Exercise 2:
The purpose of this exercise is to train you in auto-calibration routine with parsac of GOTM-WET models. To do this exercise, you will need to have a working GOTM-WET model set-up for Shahe Reservoir (see exercise 1).

We have created a tutorial to explain how to install parsac, configure the folder setup and files required to perform an auto-calibration routine and the calibration steps. You can find the tutorial on workshop page or the provided USB stick under *Tutorials*.

Exercise content:
> If you do not have parsac installed, you must download and install parsac. Please follow the installation guide provided.

> **A. Perform auto-calibration of water temperature (step 1)**
> In this task, you will perform an auto-calibration on water temperature for Shahe Reservoir.
>
> First, you need to configure your model folder for Shahe Reservoir. We recommend you copy your model folder you created with QWET. You can find your QWET model folder by
> //QWET/lake_project_name/LAKEMODEL/Default
>
> You must include a folder named *parsac*. Your folder setup should look like this:
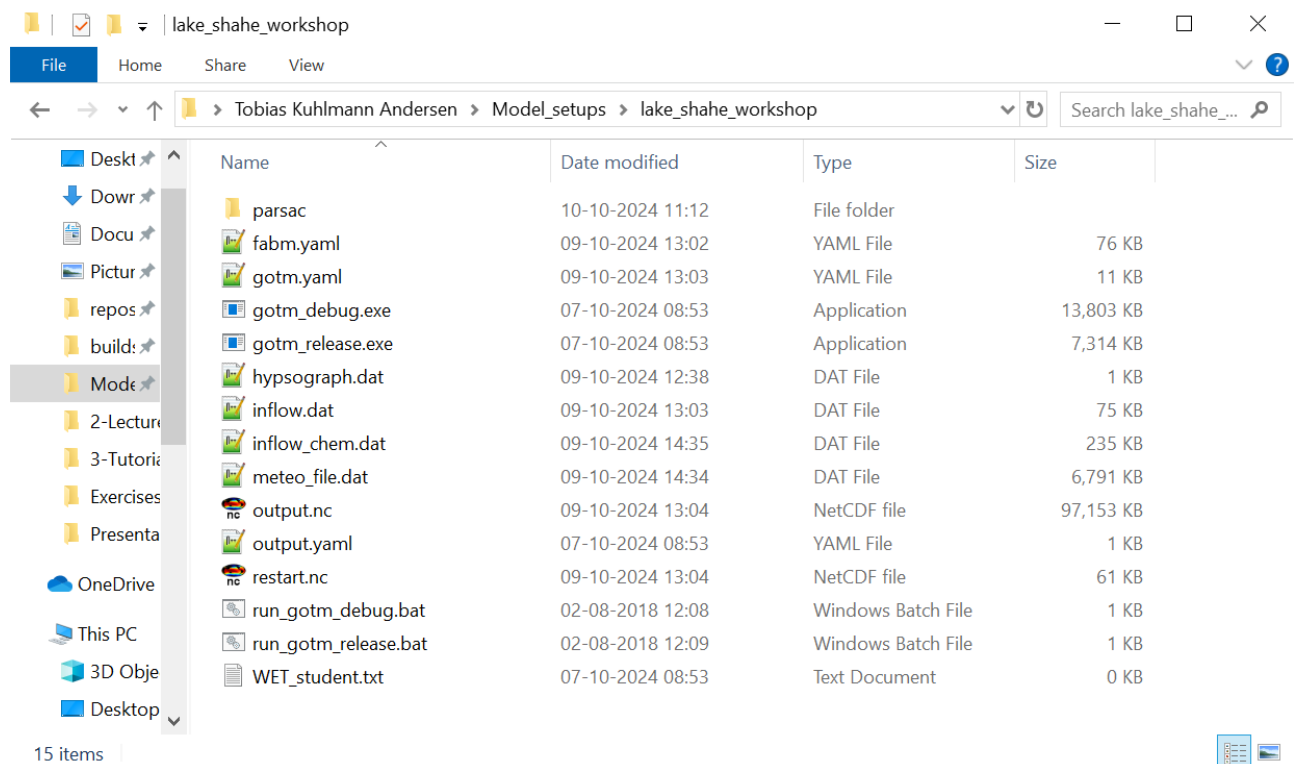
Within your *parsac* folder you must include the observation files for Shahe Reservoir and a xml file with configurations of parsac. For this exercise, download wet_dashahe_step1.xml from the workshop page. Open the xml file and investigate if wet_dashahe_step1.xml include all the information, that a calibration xml file should include, as described in the auto-calibration tutorial.
