1. **Clone repository**

Git clone https://github.com/czarakas/local-climate-data-tool.git

Cd local-climate-data-tool

2. **Create environment**

conda env create -f environment.yml

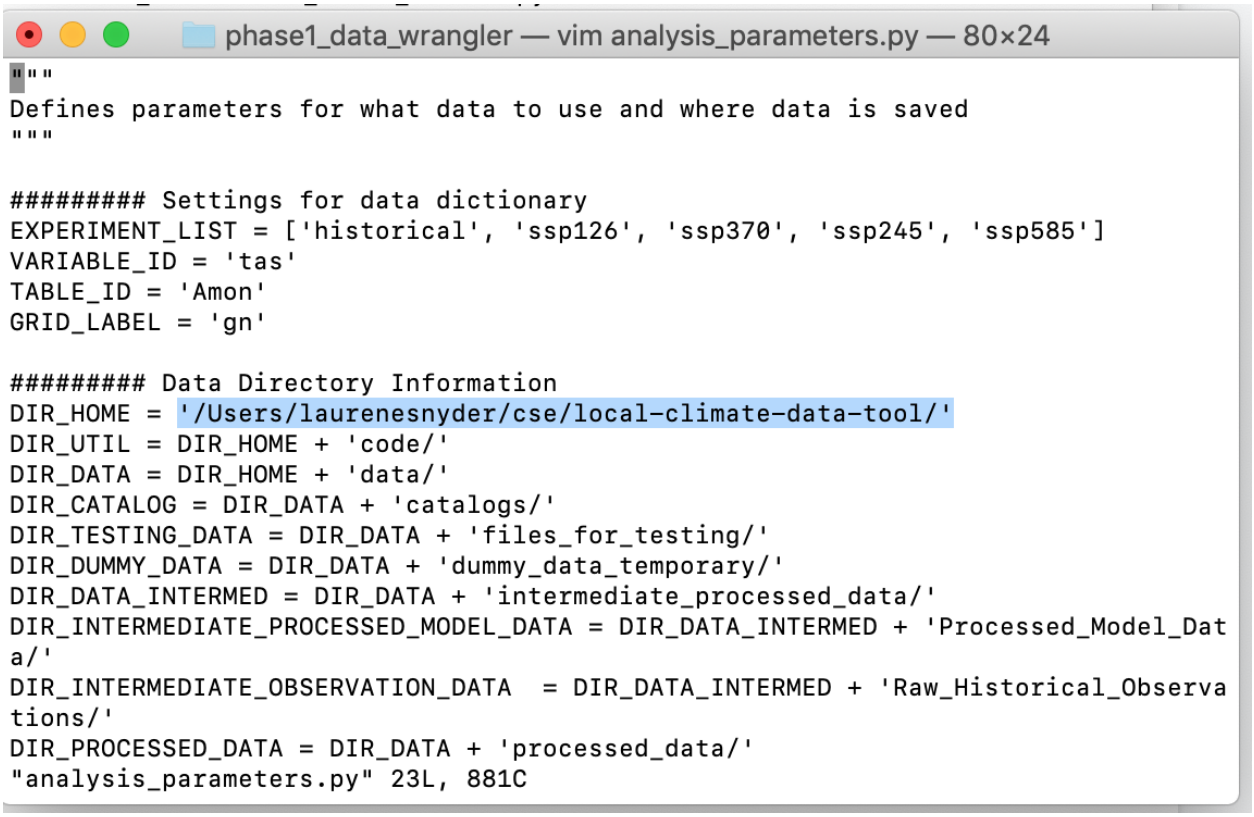
3. **Activate environment**

conda activate myenv

4. **Open analysis_parameters and change the home directory to where you have the repo saved:**

Find the python file here: code>phase1_data_wrangler> analysis_parameters

Change home directory to where you have the cloned repo saved on your desktop



5. **Opendownload_file_from_google_drive and change the working directory to where you have the repo saved:**

Find the python file here: code> download_file_from_google_drive.py

Change the working directory to where you have the repo saved on your desktop

code — vim download_file_from_google_drive.py — 80×24

```
import io
import tarfile
import os
import oauth2client
import googleapiclient.discovery as discovery
from httplib2 import Http
from oauth2client import file, client, tools
from googleapiclient.http import MediaIoBaseDownload
import sys

WORKING_DIR = '/Users/laurenesnyder/cse/local-climate-data-tool/code/phase1_data
_wrangler/'
sys.path.insert(0, WORKING_DIR)
import analysis_parameters as params

def get_credentials(permissions_dir):
    obj = lambda: None
    lmao = {"auth_host_name":'localhost', 'noauth_local_webserver':'store_true',
 'auth_host_port':[8080, 8090], 'logging_level':'ERROR'}
    for k, v in lmao.items():
        setattr(obj, k, v)

    # authorization boilerplate code
"download_file_from_google_drive.py" 109L, 4357C
```

6. **Run the download_file_from_google_drive jupyter notebook (this will take 10-15 minutes)**

