**iRONs - Jupyter Notebooks questionnaire**

**BEFORE** THE USE OF NOTEBOOKS:

1. What methods have you used to understand and learn technical methods and concepts? (select as many as t appropriate)
   1. Lecture slides
   2. Text books
   3. Online videos
   4. Games
   5. Jupyter Notebooks or similar
   6. Other:
2. Of the methods that you know, which ones you found most effective and which ones least effective?
   1. Most effective:
   2. Least effective
3. How familiar do you feel, from 1 (not confident) to 5 (very confident), with the following concepts:
4. Calibration of a hydrological model
5. Goodness-of-fit measures
6. Validation of a hydrological model
7. Uncertainty in inflow forecast
8. Ensemble forecast
9. Hedging rules
10. Decision making under uncertainty
11. Multi-objective optimization
12. Trade-off and Pareto front

**BOTH BEFORE AND AFTER** THE USE OF NOTEBOOKS:

**Notebook 1: Introduction**

**Notebook 2: Rainfall-runoff model calibration**

1. Does the influence of a given parameter on the simulated hydrograph depends on the value of the other parameters too?
   * 1. Yes
        1. Give an example:
     2. No
     3. Not sure / I don’t know
2. What errors have a stronger influence on the Root-mean-square-error (RMSE) value?
   * 1. Errors of high flow predictions
     2. Errors in the prediction during prolonged rainfall events
     3. Not sure / I don’t know
3. Can we obtain a single optimal solution (set of parameters) in a multi-objective calibration?
   * 1. Yes
        1. Which one:
     2. No
     3. Not sure / I don’t know
4. Is the trade-off relationship between low flow calibration errors and high flow calibration errors the same every year?
   * 1. Yes
     2. No
     3. Not sure / I don’t know
5. How could you increase the robustness of the calibration results, so the optimal set of parameters is more likely to be valid for future years?
   * 1. By increasing the number of iterations in the calibration process
     2. By increasing the number of years used for the calibration
     3. Not sure / I don’t know

**Notebook 3: Operation of a reservoir system**

1. What is the main purpose of a hedging rule for reservoir operation?
   * 1. Reduce the probability of a severe water shortage
     2. Reduce the operation costs
     3. Reduce the river abstractions
     4. Not sure / I don’t know
2. What is the optimal release policy of a system with two objectives: resource conservation and reliability of water supply?
   * 1. The policy that prioritizes the minimization of water supply deficits
     2. The policy that prioritizes the maximization of the storage level
     3. There is not a single optimal solution
     4. Not sure / I don’t know

**Notebook 4: Decision making under uncertainty**

1. The weather forecast uncertainty increases with:
   * 1. The forecast lead-time
     2. Temperature
     3. Not sure / I don’t know
2. What is ensemble simulation?
   * 1. The simulation of a set of equally probable input forecasts
     2. The simulation of the most probable forecast among a set of input forecasts
     3. Not sure / I don’t know
3. Does uncertainty vary along the Pareto front?
   * 1. Yes
     2. No
     3. Not sure / I don’t know
4. What is the optimal release scheduling for a reservoir system with two objectives: minimize operation costs and meet the water demand?
   * 1. The scheduling that prioritizes the minimization of water supply deficits
     2. The scheduling that prioritizes the minimization of operation costs
     3. The scheduling that balances both objectives
     4. There is not a single optimal scheduling
     5. Not sure / I don’t know

**AFTER** THE USE OF NOTEBOOKS**:**

How familiar do you feel, from 1 (not confident) to 5 (very confident), with the following concepts:

1. Goodness-of-fit measures
2. Validation of a hydrological model
3. Uncertainty in inflow forecast
4. Ensemble forecast
5. Hedging rules
6. Decision making under uncertainty
7. Multi-objective optimization
8. Trade-off and Pareto front
9. Which Notebook **(Introduction,** **Rainfall-runoff model calibration, Operation of a reservoir system, Decision making under uncertainty)** was most useful and clear and which one least?
   * 1. Most effective:
     2. Least effective:
10. How does the Jupyter Notebooks compare to other methods you have used and found very effective for learning?
    * 1. As good
      2. Worse because:
      3. Better because: