

Local Climate Change Tool



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Background

Decision makers and the general public are often most interested in what climate projections mean for **a specific location**

Accessibility issue: technical skills required to process, view, and understand climate model output **prevents** non-technical audiences from accessing this information

Our goal: develop an outreach tool to help the public better understand climate models and uncertainty and improve communication of the following concepts:

- The local climate consequences of global socioeconomic decisions
- The difference between scenario and model uncertainty

Data

MODELS: Coupled Model Intercomparison Project, Phase 6 (CMIP6)

- Subset of the 30+ global climate models with same forcings
- Each model has its own grid
- **Historical** experiment - recreate past (1850-2014)
- Four **future projections** (2015-2100): SSP1 (Sustainability), SSP2 (Middle-of-the-road), SSP3 (Regional Rivalry), SSP5 (Fossil-Fueled Development)

OBSERVATIONS: Berkeley Earth Surface Temperature (BEST) dataset

- Monthly means of surface temperature
- Reanalysis of observations - gridded onto 1°x1° latitude-longitude grid
- Land only

Use Case - Searching for a specific location

Sarah is interested in understanding climate models for her city, Seattle. She accesses the LCCT to find this information.

Input:

- Opens dashboard
- Selects Seattle in city selection box
- Selects United States in the country selection box
- Selects refresh visualizations

Output:

- Dashboard updates visualization

Use Case - Change climate scenario

Sarah wants to understand how climate models change in other scenarios. She is curious how climate models are affected if scenario changed to SSP1 - sustainability

Input:

- Opens dashboard
- Selects Seattle in city selection box
- Selects United States in the country selection box
- Selects SSP1 from scenario selection
- Selects refresh visualizations

Output:

- Visualization updates location & scenario

Demo

Climate dashboard made with *Panel*

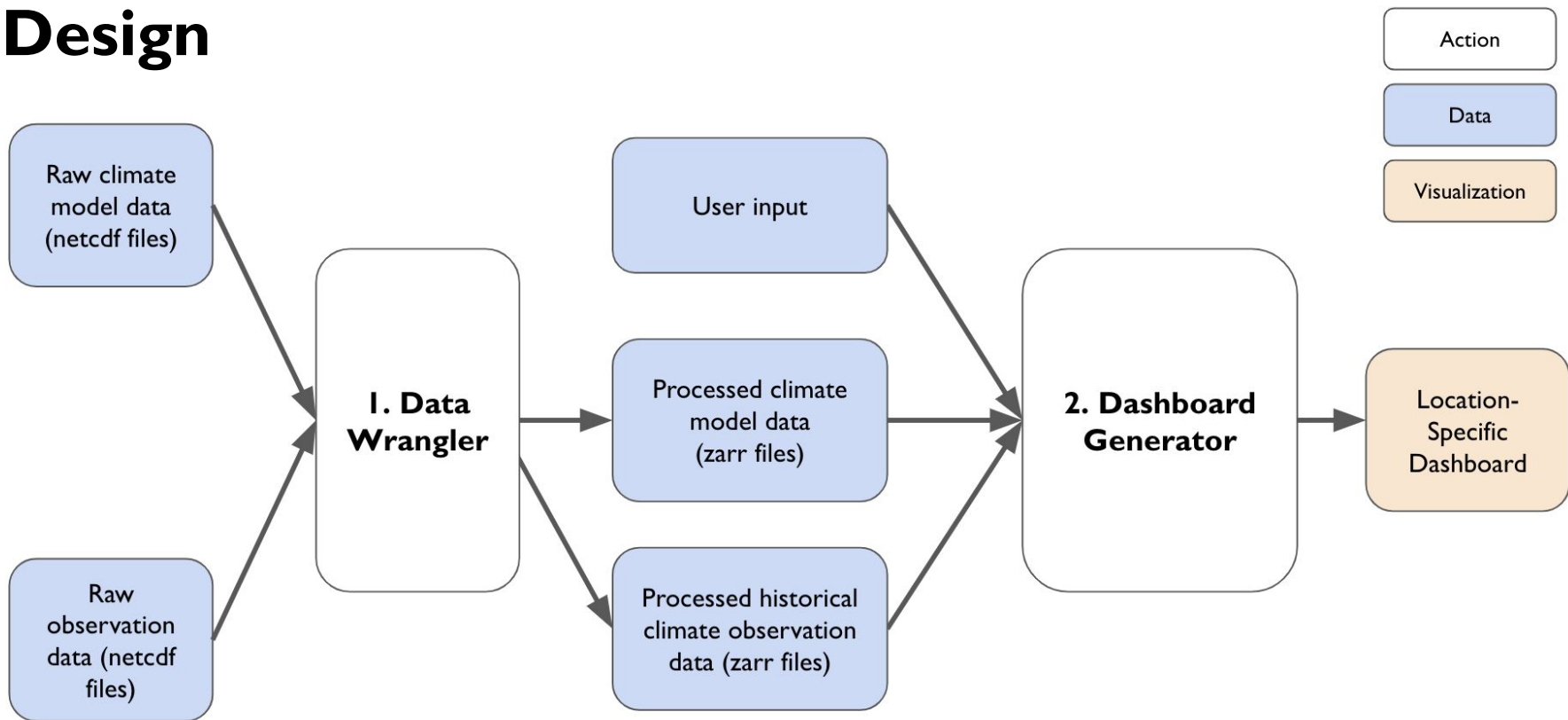
User Input:

- 1) Pick your location
 - a) Use drop-down list
 - i) Example: Moscow, Russia
 - b) Enter custom location
 - i) Example: Pukalani, HI — Lat: 20.8°, Lon: 203.3°
- 2) Change the scenario
 - a) View inter-model uncertainty

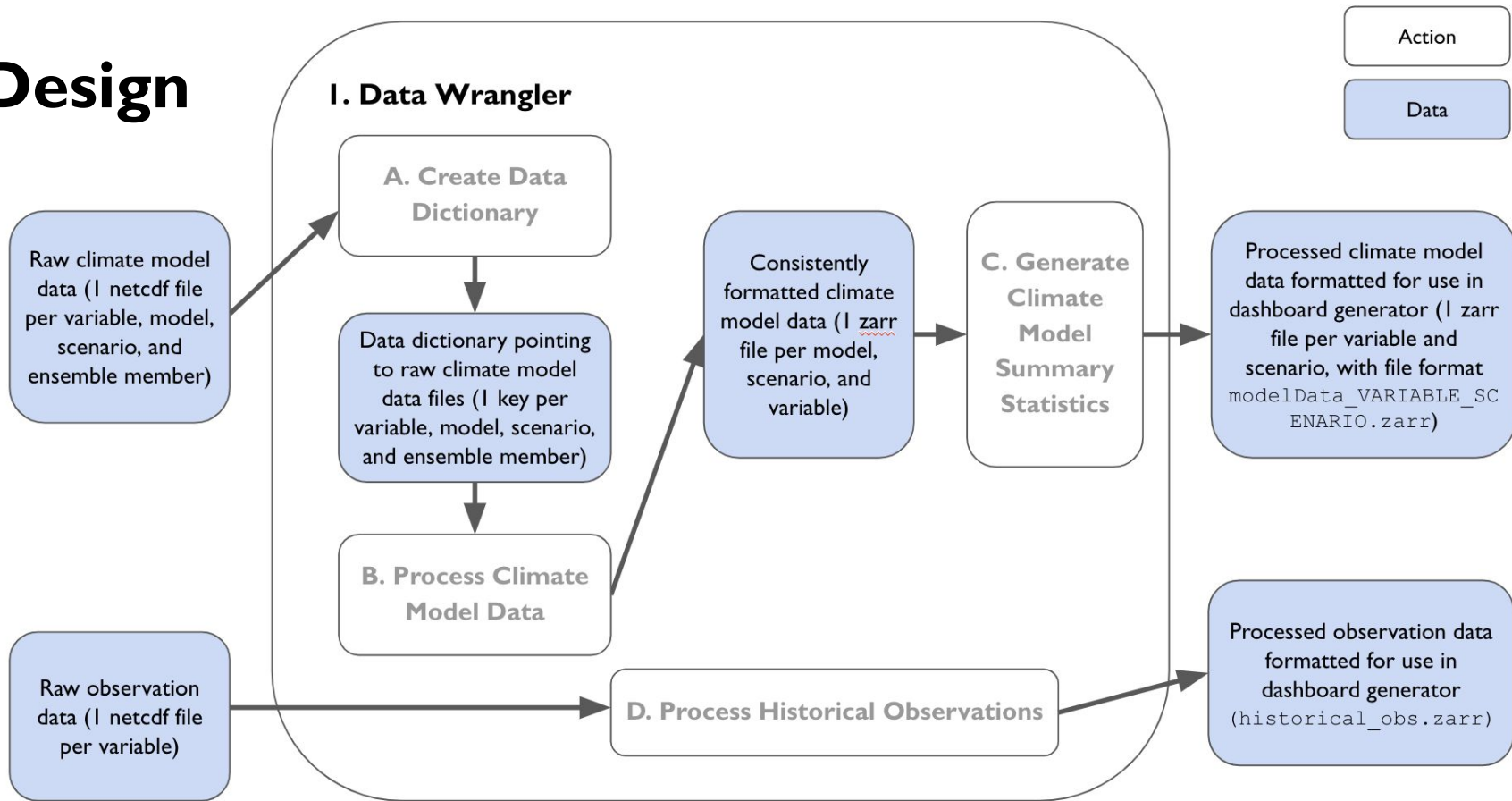
Plots:

