



Geospatial Clean Cooking access modelling using OnStove

Hands-on 7: Running the OnStove model

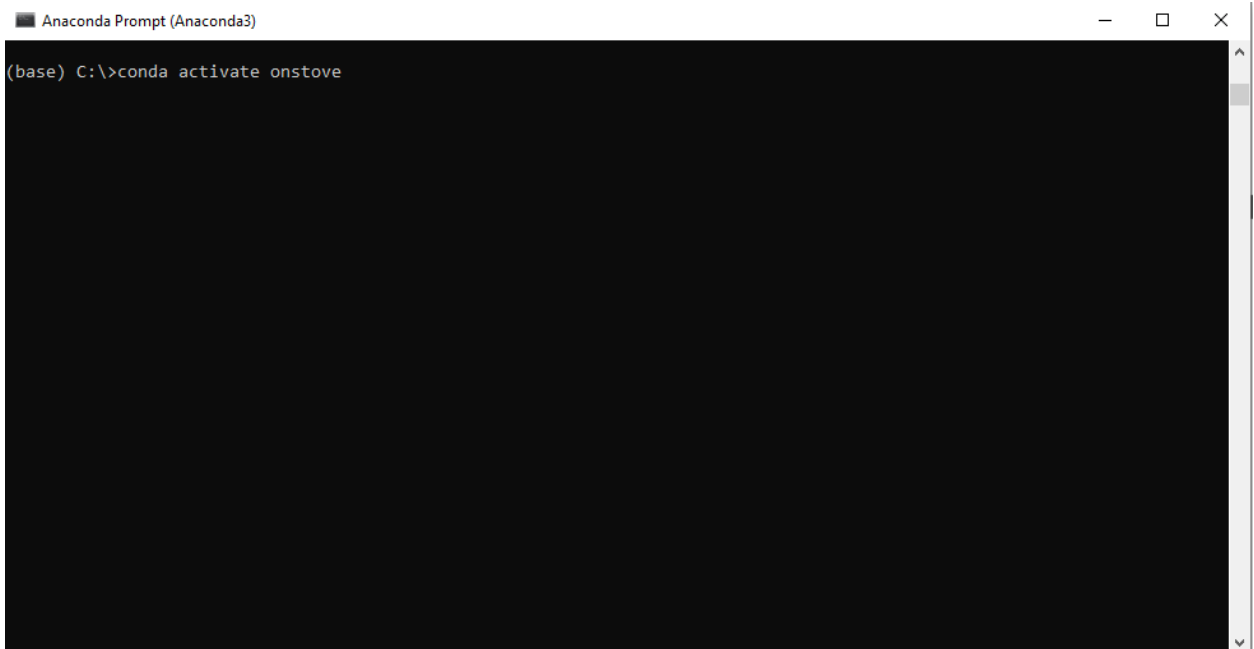
Learning outcomes

By the end of this exercise you will be able to:

