

INVITATION TO PARTICIPATE IN A SCIENTIFIC CHALLENGE

predicting water level changes IN LAKE VELENCE

Máté Chappon, Katalin Bene
correspondence: chappon.mate@sze.hu

National Laboratory for Water Science and Water Security, Széchenyi István
University of Győr,
Department of Transport Infrastructure and Water Resources Engineering,
Egyetem tér 1, Győr 9026, Hungary



The prediction of lake water levels (LWL) is becoming a crucial task of water resources management as changes in the climate and land use, coupled with increased water use, cause the water level of lakes and reservoirs to decrease progressively in many locations around the globe. (Ozdemir et. al. 2023)
Recently, an extreme drought caused record low water levels in Lake Velence, Hungary, that undermined recreational tourism around the lake, thereby triggering conflicts between water users within the catchment. Water managers' efforts to find solutions require reliable lake water level predictions.

1 WHY participate?

You can build and test your own prediction model on a well-measured catchment. You can get the excitement of the game. You can even win this challenge. There is a small but valuable prize for the champion as well.
Find out more in #2 - #7.

2 WHO can participate?

I thought this could be a good challenge for You! **Yes YOU!** You might be a hydrologist, a mathematician, a data scientist, a researcher or an engineer, but don't worry if you are none of those, you can still get involved!

Just look at #3 to see What to do.

3 WHAT to do?

In a year-long competition, predict lake water levels for each day of a month at the beginning of each month. One LWL value for each day, as simple as that. You can even guess. Of course you can make it more complicated than that.

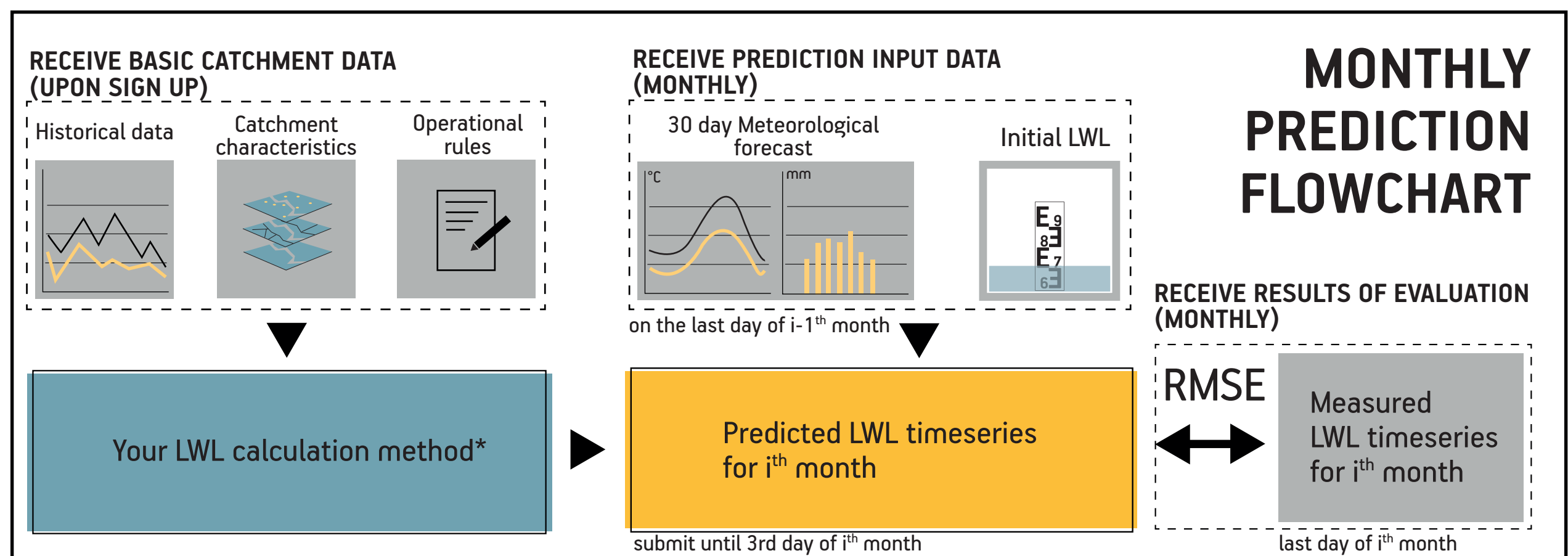
See #4 on how to do that.

STEP 1 SIGN UP! STEP 2 RECEIVE DATA STEP 3 DEVELOP METHOD STEP 4 PREDICT i^{th} MONTH STEP 5 CHECK RESULTS STEP 6 REPEAT FROM STEP 3