- 1) Save it
- 2) Zoom in
- 3) Hover for more info

Design



Design



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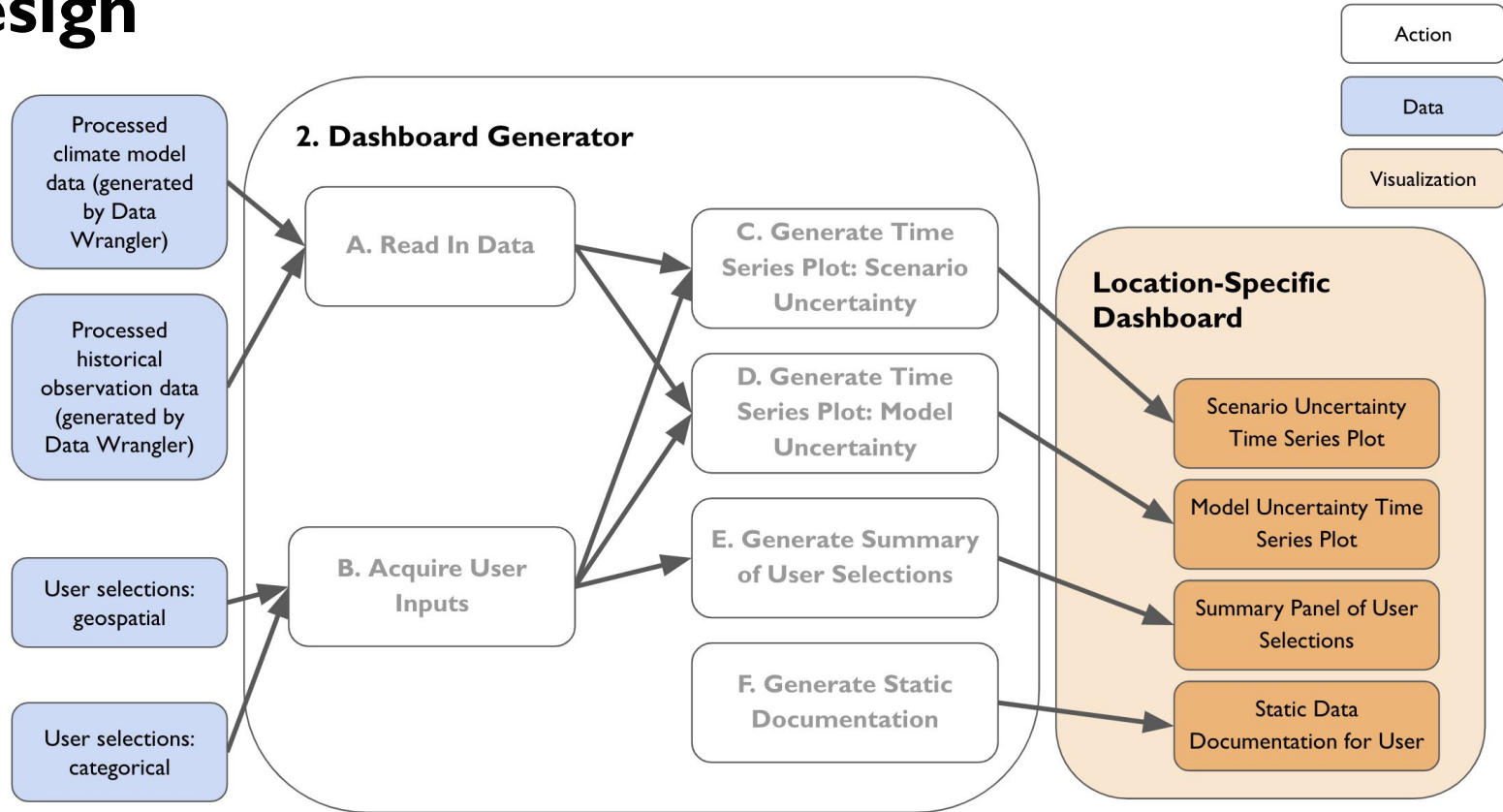
Demo

Design

Project structure

Future steps

Design



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Project Structure: github.com/czarakas/local-climate-data-tool

```
|— Data
|   |— catalogs
|— LICENSE
|— README.md
|— docs
|   |— Component_Specification.pdf
|   |— Data_Description.pdf
|   |— Functional_Specification.pdf
|   |— TechnologyReview.pptx
|   |— testing_docs
|— environment.yml
|— local_climate_change_tool
|   |— Test
|   |— phase1_data_wrangler
|   |— phase2_dashboard_generator
|— setup.py
```

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Future Steps

Short Term (before Monday):

- More unit test coverage
- Iron out details of setup.py
- Read-the-docs
- Issue-report template

Long Term (early 2020):

- Add an interactive map
- Add global mean option in dropdown
- Add other variables (e.g. precipitation)
- Add different time-filtering options: (running mean, seasonal averages)
- Add option to display change relative to the historical baseline
- Enhance usability
- Better name - ideas?