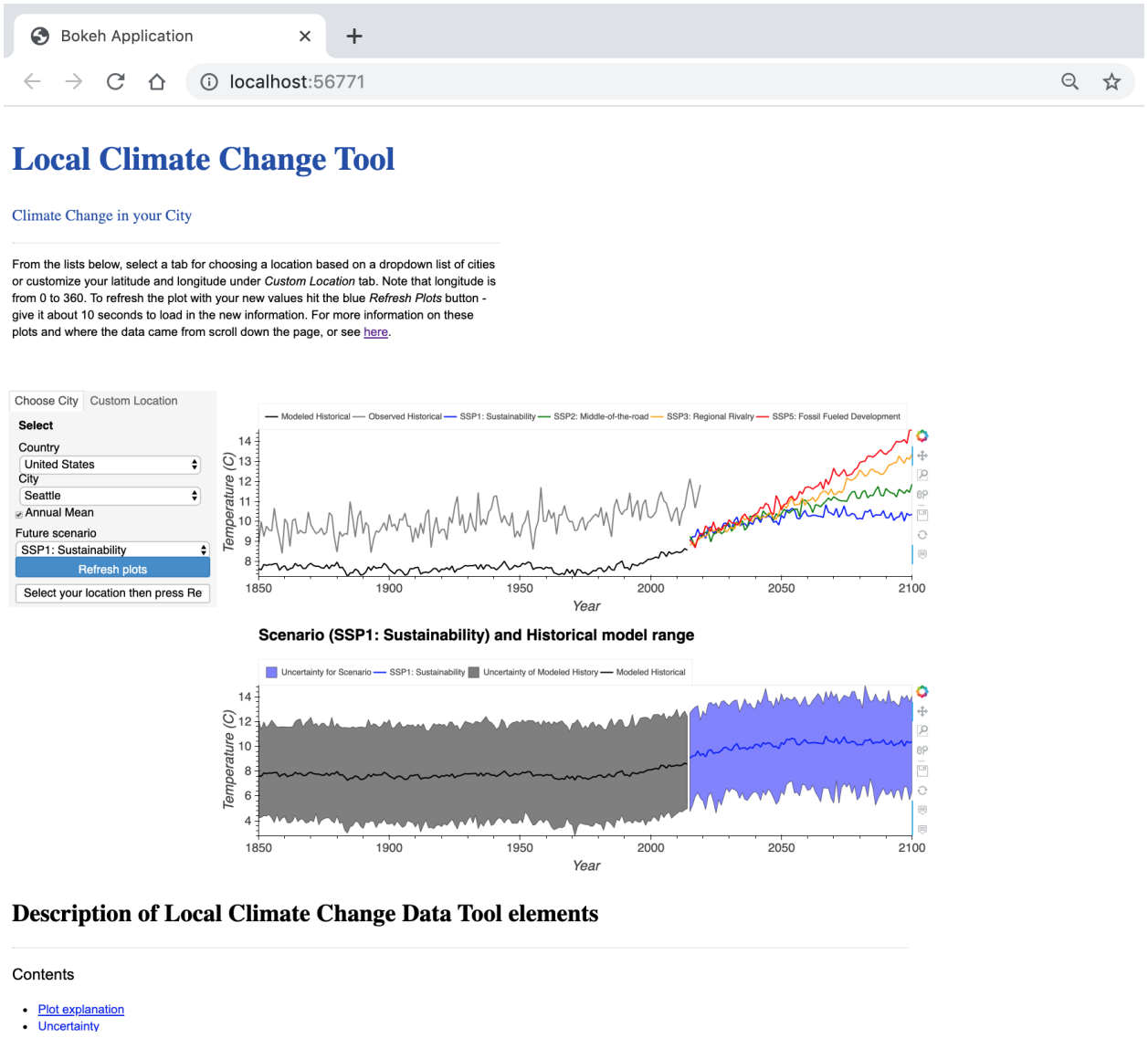
Find the file here: code> download_file_from_google_drive.ipynb

7. **Run the climate_dashboard jupyter notebook and the dashboard will open in new tab**

