«Ūdens kvalitātes modelēšana upju baseinu apsaimniekošanas plānu izstrādei Lietuvā»

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Contents

1. Background

.... Having made SWAT model for LT ...

Would be great to have the same for BY, LV, EE

Transboundary issues, joint approach, comparable evaluations, joint baseline, comparable measures.

RBMP, Nitrates, WFD, all national WQ issues

5 failes applications: 2x INTERREG, 1x ERAF, 2x LCS

(nordic countries object, soil scientists object, too interdisciplinary, too theoretical, too practical)

1. Background

2011/12 –

SWAT model for LT. Source apportionment.

2014/15 – (presentation)

Renewal and upgrade. Use for RBMP. Translation of policies and measures into model data. Scenarios incl baseline. Optimisation tools. Optimisation of measures.

2019/20 – (ToR ready)

Renewal. Transfer to SWAT+. Scenario modelling.

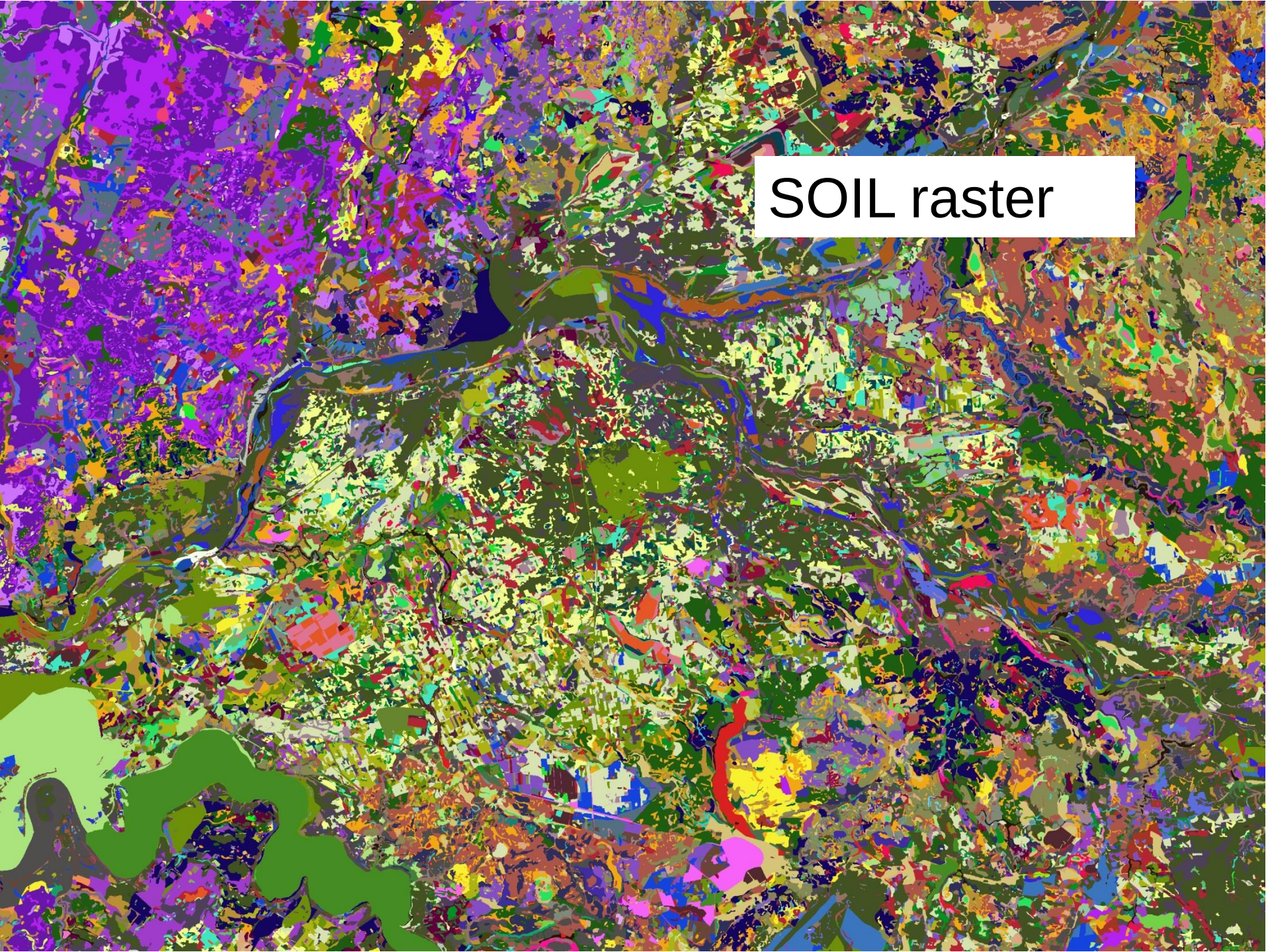
1. MODEL

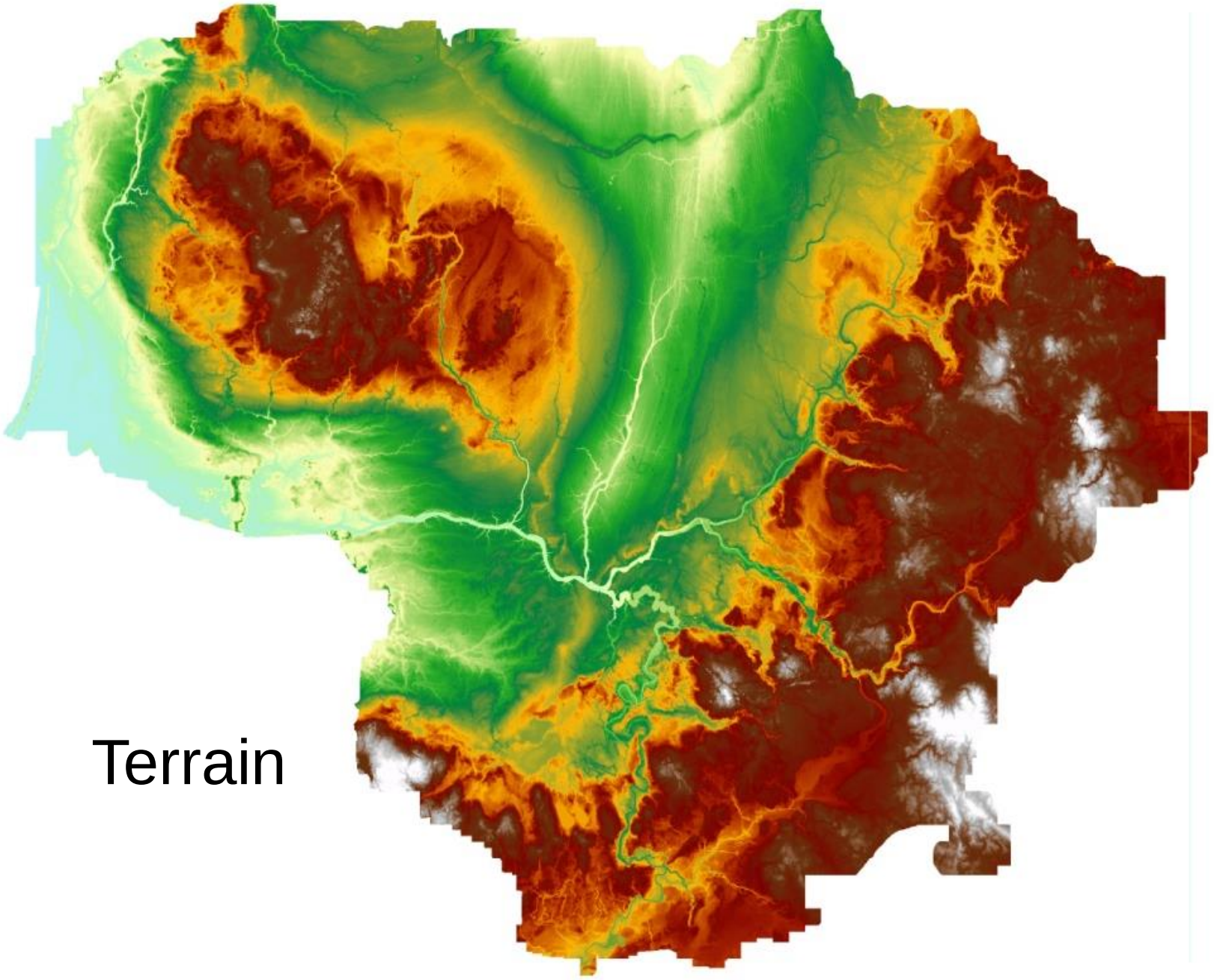
SPATIAL ELEMENTS: HRU -> CATCHMENTS / RIVER NETWORK -> WATERSHEDS -> LT

HRU: SLOPE (3) vs SOIL (86) vs LAND USE (56 incl crops)