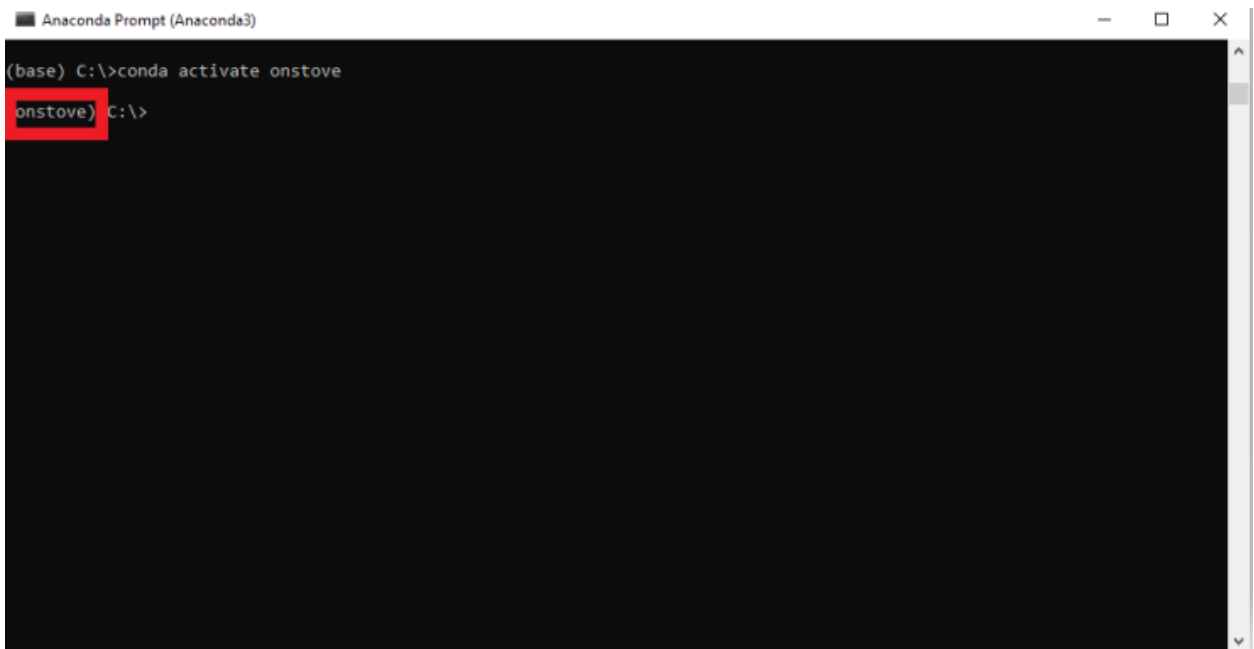
- 1) Process all required geospatial data for an OnStove model.
- 2) Create an OnStove model and calibrate it using socio- and techno-economic data of a country.
- 3) Run an OnStove scenario and visualize results.

Opening up Jupyter Notebook

1. Ensure that you have downloaded the file named **E7 – OnStove notebook.zip**. Put this file somewhere on your computer where it is easily accessible and unzip it.
2. Open up your start menu, search for **Anaconda Prompt** and click on it to open up a prompt window.
3. In your prompt window type: **conda activate onstove**. Note that the (base) in the beginning of the line of the prompt changes to (onstove). This means that OnStove is active and you now have access to the tool.

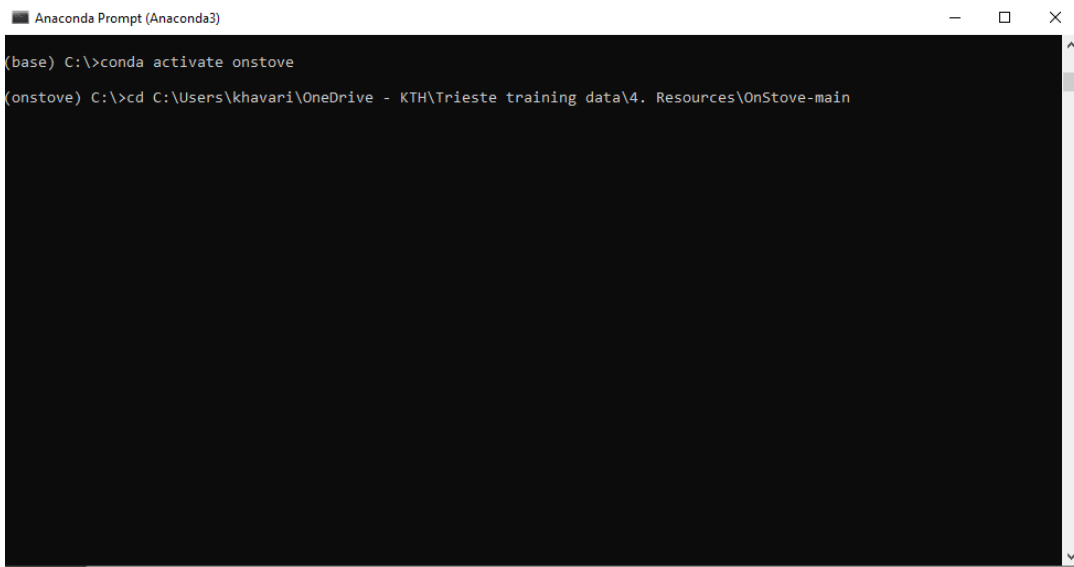
A screenshot of an Anaconda Prompt terminal window. The title bar reads "Anaconda Prompt (Anaconda3)". The terminal shows the command `(base) C:\>conda activate onstove` being entered. The rest of the terminal is black and empty.

```
■ Anaconda Prompt (Anaconda3)
(base) C:\>conda activate onstove
```

A screenshot of an Anaconda Prompt terminal window. The title bar reads "Anaconda Prompt (Anaconda3)". The terminal shows the command `(base) C:\>conda activate onstove` being entered. The prompt has changed to `onstove) C:\>`, which is highlighted with a red rectangular box. The rest of the terminal is black and empty.

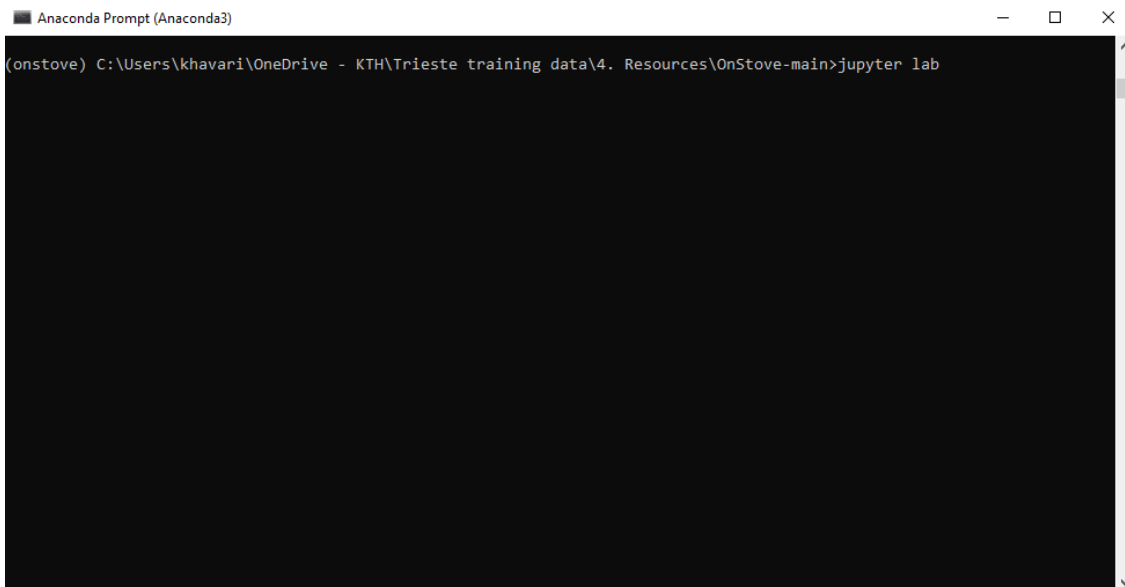
```
■ Anaconda Prompt (Anaconda3)
(base) C:\>conda activate onstove
onstove) C:\>
```

4. Open the folder where you extracted the file called **E7 – OnStove notebook.ipynb**. Copy the path of the folder and paste it in the anaconda prompt with “cd” in front of it (**cd PATH**, see images). Press enter.

A screenshot of an Anaconda Prompt terminal window. The title bar reads "Anaconda Prompt (Anaconda3)". The terminal shows the following commands and output:

```
(base) C:\>conda activate onstove
(onstove) C:\>cd C:\Users\khavari\OneDrive - KTH\Trieste training data\4. Resources\OnStove-main
```

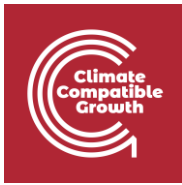
5. Next type “**jupyter lab**” in anaconda.