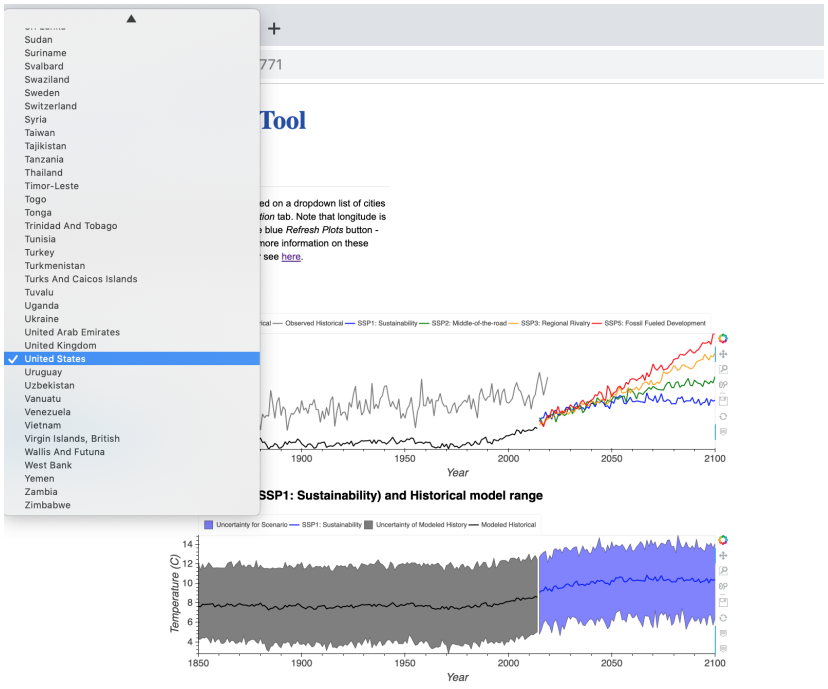
Find the file here: code> phase2_dashboard>generator>climate_dashboard.ipynb

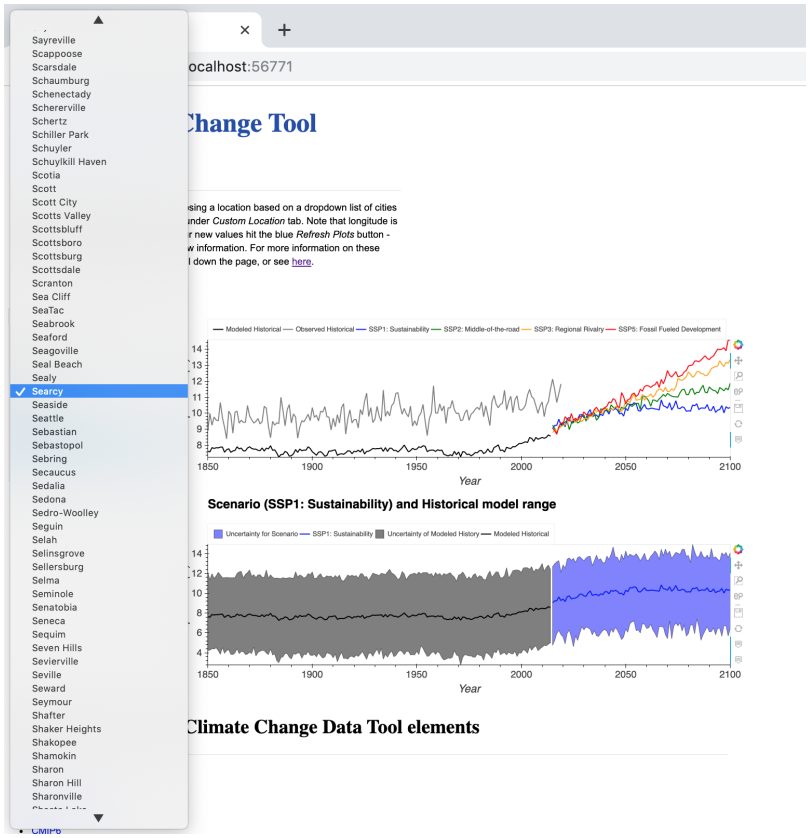
8. Interact with dashboard

After you run the jupyter notebook in step 7, the following dashboard will appear:



You can change the location by selecting a different country, then city in the selection box.



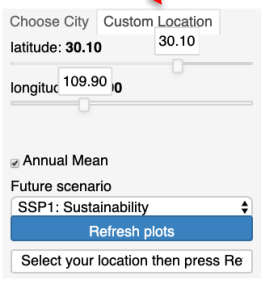


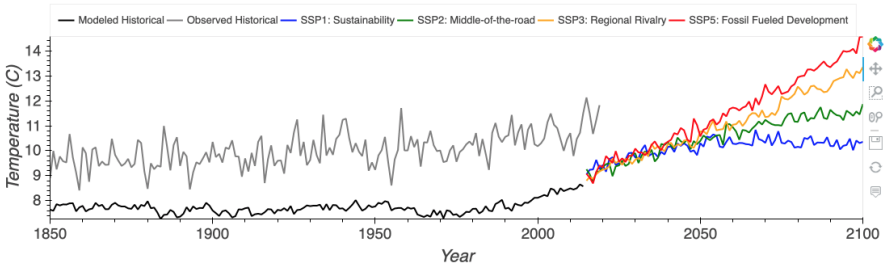
You can also select a custom location by selecting the tab and then entering the latitude and longitude.