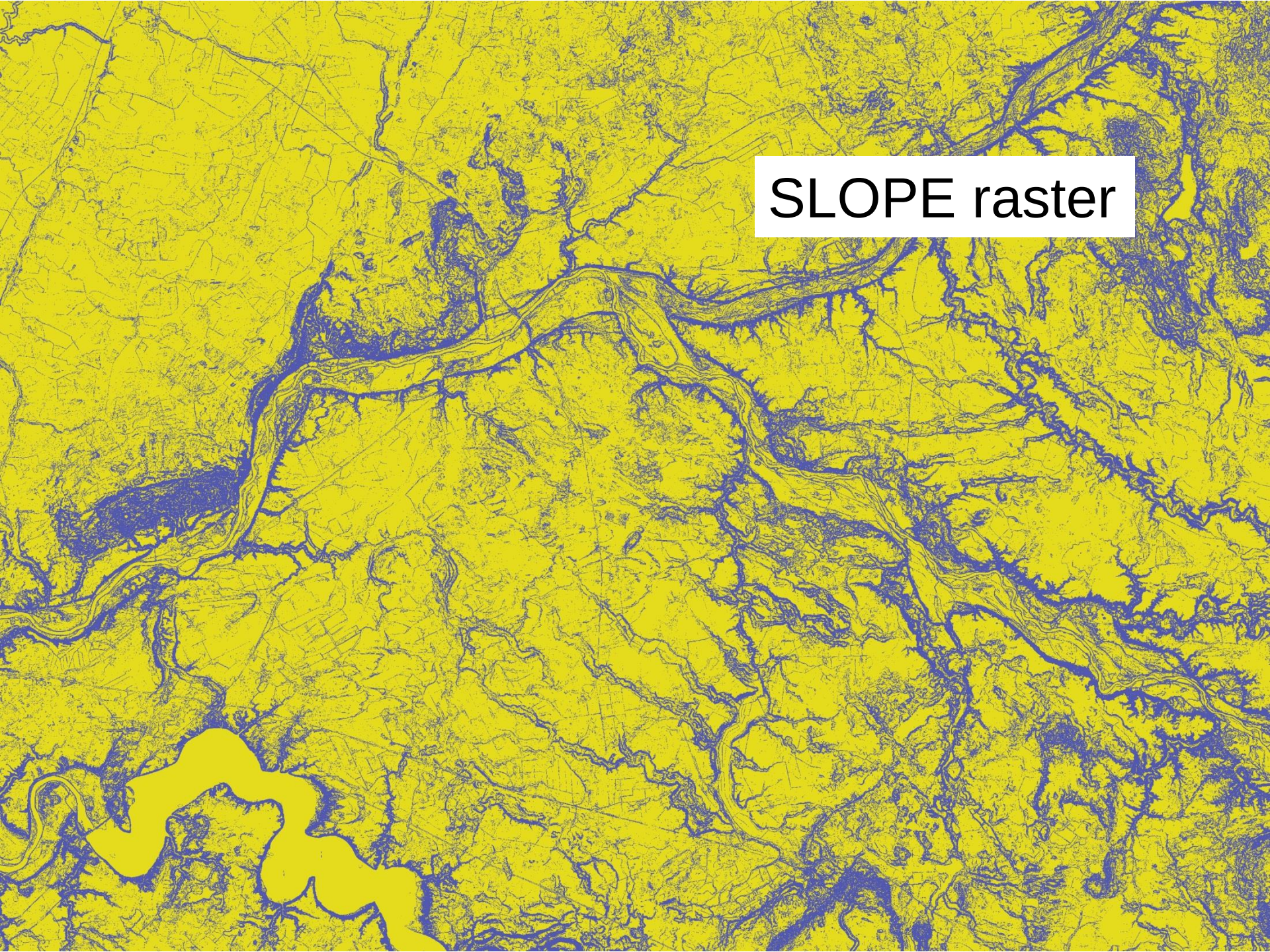
Meteorology, Point sources, Agricultural management

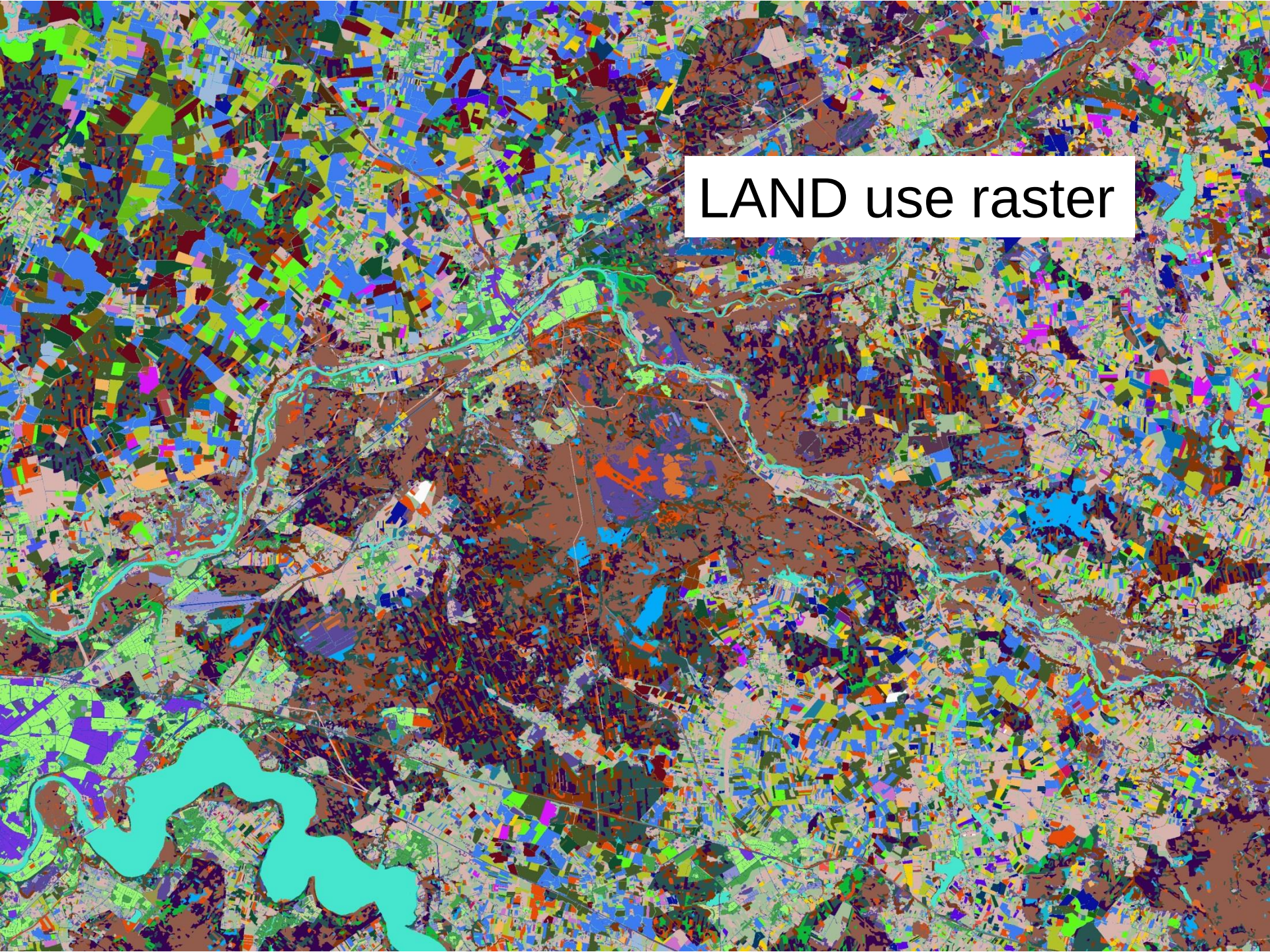
System for enabling data logistics through SWAT numerical engine