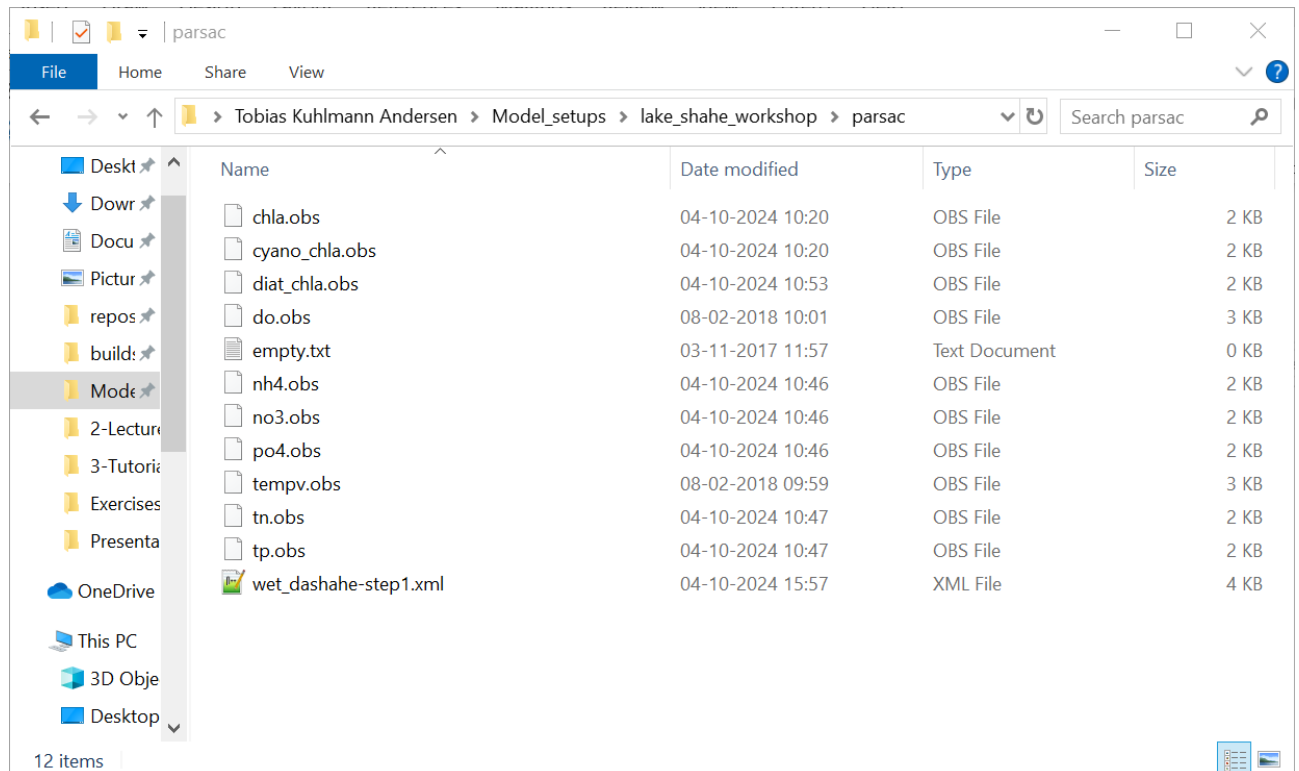
Now, you are ready to perform your first auto-calibration iteration. Follow the tutorial on auto-calibration with parsac and go through all three steps (run, plot and plotbest) and determine

I)   How can you improve the model performance in the next calibration iteration? Change the xml file accordingly.

II)   Which parameter gave the strongest calibration signal and what was its optimal parameter value?

You will have to wait some time (depending on the amount of CPUs on your computer. While you are waiting for the calibration results, you can start on task B (optional). You can check how far your calibration has come along with the plot function.

B. Design and run your own auto-calibration iteration (optional)
Select one state variable with observations that you will target for calibration. Based on what you know of GOTM-WET and your knowledge of lake ecology select 6-8 parameters that are important for your selected state variable.

Now, create a xml file to calibrate the selected state variable. You will need to decide and set the parameter value ranges in the xlm file.

Go through the parsac routine (run, plot, plotbest) and determine which parameters gave the strongest calibration signal and how you would change these parameter ranges.