Local Climate Change Tool

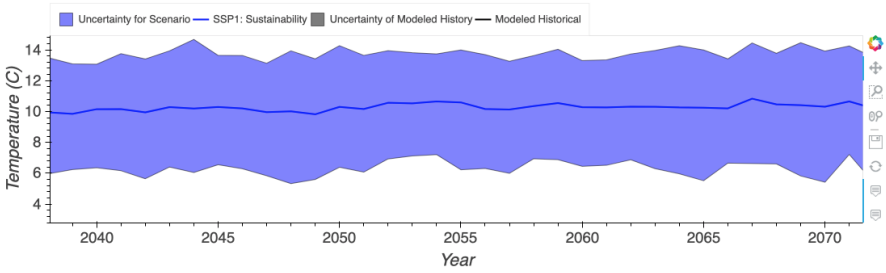
Climate Change in your City

From the lists below, select a tab for choosing a location based on a dropdown list of cities or customize your latitude and longitude under *Custom Location* tab. Note that longitude is from 0 to 360. To refresh the plot with your new values hit the blue *Refresh Plots* button - give it about 10 seconds to load in the new information. For more information on these plots and where the data came from scroll down the page, or see here.

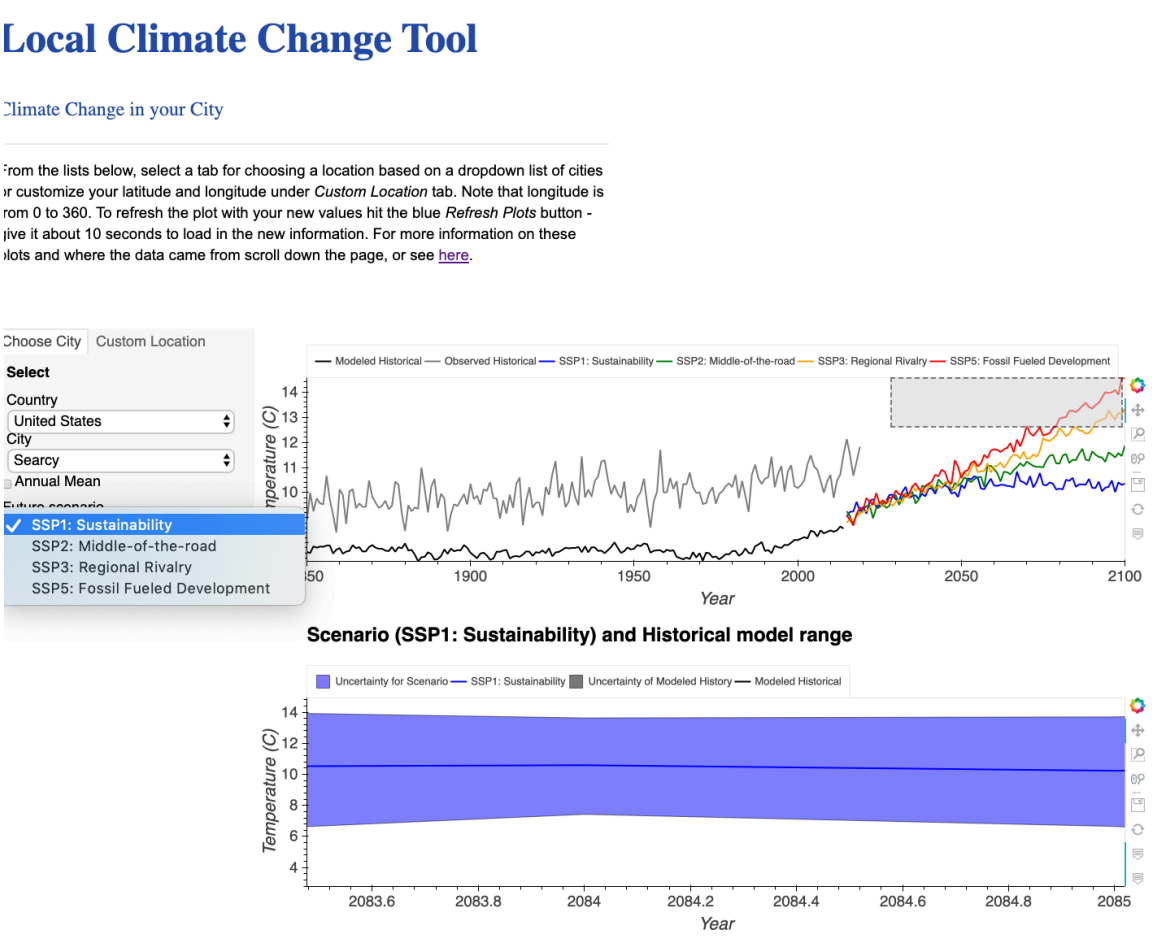




Scenario (SSP1: Sustainability) and Historical model range



You can also change scenarios in the ‘Future scenario’ drop down selection. After selections click ‘refresh plots’