SOIL raster

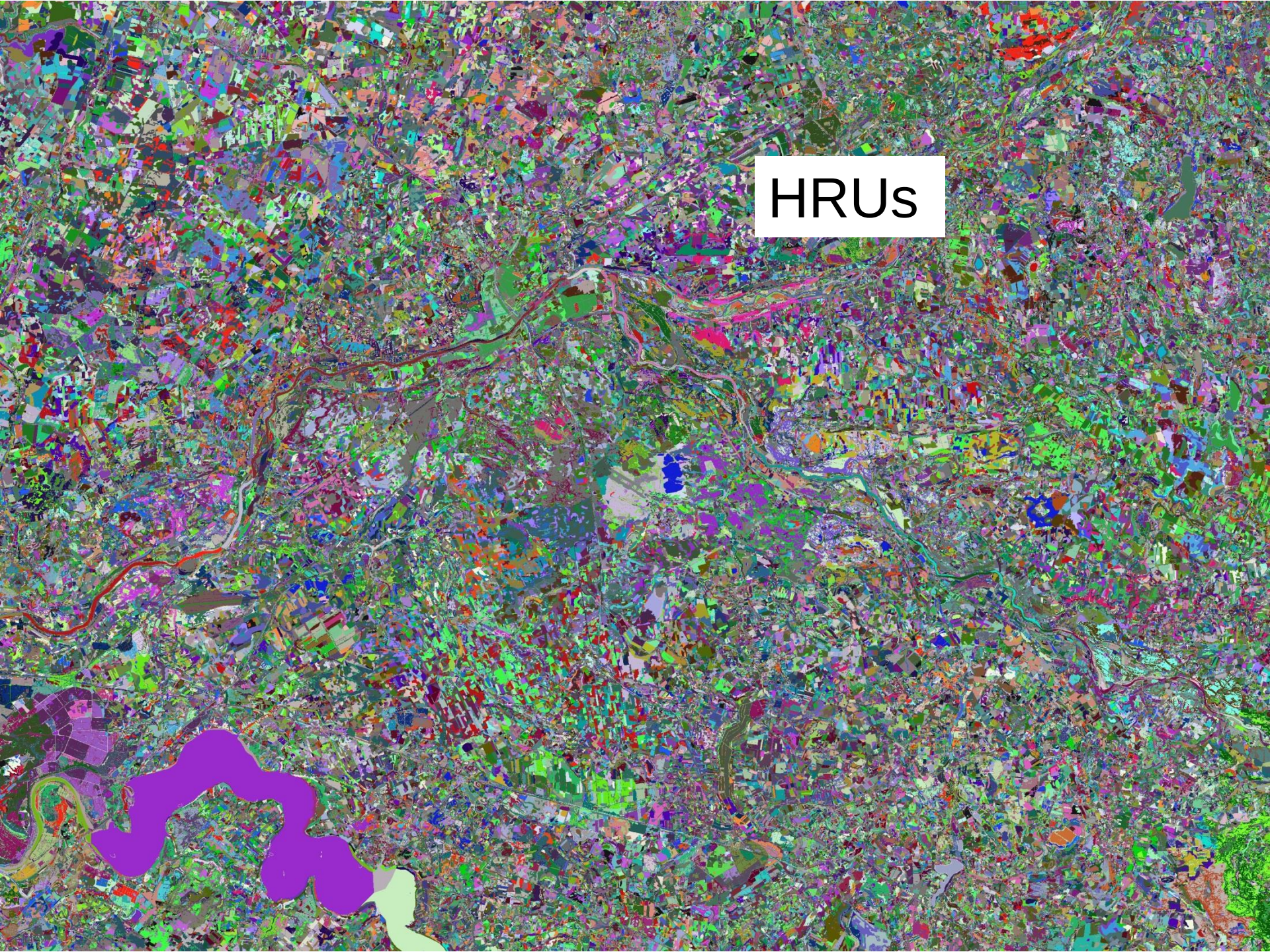


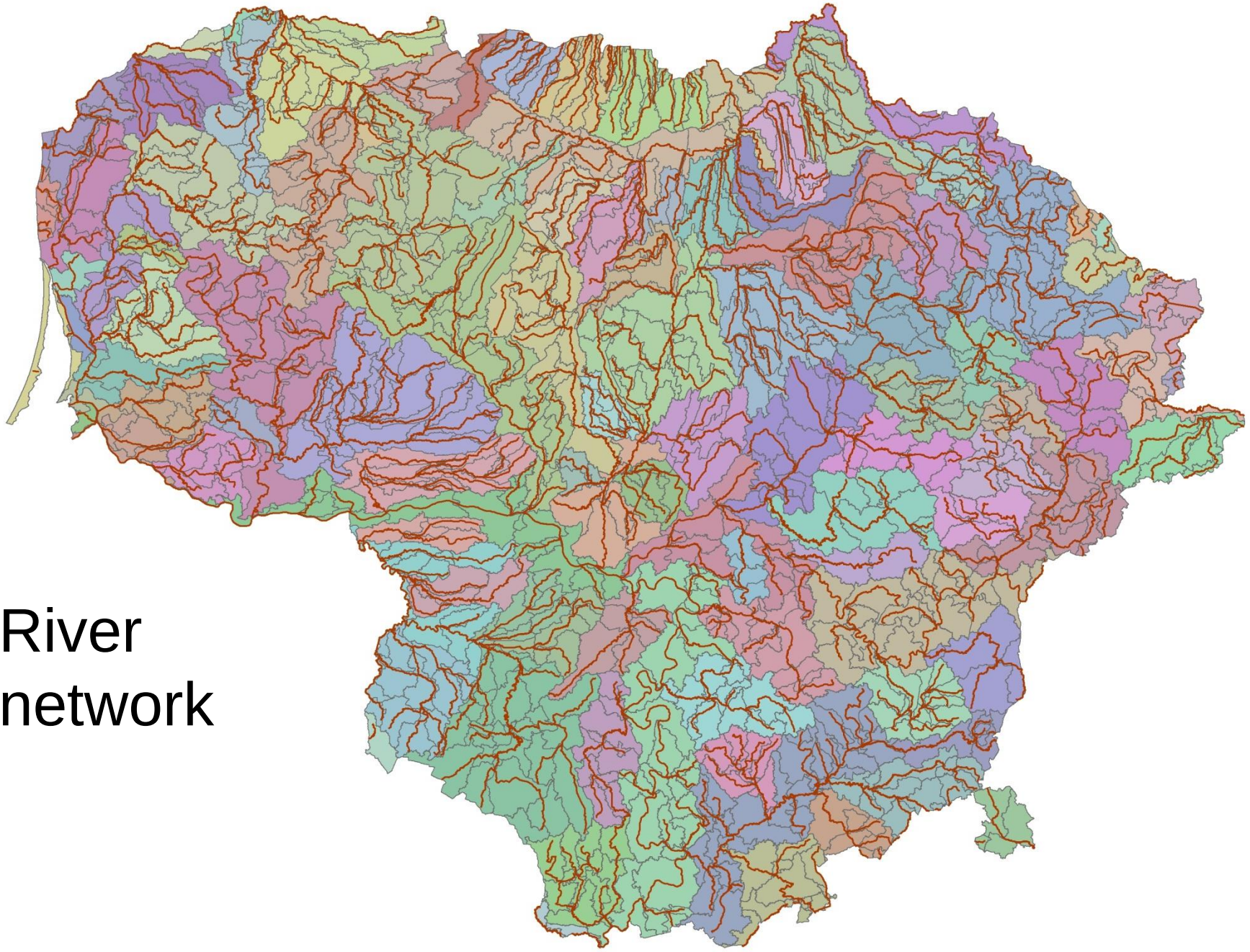
Terrain


SLOPE raster

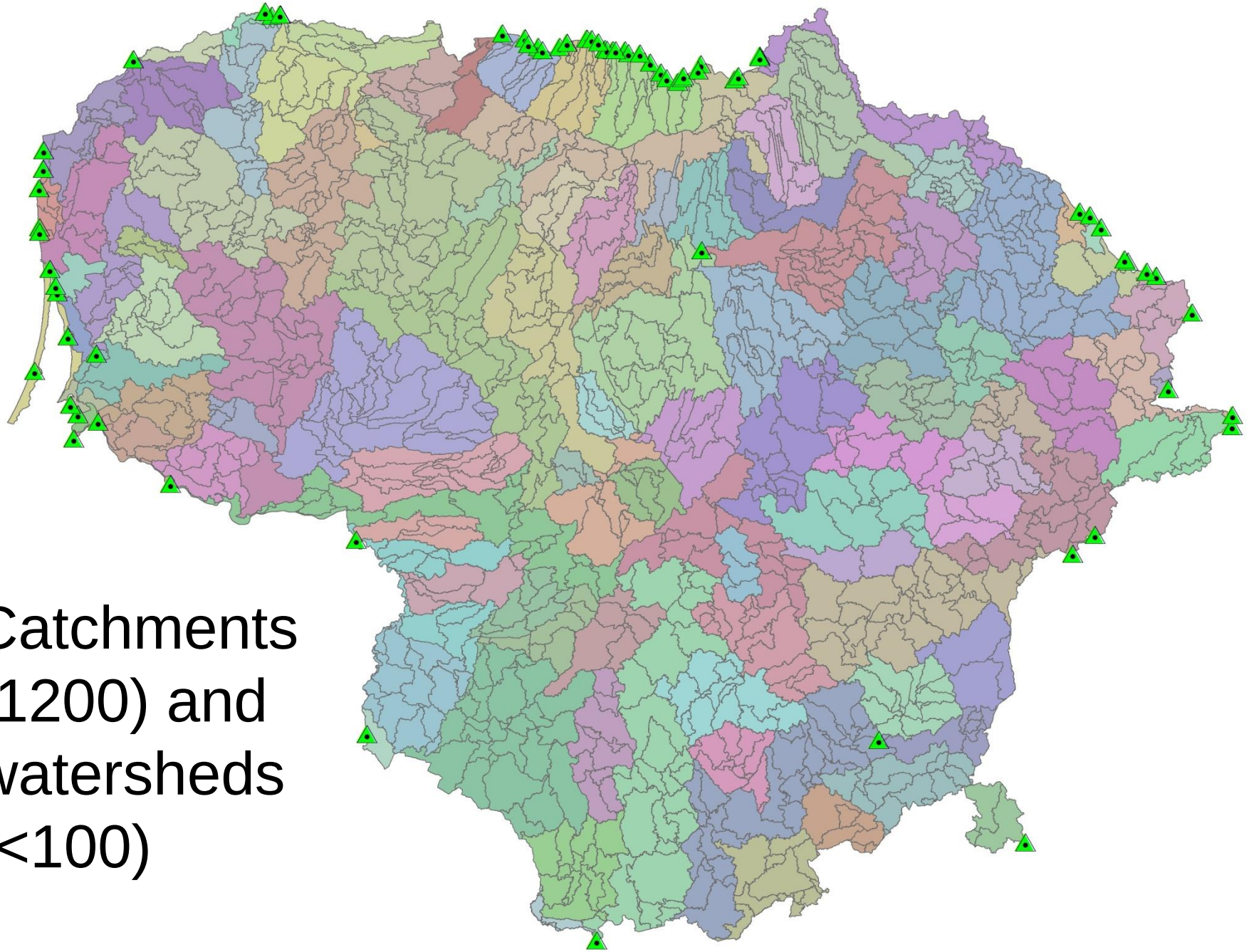

LAND use raster


LAND use raster
zoom


HRUs

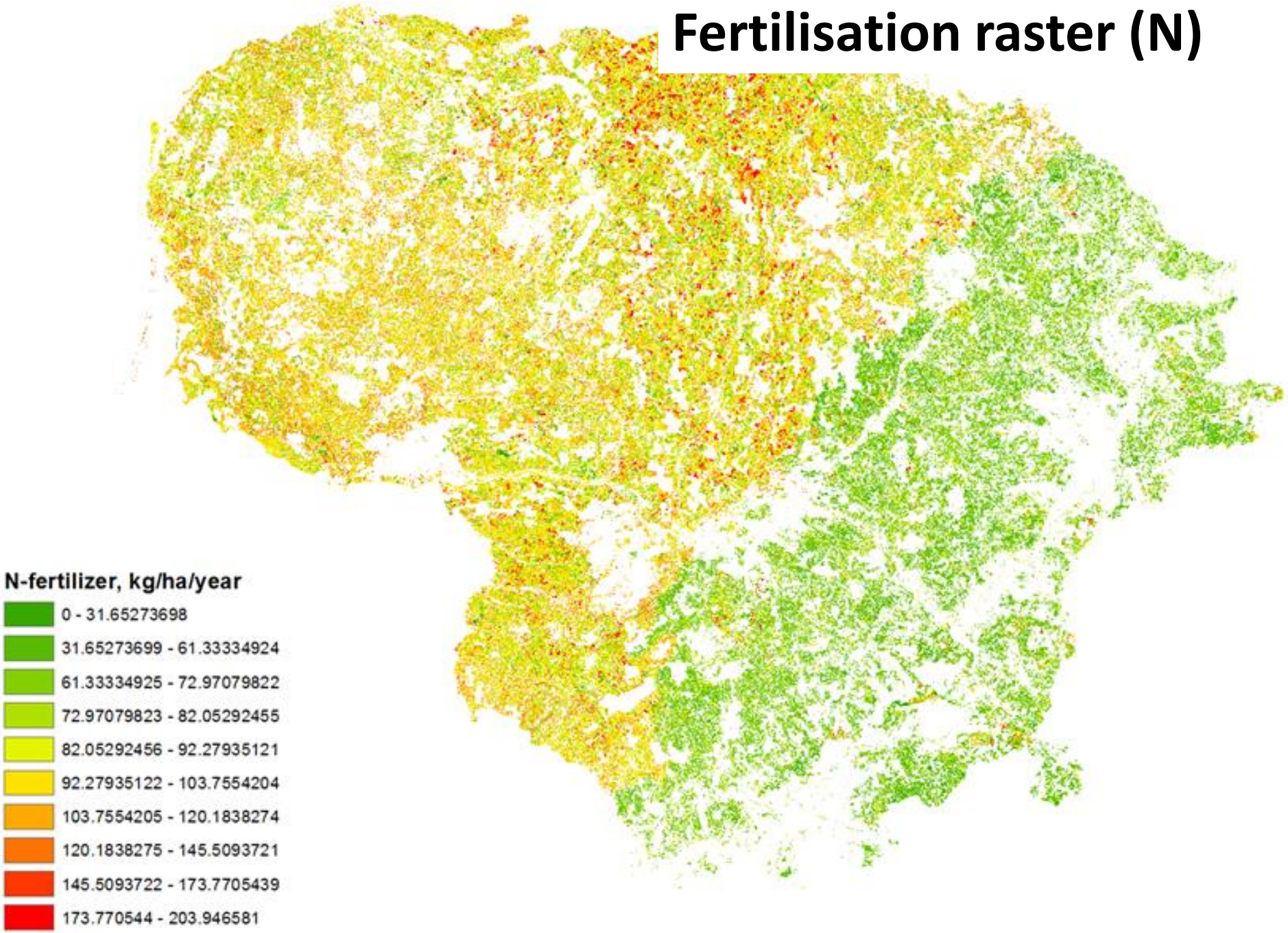


River network



Catchments (1200) and watersheds (<100)

