- The standalone SACSMA code is in the "no-snow-SACSMA-SNOW17" folder. It is the modification from the original repository at https://github.com/Upstream-Tech/SACSMA-SNOW17/tree/master

  - You must compile the code following the instructions in the *"README.md"* file. Note also that the folders *"model_output_no_snow"* and *"LeafRiverFileBAK"* inside the *"no-snow-SACSMA-SNOW17"* directory contain the files to run the code. Please go through the code carefully and modify the path accordingly.

- The GR4J code is in the "GR4J-BM" directory folder. It is the modification from the original repository at https://github.com/amacd31/gr4j

  - You will have to adjust the working and running directory to run the GR4J code. Also, the SPOTPY package must be installed so that the parameter optimization can be performed.

- The HyMOD Like code is in the "HyMODLike-BM" directory folder. We follow the same procedure in the manuscript to train the HyMOD Like model. We have included all the necessary classes in the *"MCPBRNN_lib_tools"* for developing the HyMOD Like model.

- All the files are briefly summarized below:

  - mcpbrnn_Main_constantO_variableL.py

    It is the single-node (soil-moisture tank) architecture with constant output gate and time-variable loss gate. It denotes $MC\{O_\kappa L_\sigma\}$ in Wang & Gupta (2024).

  - mcpbrnn_Main_constantO_variableL_MCA2.py

    It is the single-node (soil-moisture tank) architecture similar to the MA_2 architecture with two constant output gates, one each at the surface and groundwater flow path, and also the time-variable loss gate. The model here named $MA_2\{O_\kappa L_\sigma\}$ and the soil-moisture tank (except for the second output gate parameter) is initialized by $MC\{O_\kappa L_\sigma\}$.

  - mcpbrnn_Main_constantO_variableL_MCA3.py

    It is the two-node (soil-moisture tank and surface routing tank) architecture similar to the MA_3 architecture with one constant output gate and one time-variable loss gate in the soil-moisture tank, and one constant output gate in the surface routing tank. The model here named $MA_3\{O_\kappa L_\sigma\}$ and the soil-moisture tank is initialized by $MC\{O_\kappa L_\sigma\}$.

  - mcpbrnn_Main_constantO_variableL_MCA4.py

    It is the two-node (soil-moisture tank and groundwater tank) architecture similar to the MA_4 architecture with one constant output gate and one time-variable loss gate in the soil-moisture tank, and one constant output gate in the groundwater tank. The model here named $MA_4\{O_\kappa L_\sigma\}$ and the soil-moisture tank is initialized by $MA_2\{O_\kappa L_\sigma\}$.

  - mcpbrnn_Main_constantO_variableL_MCA5.py

    It is the three-node (soil-moisture tank, surface routing tank and groundwater tank) architecture similar to the MA_4 architecture with one constant output gate and one time-variable loss gate in the soil-moisture tank, and one constant output gate in the surface routing tank and the groundwater tank. The model here named $MA_5\{O_\kappa L_\sigma\}$ and the soil-moisture tank is initialized by $MA_2\{O_\kappa L_\sigma\}$, the surface routing tank is initialized by $MA_3\{O_\kappa L_\sigma\}$, and the groundwater tank is initialized by $MA_4\{O_\kappa L_\sigma\}$.

- mcpbrnn_Main_PETconstraint_constantO_variableL_MCA5.py
  Same architecture as $MA_5\{O_\kappa L_\sigma\}$ but with PET constraint applied to the loss gate in the soil-moisture tank. The model is named $MA_5\{O_\kappa L_\sigma^{con}\}$ (and hence HyMOD Like model), and it is initialized directly from $MA_5\{O_\kappa L_\sigma\}$.

- All other files with the filename ending with "_EVAL" are those used for evaluating the performance of that architecture.

References:

Wang, Y.H. and Gupta, H.V., 2024. A mass-conserving-perceptron for machine-learning-based modeling of geoscientific systems. *Water Resources Research*, *60*(4), p.e2023WR036461. https://doi.org/10.1029/2023WR036461