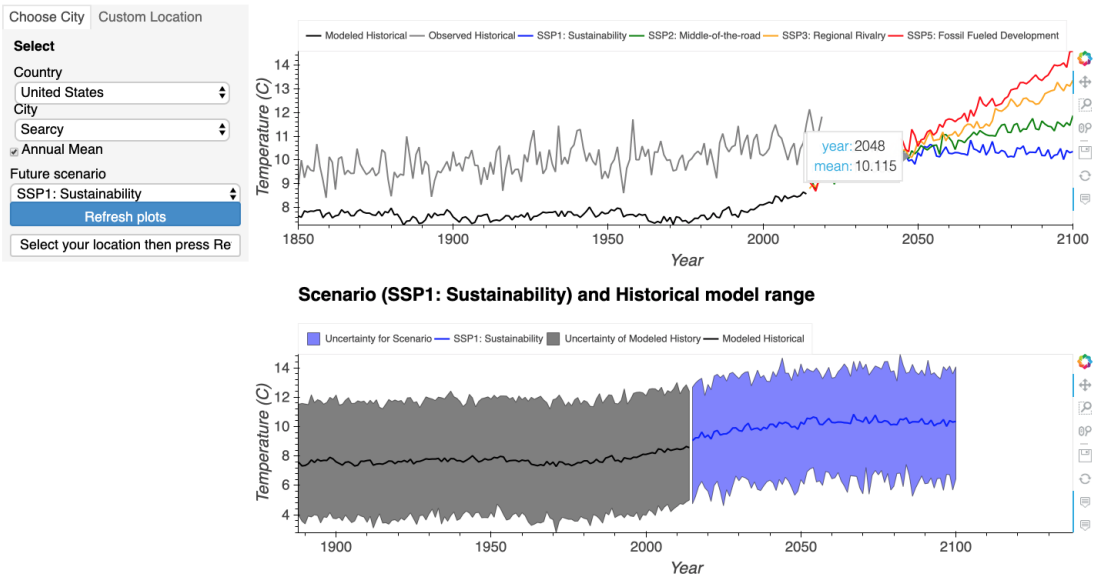


A tooltip appears when you hover over the plots to provide exact data points.

