**CLASS Modelling Workshop – Thursday 29th February 2024**

**Oceanparcels Task**

Ready, set, go! Running the parcels simulation:

1. ssh into JASMIN login node *ssh -A trainXXX@login1.jasmin.ac.uk* and then into sci3 server *ssh -AX trainXXX@sci3.jasmin.ac.uk*
2. run ‘*pwd*’ to check you are in your home directory – it should return ‘/home/users/trainXXX/’. Run the code below to make a directory to save all the files from this exercise in. Run ‘*ls*’ to check the new folder is there.

*mkdir lagran*

1. Change directory into the ‘lagran’ folder in the groupwork space by running the code below in the command line

*cd /gws/pw/j07/workshop/users/lagran/*

1. Copy the python environment file to your home directory using the code below but replacing XXX with your username

*cp parcelsenv.yml /home/users/trainXXX/lagran/*

1. Change directory back to your lagran folder

*cd /home/users/trainXXX/lagran/*

1. Install the python environment required using the code below in the command line

*conda env create -f parcelsenv.yml*

1. Once the environment is installed run the code below in the terminal

*conda activate parcels*

1. Change directory to the lagran folder in the group workspace. This has all the model output and scripts stored here.

*cd /gws/pw/j07/workshop/users/lagran/*

1. Copy the parcels scripts to your home directory using the code below but replacing XXX with your username

*cp \*\_\*.py /home/users/trainXXX/lagran/*

1. Copy the parcels\_plot.ipynb script to your home directory using the code below but replacing XXX with your username

*cp parcels\_plot.ipynb* */home/users/trainXXX/lagran/*

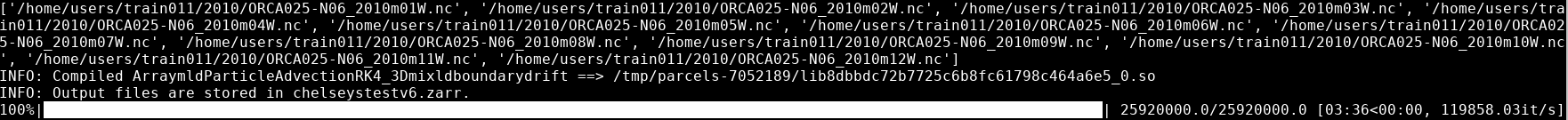
1. Change directory to your directory – **this is very important otherwise you will edit the template script!**

*cd /home/users/trainXXX/lagran/*

1. Use vi to open the script (*vi parcels\_test.py*) and press *i* to insert new text. You have to navigate to the place you want to edit using the arrows on your keyboard. For the test run do not change the release locations, depth or run time. Choose a file name. Make sure the home directory points to your *lagran* directory. Once you’ve made all the changes press escape and type *:wq!* And press enter to write and quit the file.
2. To run the simulation type the code below into the terminal and press enter

*python parcels\_test.py*

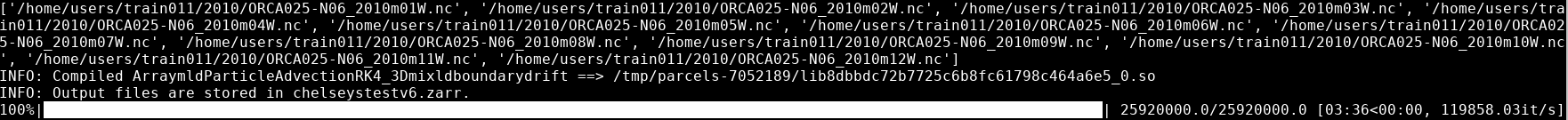
1. If the simulation is running you should see something like this:



1. Once the simulation reaches 100% run ‘*ls*’ and press enter in your home directory and you should see a .zarr folder and .nc file with the name you gave the outfile
2. Now you are ready to complete a 5 year simulation. Use vi to open the script (*vi parcels\_run.py*) and press *i* to insert new text. You have to navigate to the place you want to edit using the arrows on your keyboard. Choose your release location, depth, run length (stick to 5 years initially) and years to run for by changing the numbers at the header of the script. Choose a file name. Make sure the home directory points to your *lagran* directory. Once you’ve made all the changes press escape and type *:wq!* And press enter to write and quit the file.
3. To run the simulation type the code below into the terminal and press enter

*python parcels\_run.py*

1. If the simulation is running you should see something like this:



1. Once the simulation reaches 100% run ‘*ls*’ and press enter in your home directory and you should see a .zarr folder and .nc file with the name you gave the outfile
2. Now you can move on to analysing the output (section below).

Where did they come from, where did they go? Analysing the parcels simulation:

1. Log in to the jupyter notebooks service in the browser:  [https://notebooks.jasmin.ac.uk](https://notebooks.jasmin.ac.uk/). If this is the first time you are logging in use the ‘forgotten password’ link, which allows you to create a password and log in with your training account.
2. Open the parcels\_plot.ipynb by navigating from your home directory into your ‘lagran’ folder on the left hand side. This loads a python environment with all the packages you will need for plotting.
3. You should be able to run through the jupyter notebook and you can edit the plots to make them zoom in on your release location.
4. Once you reach the end of the notebook you can calculate distance and speed metrics. To do this return to the terminal where you ran the simulation.
5. Run ‘*vi trajectory\_metrics.py*’ in the command line and press i. Edit the outfile directory and name. Once you’ve made all the changes press escape and type :wq! And press enter to write and quit the file.
6. Run ‘*python trajectory\_metrics.py*’ in the command line and add your results to the google spreadsheet of challenge results.

Google spreadsheet for challenge results: <https://docs.google.com/spreadsheets/d/1juYb0VeZHk7gaw6bmKYFWbgNxcZbmwfoo_LcJcaZofk/edit?usp=sharing>

Google folder to drop in charismatic plots (don’t forget to put your name in the filename!): <https://drive.google.com/drive/folders/1HWXRar8vSsp590Yjowk0OIoAaOQUmGe8?usp=sharing>

Challenges:

1. Simulate a trajectory that travels the furthest in 5 years
2. Simulate a trajectory that travels the fastest over 5 years
3. Simulate a trajectory that has the largest depth change in 5 years
4. Find a depth and location which has a sequestration efficiency of 50% outside of the North Atlantic (closest to 50% wins)
5. Plot the most charismatic trajectory pathways (this is not scientific and extremely subjective – Andrew and Chelsey will judge!) e.g.