Fertilisation raster (N)



2. MODEL RESULTS

TEMPORAL: daily values, 1997-2012 (16 years)

SPATIAL: HRU output traceable

Catchments ~ water bodies (~1200)

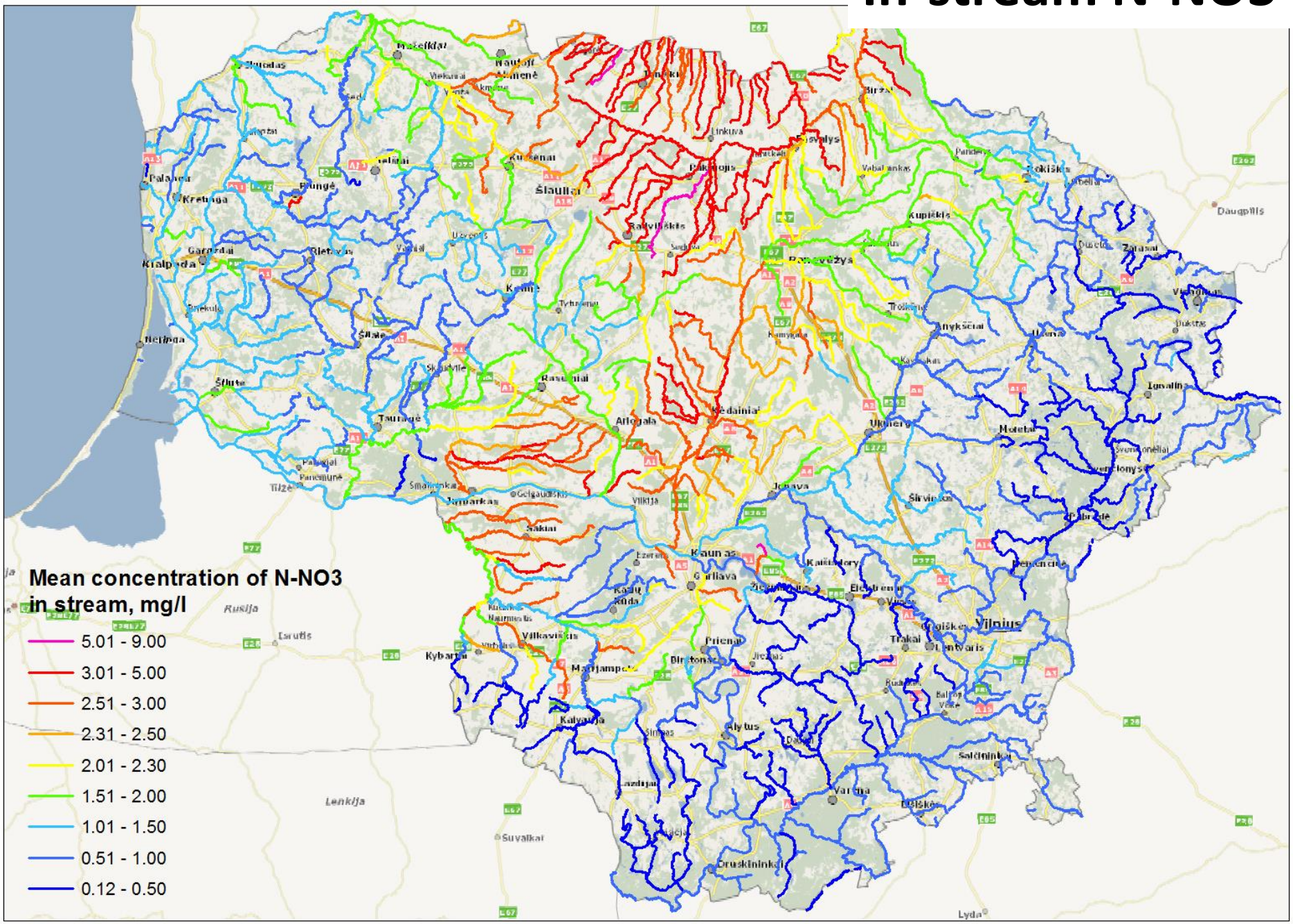
Calibrated parameters: Q, N-NO3, TotalN, TotalP in rivers

