SURFEX TRAINING COURSE EXERCISES : physiography and 1D cases

Tools :

- pgd.exe, prep.exe, offline.exe, sxpost.exe
- sxpost_to_grads
- trpixel.bash
- profil.bash

physiography :

- First go to $HOME/aneto/test_pgd where prepared experiments are ready. Select one of the experiments between cuba, japan, parisI and spitzberg. The main namelist is named OPTIONS.nam. Submit job_pgd (qsub).
  - The main output file is PGD.txt. Which COVERS are present in the domain ?
  - An other output file is class_data_cover.tex which describes COVERS. Use latex and xdvi to visualize it
  - to plot covers, create a namelist file SXPOST.nam containing the following instructions (2 lines):
    ```
    1
    - FULL   COVERxxx
    ```
  - where xxx is one the cover present in your domain, and then submit job_sxpost : in return you'll get COVERxxx.dat that you can visualize with : trpixel.bash COVERxxx.dat
  - modify SXPOST.nam to plot the orography ZS :
    ```
    1
    - FULL   ZS
    ```
    or
    ```
    2
    - FULL   COVERxxx
    - FULL   ZS
    ```
- define your own domain
  - geographical area, projection, number of points, …
  - define sand and clay % from FAO database (NAM_ISBA)
  - plot the orography ZS, the SAND fraction of the new domain

1D experiment :

- A - isba : vegetation scheme → $HOME/aneto/isba/
  - A.1 : run the reference simulation : file job includes the steps pgd, prep and offline. Save output files in a separate directory (ref) for later comparison. Output vector files (*.TXT) can be plot with command : xmgrace TG1.TXT (TG1 being surface temperature)
  - A.2 : start from reference simulation and modify soil moisture initial state (decrease soil wetness index by 10%) in OPTIONS.nam. How long does it take to return to equilibrium ? Save output in separate directory (exp1). Plot root water content for simulations A.1 and A.2 using for example xmgrace ref/WG2.TXT exp1/WG2.TXT -legend load
  - A.3 : start from reference simulation and modify thermal coefficient Cv in OPTIONS.nam and evaluate the impact on surface temperature : Cv = {0.125E-5, 0.5E-5, 2.E-5}. Save output in separate directory (exp2).
    Plot surface temperature for simulations A.1 and A.3 using for example xmgrace ref/TG1.TXT exp1/TG1.TXT -legend load
  - A.4 : What is the impact in terms of surface latent heat (H) and sensible heat (LE) fluxes for experiments A.2 and A.3 compared to A.1?

- B - FLake : lake scheme → $HOME/aneto/alqueva/
  - B.1 : run the reference simulation : file job includes the steps pgd, prep and offline. Save output files in a separate directory (ref) for later comparison. Output vector files (*.TXT) can be plot with command : xmgrace TS_WATER.TXT (TS_WATER being surface temperature).
  - B.2 : start from reference simulation and modify lake depth : originally D = 27.5m, change to D = 17.5m.
    Save output in separate directory (exp1).
    Plot initial lake temperature profiles (TW(z)) for reference run and B.2 run by adapting and using profil.bash. Remark?
  - B.3 : rerun B.2 with D=17.5 and initial bottom temperature T_BOT taken at 17.5m from reference run. Save output in separate directory (exp2).
    Plot initial lake temperature profiles for reference and B.3 by adapting and using profil.bash. Remark ?
  - B.4 : rerun with D=17.5m, bottom temperature T_BOT from reference run and increase mean water temperature T_MNW by

2°C. Then plot initial water temperature profile : remark ?

Compare B.4 experiment and reference run in terms of surface temperature TS_WATER, depth of the mixed layer H_ML, bottom temperature T_BOT and shape factor CT,

- B.5 : what is the sensibility of lake surface temperature to extinction coefficient? Ec = {2., 3., 4.}