A screenshot of an Anaconda Prompt terminal window. The title bar reads "Anaconda Prompt (Anaconda3)". The terminal shows the following command and output:

```
(onstove) C:\Users\khavari\OneDrive - KTH\Trieste training data\4. Resources\OnStove-main>jupyter lab
```

6. This will open up an instance of jupyter lab on your computer. Note that while it opens up in your web-browser the jupyter lab instance is ran completely offline and does not require an internet connection.

7. Double click on the file called **E7 – OnStove notebook.ipynb** in the file browser. Follow the instructions given in the file. If you can not see the file, it may be because you are in the wrong path (check step 4), or because your file browser is closed (see next image for how to open it).



The screenshot shows the JupyterLab interface. At the top, there's a browser window with the address bar showing 'localhost:8890/lab'. Below that is the JupyterLab menu bar with options: File, Edit, View, Run, Kernel, Tabs, Settings, Help. The main area is divided into a sidebar on the left and a main workspace. The sidebar contains a 'Launcher' tab, which is highlighted with a red box. Below the Launcher tab, there's a 'Notebook' icon and a 'Python 3 (ipykernel)' icon. The main workspace shows a file browser on the left with a table of files and a notebook viewer on the right. The notebook viewer displays the 'OnStove notebook' content.

Name	Last Modified	File Size
14.2 E7 - OnStove noteb...	23 minutes ago	53.7 KB
--- Hands-on_data_coll...	2 months ago	1.8 MB
--- OnStove_theory_dat...	3 days ago	155.2 KB
1. L1 - Clean_cooking_...	12 days ago	20.5 MB
10. L4 - OnStove theory ...	4 days ago	12.5 MB
11. L5 - OnStove_theory...	3 days ago	15.1 MB
14.1 E7 - Running the O...	1 minute ago	338.2 KB
14.2 E7 - OnStove noteb...	20 minutes ago	13.1 KB
2. L2 - Cost_benefit_anal...	12 days ago	14.9 MB
3. E1 - BAR-HAP.docx	12 days ago	2.5 MB
4. L3 - Key_GIS_concept...	12 days ago	16.2 MB
5. E2 - Installing QGIS.d...	12 days ago	776.8 KB
6. E3 - Working with vec...	21 hours ago	1.3 MB
7. E4 - Working with rast...	21 hours ago	653.8 KB
8. E5 - Anaconda and O...	3 months ago	1.2 MB

OnStove notebook

This is the OnStove notebook. The purpose of the notebook is to give users the ability to run through the analysis with example data and it can therefore act as a complement to the scientific publication and read-the-docs documentation.

The notebook is divided into 4 major parts:

- 1. Data processing** - In this part of the analysis different geospatial datasets are read and processed (reprojecting, clipping, masking, aligning, resampling, etc.). The datasets from this step are saved on the users computer. For future runs on the same area of interest this step can consequently be skipped unless datasets are switched.
- 2. Calibration** - In this part, the area of interest is calibrated. Raster cells are classified as either urban or rural, the electrification rate in different cells is determined and the rates of different cooking fuels across settlements are calibrated. The calibrated data is saved in a `.pk1-file`. Unless data related to these steps are changed from one run to another, this step only needs to be ran once.
- 3. Model run** - The net-benefit for different stoves is determined in different parts of the study area. Once all stoves have a net-benefit calculated the stoves will be compared and the stove with the highest net-benefit in each settlement is selected. Summaries of the results documenting the benefits and costs of each stove type across the entire study area are produced. The results are saved as a `.pk1-file`.
- 4. Visualization** - Visualizing and saving different maps related to the results.

Each part of the notebook is divided into several different cells and each cell is described more in depth.

Always run the imports first and do not edit these cells

8. To finalize the exercise follow the instructions given in the notebook.