Other results: **All parameters elsewhere**

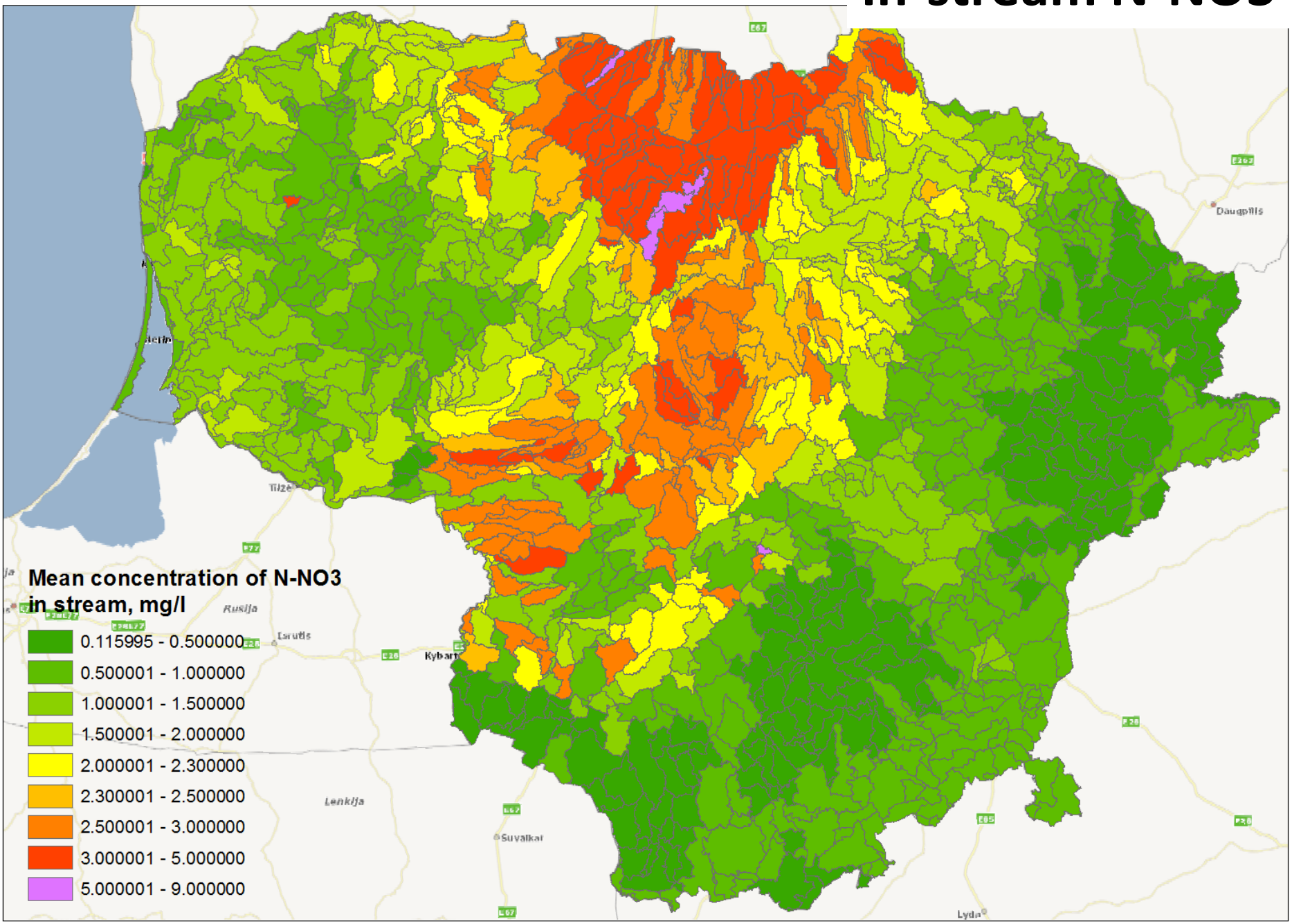
Other WQ parameters

Crop yields

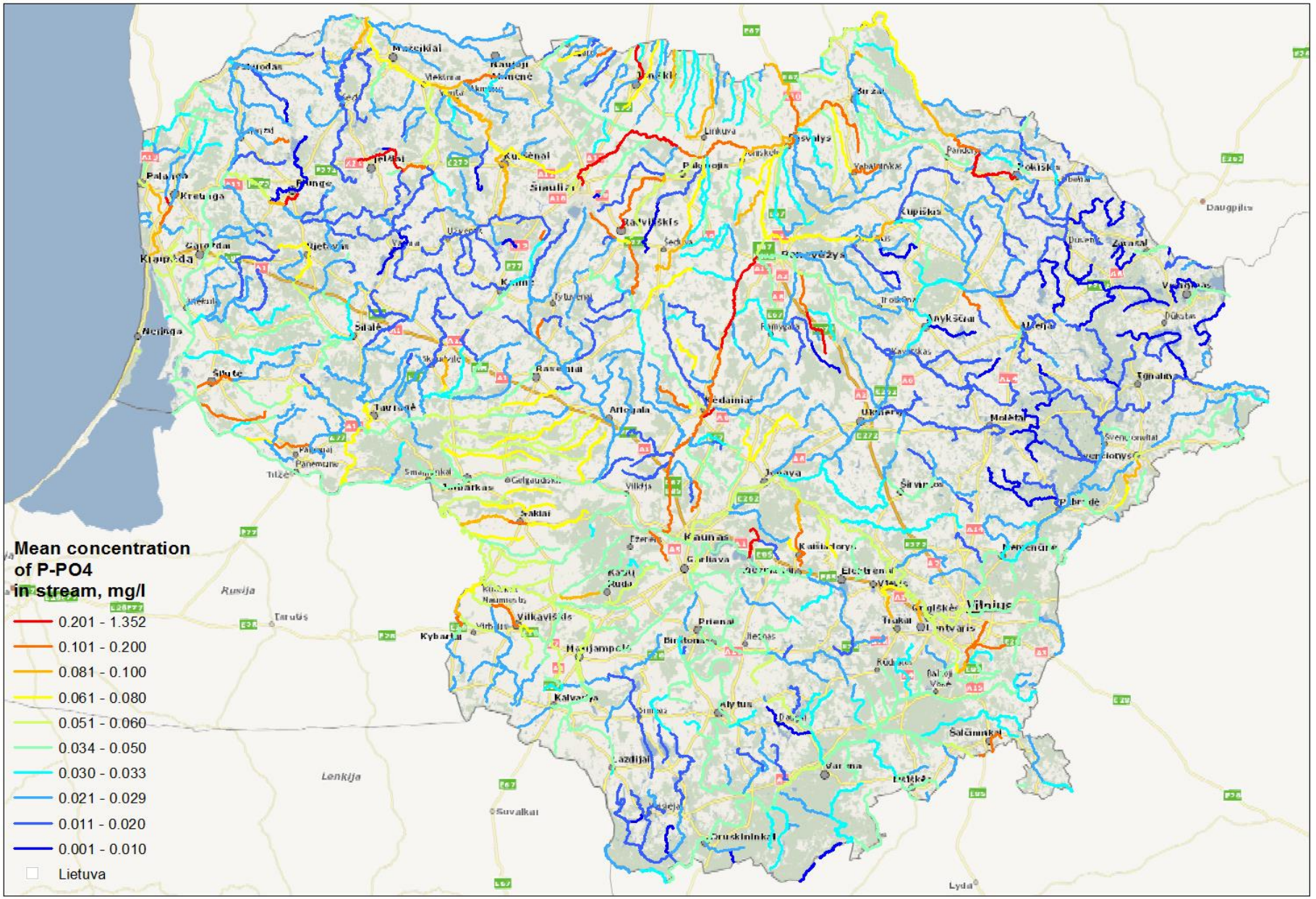
In-stream N-NO3



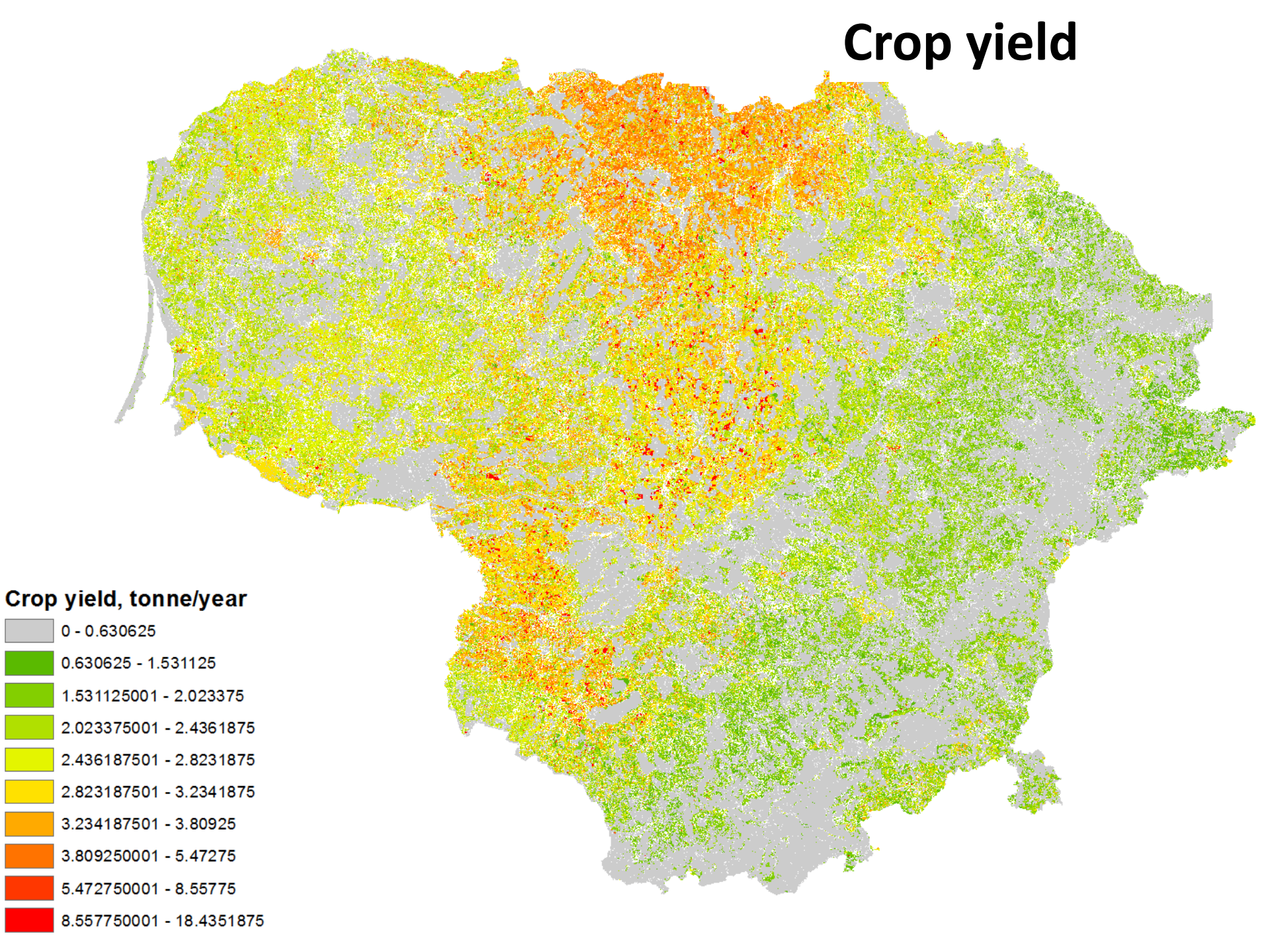
In-stream N-NO3



In-stream P-PO4



Crop yield


Crop yield, tonne/year
0 - 0.630625
0.630625 - 1.531125
1.531125001 - 2.023375
2.023375001 - 2.4361875
2.436187501 - 2.8231875
2.823187501 - 3.2341875
3.234187501 - 3.80925
3.809250001 - 5.47275
5.472750001 - 8.55775
8.557750001 - 18.4351875

3. EXPECTED USE OF MODEL RESULTS IN RBMP

Use of reference (1997-2012) run for the assessment of the present situation

Numerical exercises:

- Source apporttionment - Scenario calculation

Definition and running a baseline scenario (16 years assuming situation as of 2020)

Optimisation of agricultural measures in WB at risk on top of baseline scenario

4. CAL/VAL STAGE of the project

CAL / VAL STRATEGY and Target Definition; balance of quantitative targets andporcess description

