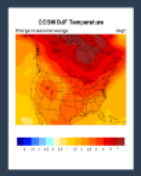

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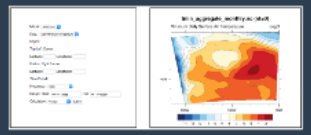

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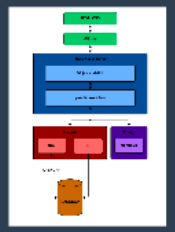

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