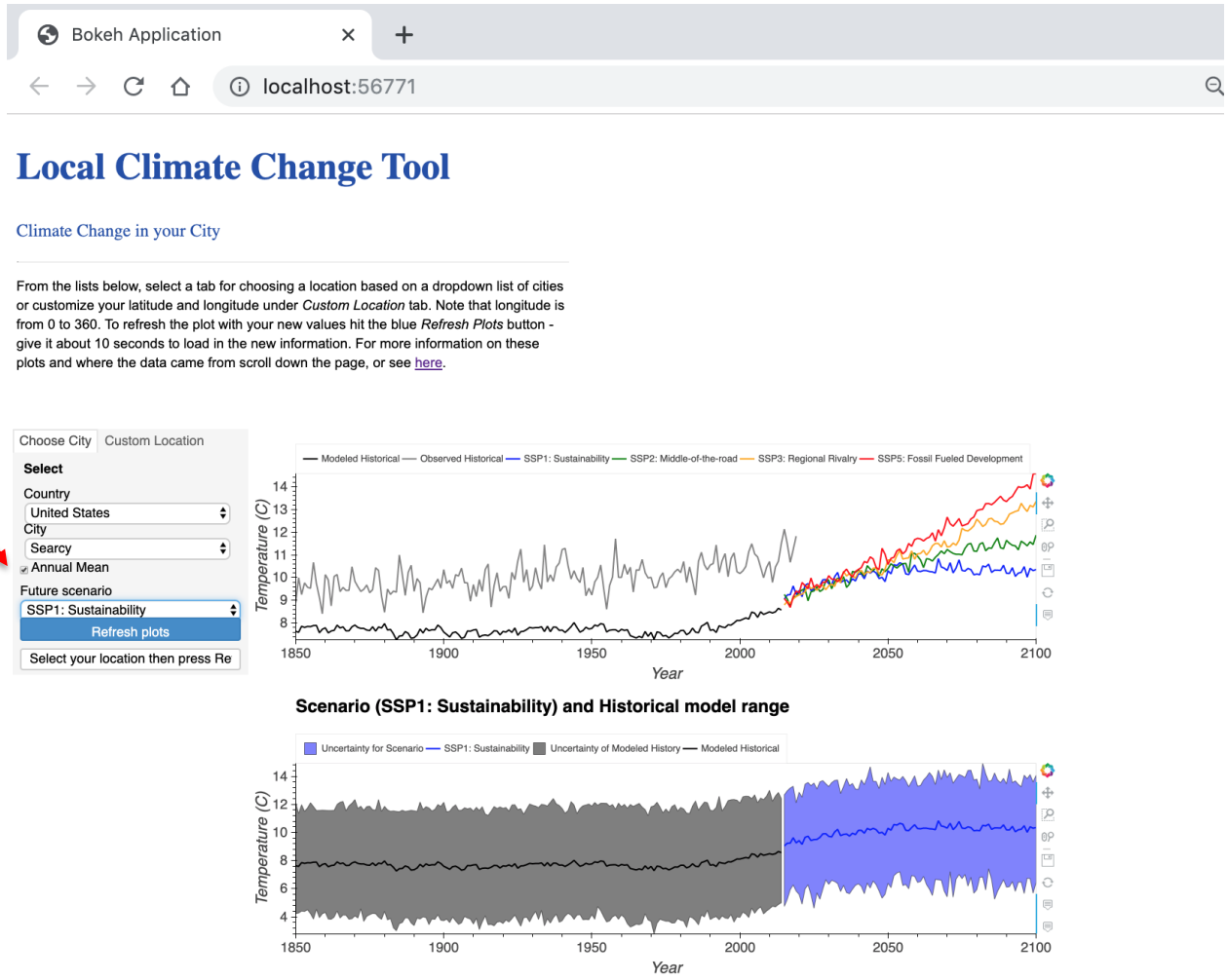
Local Climate Change Tool

Climate Change in your City

From the lists below, select a tab for choosing a location based on a dropdown list of cities or customize your latitude and longitude under *Custom Location* tab. Note that longitude is from 0 to 360. To refresh the plot with your new values hit the blue *Refresh Plots* button - give it about 10 seconds to load in the new information. For more information on these plots and where the data came from scroll down the page, or see here.



You can also view the annual means or raw data by selecting or deselecting the annual means indicated by the red arrow.



Description of Local Climate Change Data Tool elements

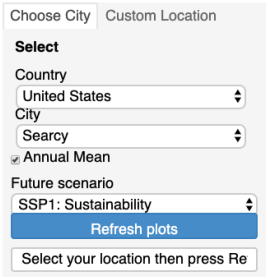
Contents

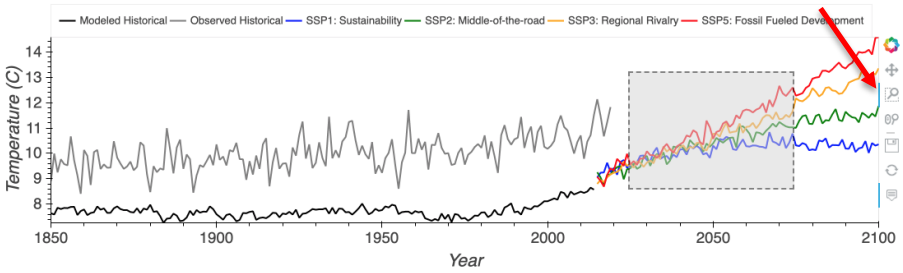
You can zoom into a subset of years by selecting the magnifying glass on the plots. The non-selected plot will update to the years you have selected.

Local Climate Change Tool

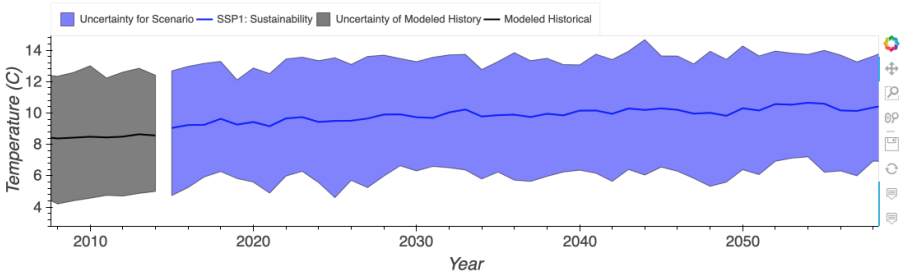
Climate Change in your City

From the lists below, select a tab for choosing a location based on a dropdown list of cities or customize your latitude and longitude under *Custom Location* tab. Note that longitude is from 0 to 360. To refresh the plot with your new values hit the blue *Refresh Plots* button - give it about 10 seconds to load in the new information. For more information on these plots and where the data came from scroll down the page, or see here.