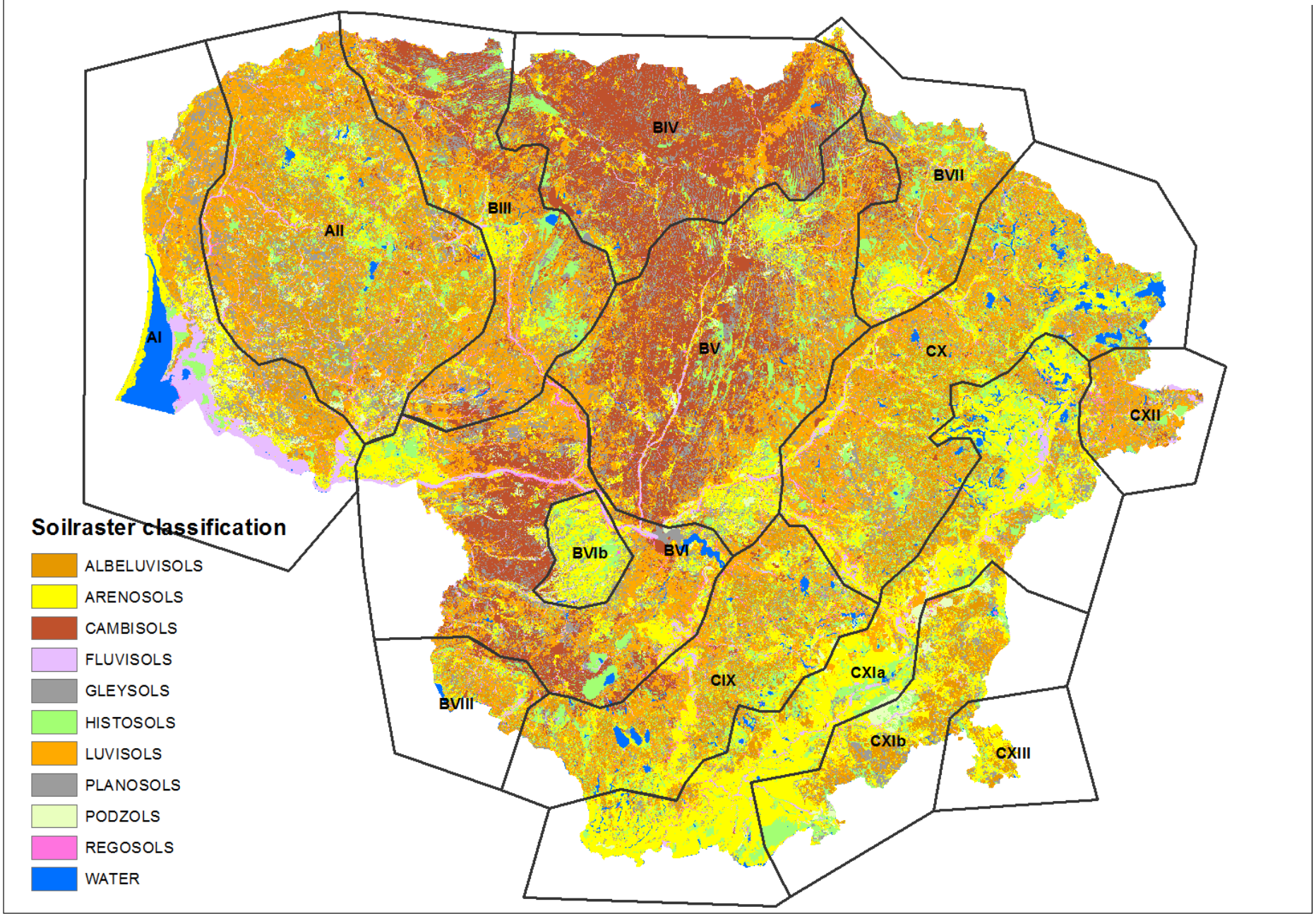
REGIONALISATION, PICKING REPRESENTATIVE DATA RICH STATIONS

HYDROLOGY: CALIBRATION, VALIDATION EXTRAPOLATION, REVALIDATION

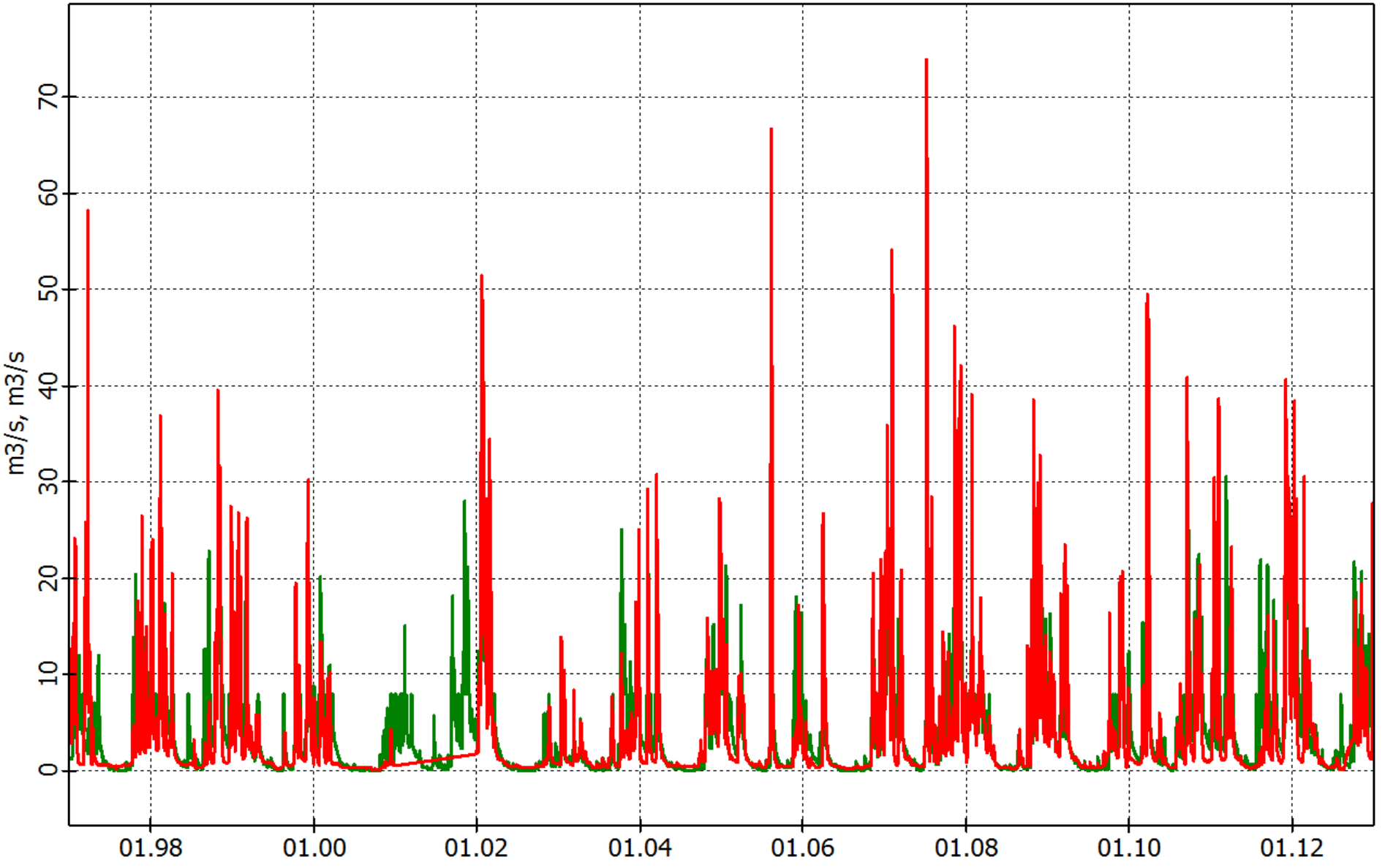
WATER QUALITY: CALIBRATION, VALIDATION EXTRAPOLATION, REVALIDATION

Preparation of model for use and delivery

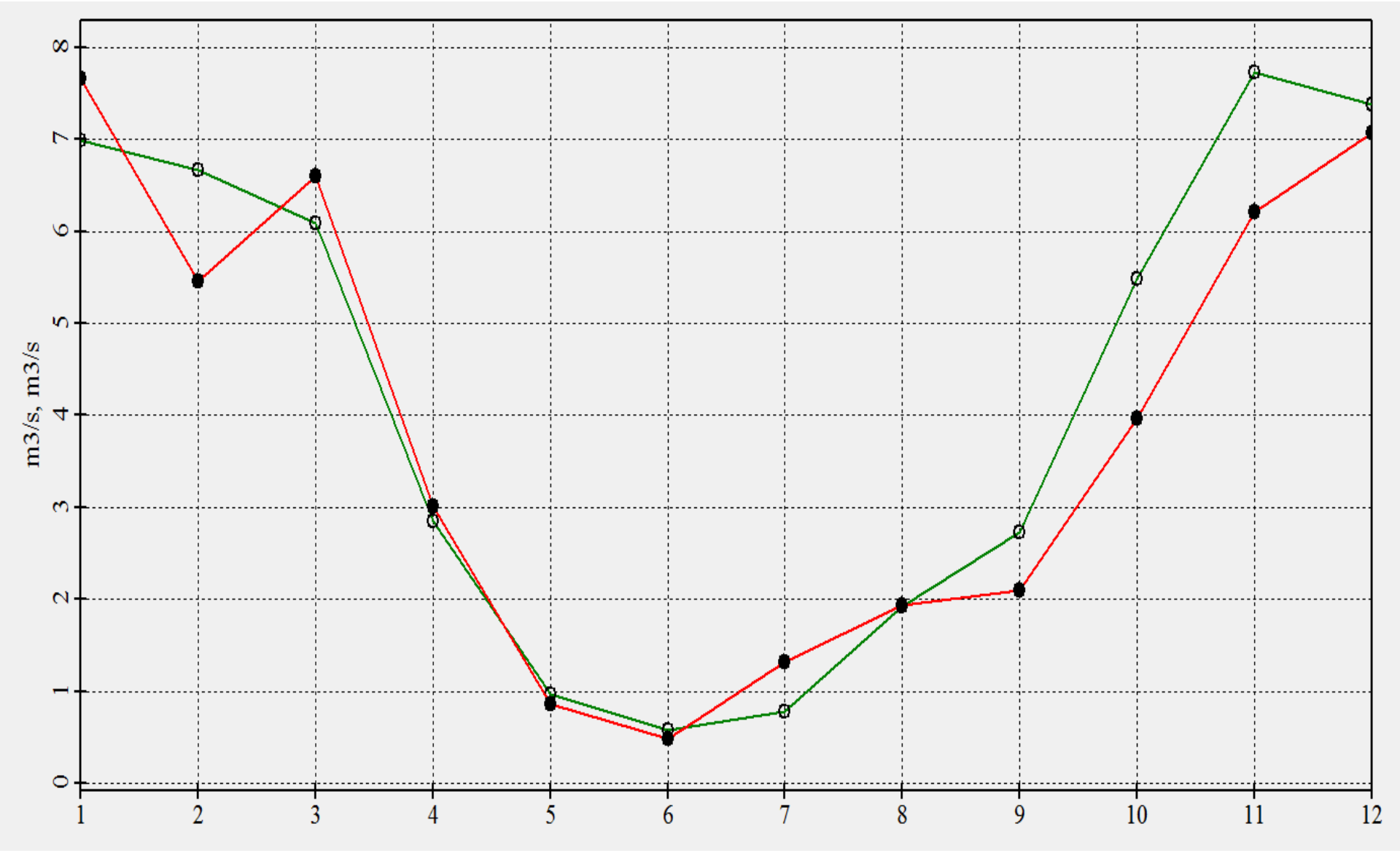
Regionalisation



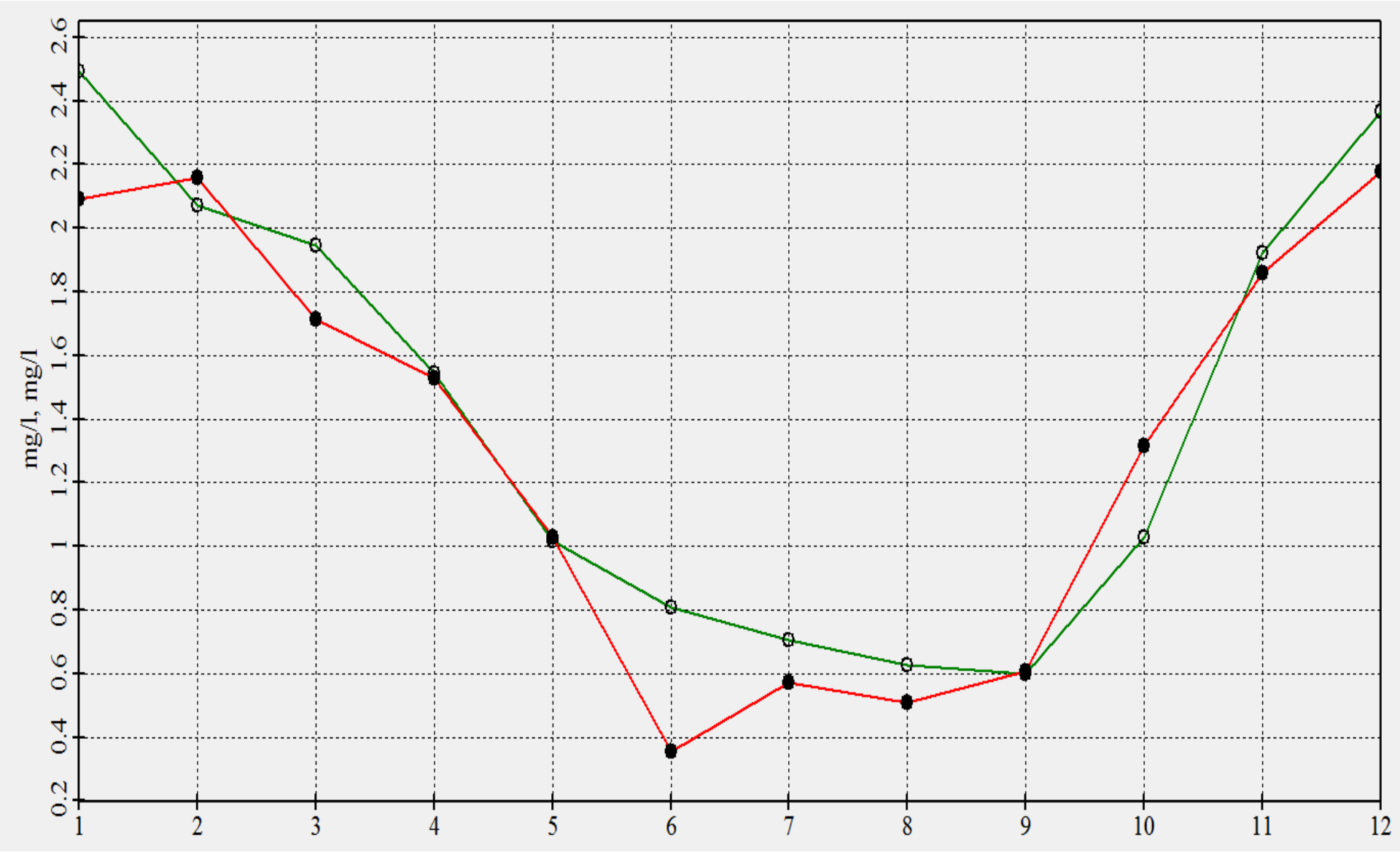
CALVAL: Western Hydrology,Akmena-Dane-Kretinga



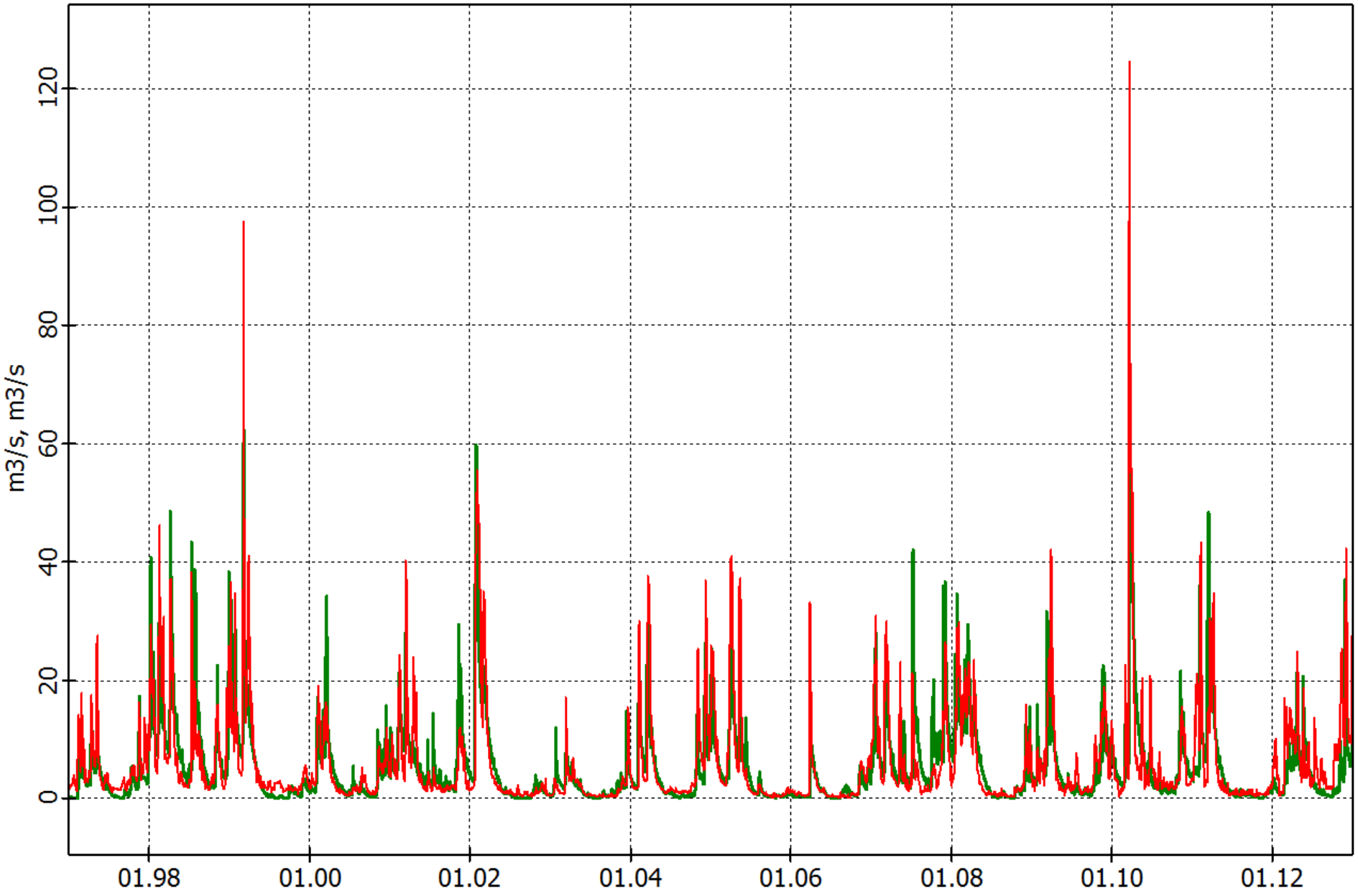
CALVAL: Western Hydrology,Akmena-Dane-Kretinga. Winter/spring high flow



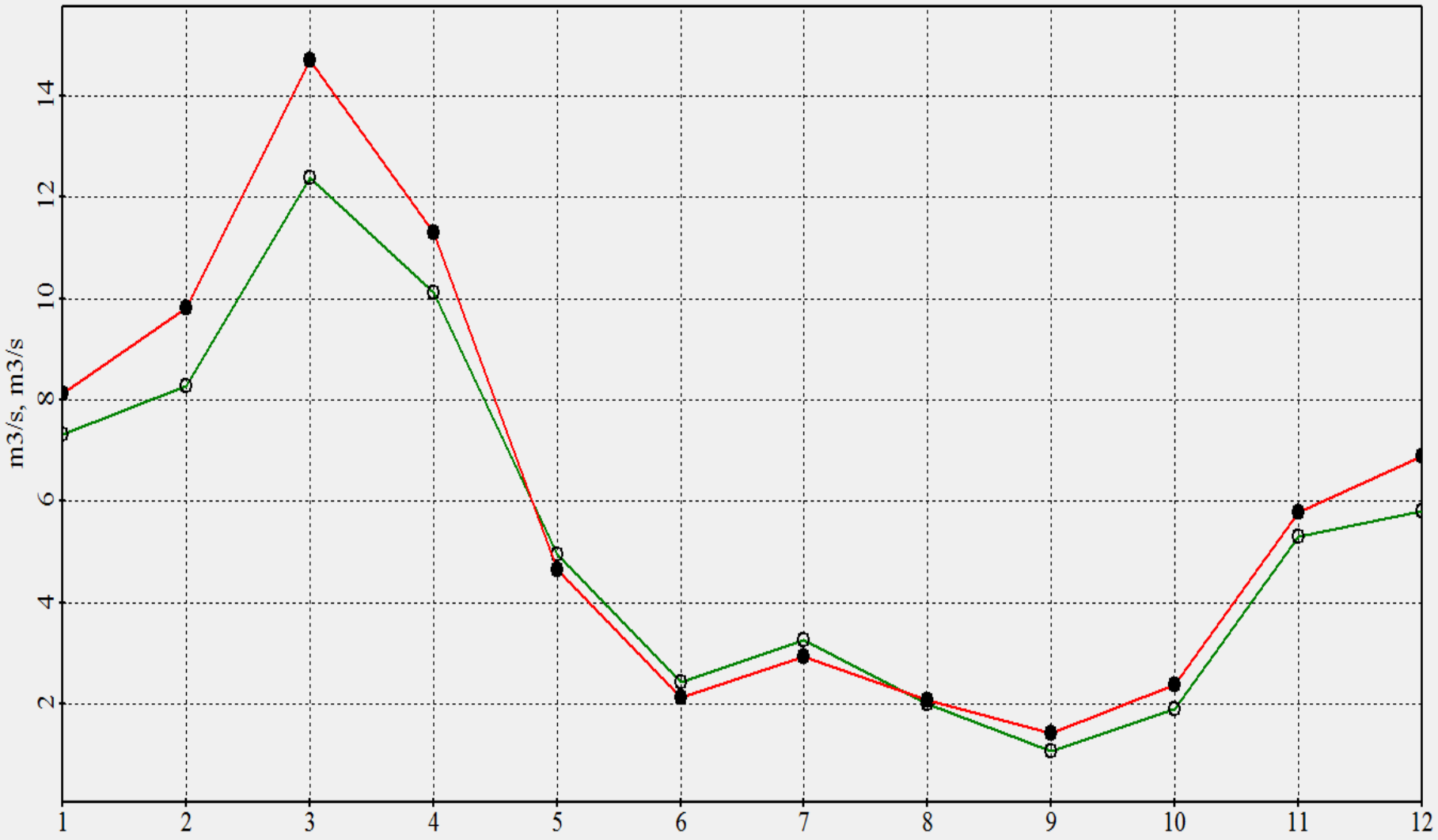
CALVAL: Western WQ, Akmena-Dane-ties-Tūbausiais. N-NO3: distinct seasonal cycle (different from Q)