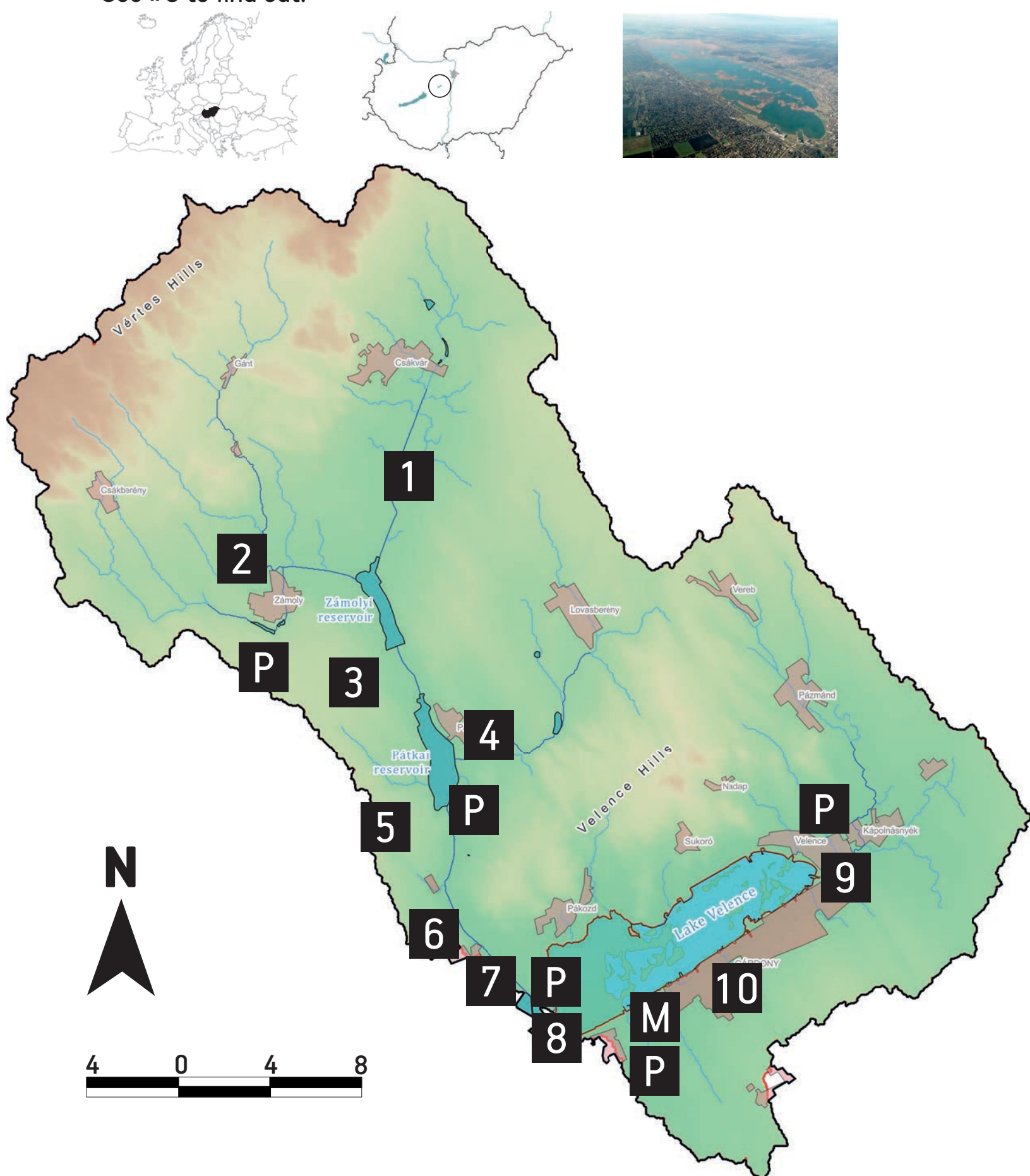
4 HOW to predict?

You can use any method you want. Conceptual models, Hydrodynamic models, Statistical models, Regression models, AI or ML models, a combination of the above, or a completely new approach? You decide.
You will be equipped with past data for the 1998-2022 period, including catchment characteristics, stage and flow measurements, and the operational rules of main hydraulic structures.
Initial water levels and meteorological forecasts for the basin area will be given on the last day of each month. You need to hand in your predictions for the next month within the next 3 days.
Seems like you have some work to do... So when does this whole thing start?

See #5 to find out.



* The lake's current official water budget calculation method will be given as well, however considering the known uncertainties of the current method (Chappon, Bene 2022, 2023), you are encouraged to develop your own model to determine future lake water levels.



5 WHEN does it start?

Predictions are first expected on **3rd January 2024**.

Initial water levels and meteorological predictions will be provided on 31st December 2023.
But don't worry if you miss the first months, you can still be the **OVERALL CHAMPION** at the end of the year.

See #6 to find out how to become champion.

6 WHO wins?

At the end of each month, predicted and measured lake water levels will be compared and root mean squared error (RMSE) values will be calculated. The monthly winner is the one whose prediction results in the lowest RMSE. The overall champion of the challenge is the one with the most monthly wins throughout the year.

Sounds like fun? Want to sign up? See #7.

7 WHERE do I sign up?

Just go to:
<https://github.com/mate-chappon/LVWL-prediction-challenge>
to request access to all necessary data, comprehensive rules, and to join the discussion.

CHAMPION'S PRIZE: A hard cover book: "Conflict Resolution in Water Resources and Environmental Management" (Springer, 2015)
- or a scientific publication of your choice up to 150€.



Acknowledgements:
The research presented in this poster was carried out within the framework of the Széchenyi Plan Plus program with the support of the RRF 2.3.1 21 2022 00008 project.

Literature:
Serkan Ozdemir, Muhammad Yaqub, Sevgi Ozkan Yildirim: A systematic literature review on lake water level prediction models 2023, <https://doi.org/10.1016/j.ensoft.2023.105684>
Máté Chappon, Katalin Bene: Uncertainties in the water budget calculation of Lake Velence, Hydrocarpath Conference 2022
Máté Chappon, Katalin Bene: Improving methods to calculate monthly water budget for Lake Velence EGU Conference 2023 <https://doi.org/10.5194/egusphere-egu23-8334>