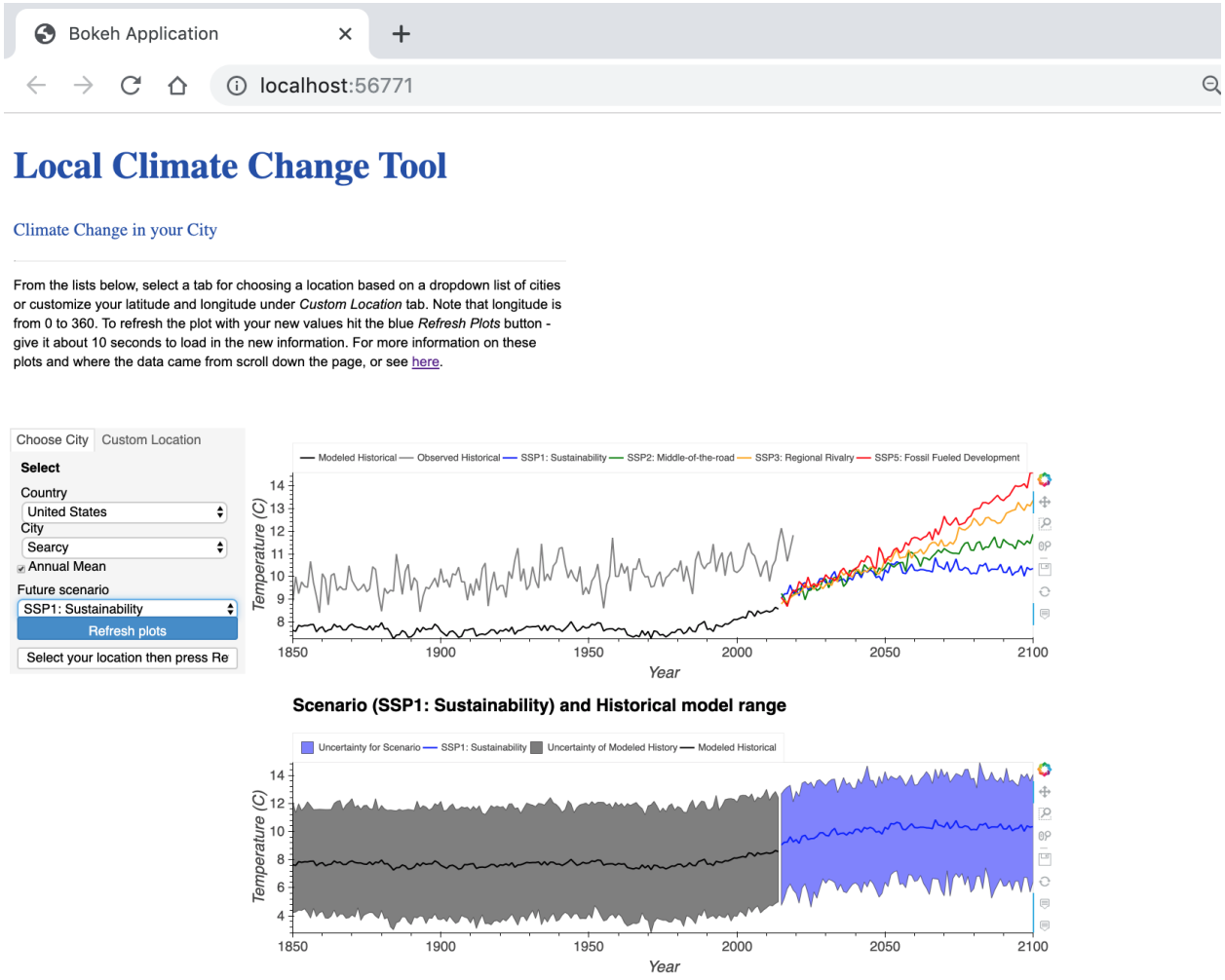




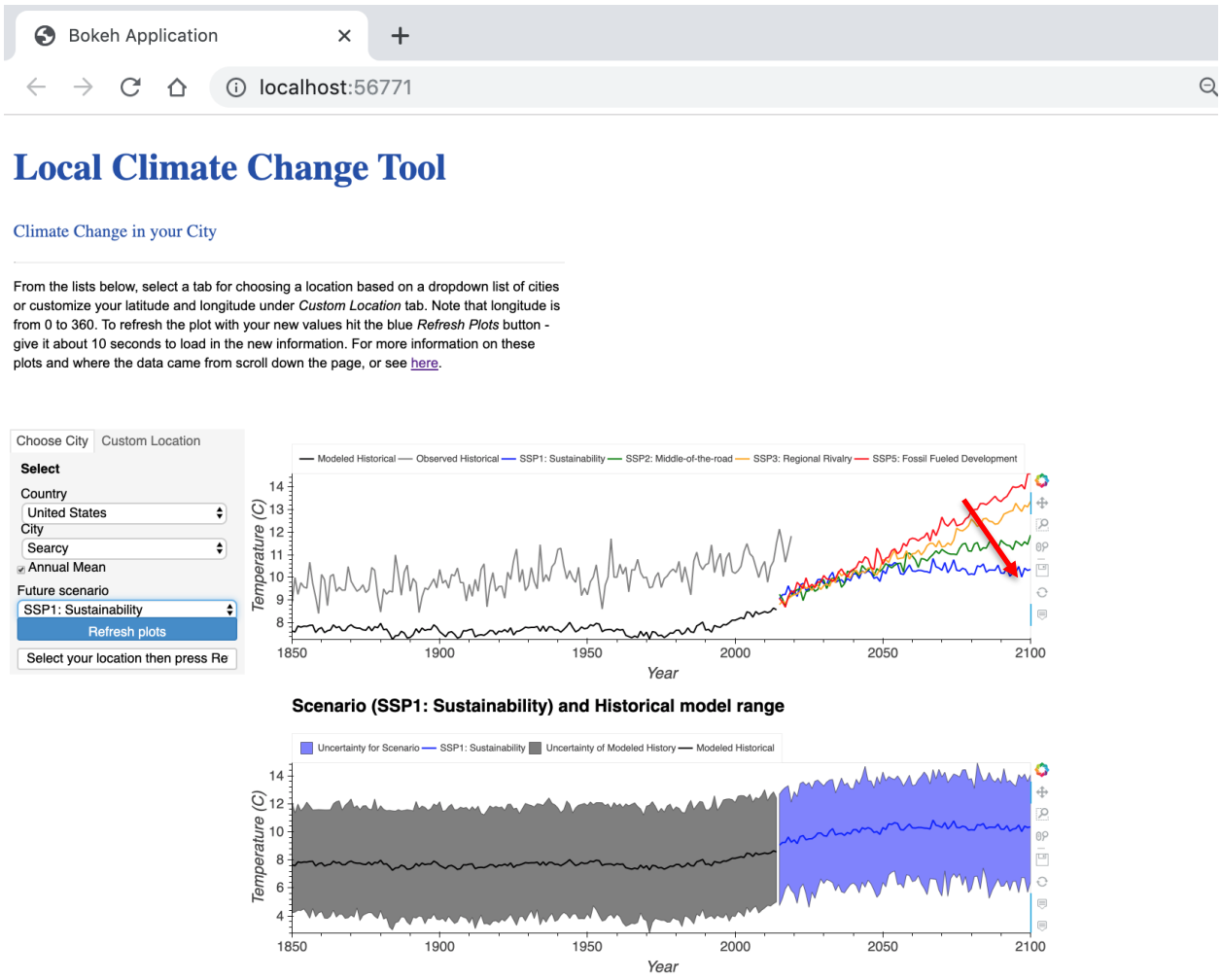
Scenario (SSP1: Sustainability) and Historical model range



You can also save images to a file when you select the floppy disk.



You the zoom or selected plots with the refresh the selection.



Finally scroll to the bottom of the screen to find a description of the data used in the dashboard.

Description of Local Climate Change Data Tool elements

Contents

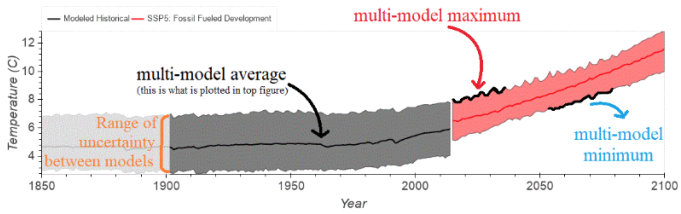
Plots

These plots show the near-surface air temperature for the grid point closest to your selected location from the CMIP6 climate model projections (1.125°x1.125° latitude-longitude grid) for the historical experiment and for each of the four scenarios. The mean, minimum, and maximum are computed over 16 models for the historical experiment, 11 models for SSP1: Sustainability, 10 models for SSP3: Regional Rivalry, and 9 models for SSP5: Fossil Fueled Development. The historical experiment was run for 165 years from 1850-2014, while the scenarios were run for 85 years from 2015-2100. This data is plotted monthly, so you will see a lot of noise from the seasonal temperature changes unless annual mean is selected. In the bottom plot, the model data is plotted alongside historical observations of surface temperature.

Uncertainty

Note that uncertainty inherently arises in these simulations from the models themselves, from factors in the scenarios (such as emission), and from the natural internal variability in the climate. Uncertainty from the models is demonstrated in the spread between the minimum and maximum values for each scenario.

Scenario (SSP5: Fossil Fueled Development) and Historical model range



CMIP6

The Coupled Model Intercomparison Project, Phase 6 (CMIP6) is an intercomparison of over 30 global climate models with the same forcings and with a consistent output format to facilitate comparison. These models were run for a historical experiment to recreate the past to validate the models and for several different future scenarios. Currently, this tool only utilizes a subset of these climate models; this will be updated as more data becomes available. For more information, visit https://www.wcrp-climate.org/wgcm-cmip.

SSPs

These scenarios are different shared socioeconomic pathways (SSPs), which make projections on what would happen in the future if that amount of radiative forcing is present, assuming no further climate change or changing policies. Each scenario is named after the amount of radiative forcing from human activities (e.g. the amount of carbon-based energy used and carbon emissions), meaning the amount of excess solar radiation entering the earth's atmosphere. In the order of most to least sustainable, these radiative forcings are 1-2.6 W/m2 (SSP1: Sustainability), 2-4.5 W/m2 (SSP2: Middle-of-the-road), 3-7 W/m2 (SSP3: Regional Rivalry), and 5-8.5 W/m2 (SSP5: Fossil Fueled Development). Generally, higher forcing corresponds to warmer temperatures on Earth.

Observations

BERKELEY EARTH

These temperature observations come from the Berkeley Earth Surface Temperature (BEST) dataset, which consists of monthly means of land surface air temperature observations that have been structured onto a 1° x 1° latitude-longitude grid, although observations may not be available for every point on the grid at all time steps. For more information, visit http://berkeleyearth.org/.