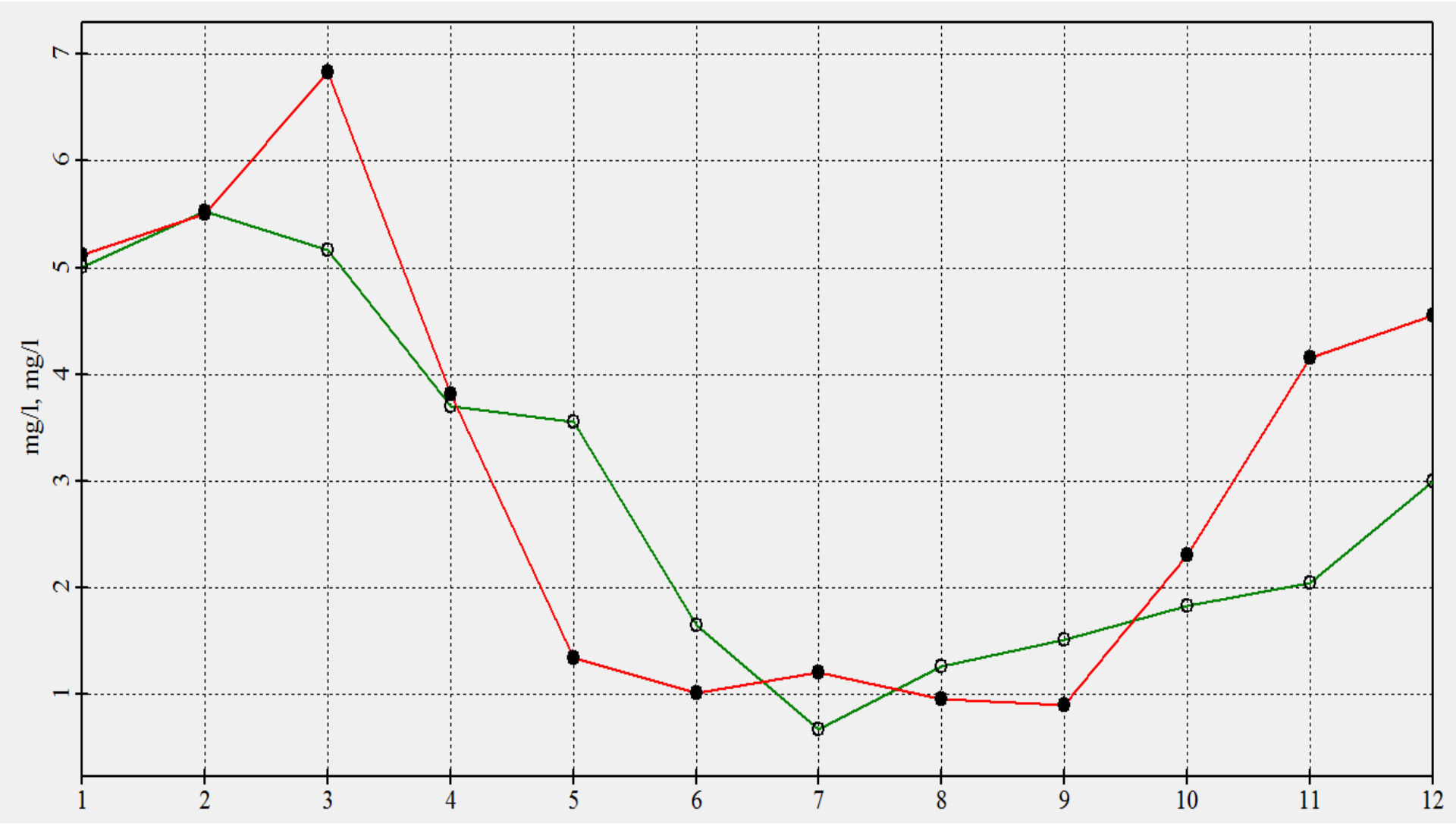
CALVAL: Central Hydrology, Nevežis-Paņevežis



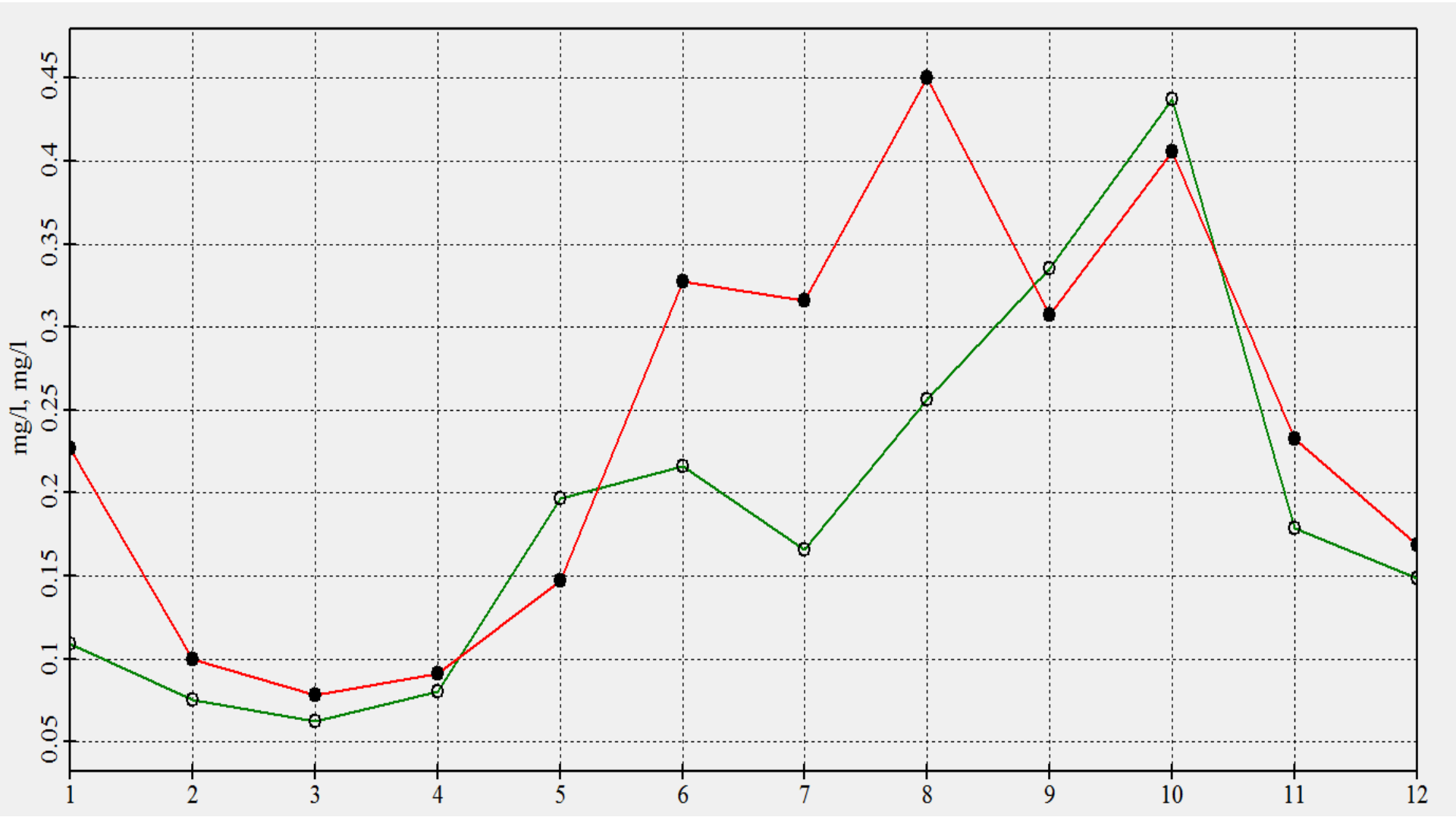
CALVAL: Central Hydrology, Nevežis-Paņevežis. Distinct snow melt flood.



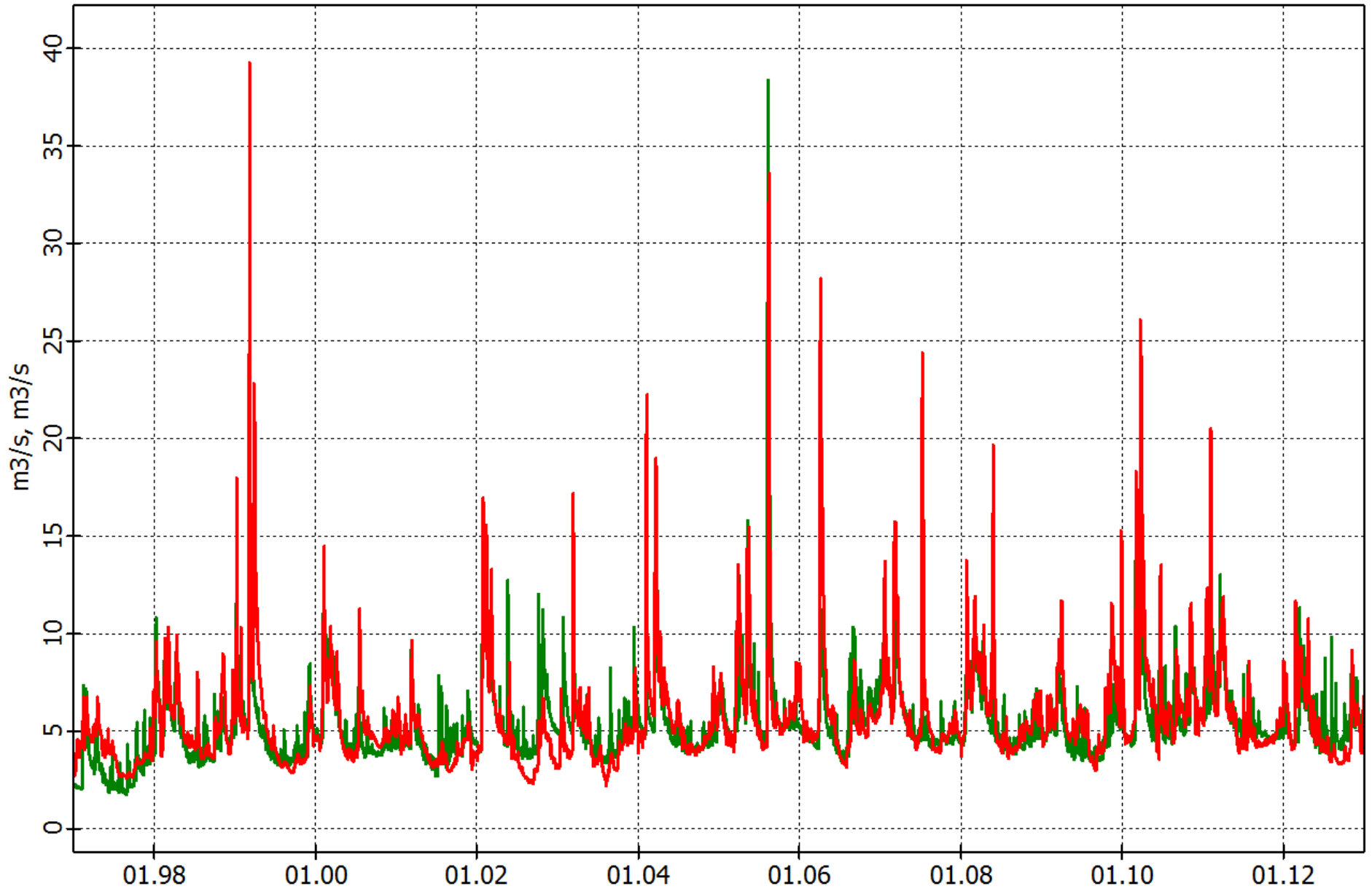
CALVAL: Central WQ, Šeimena - žemiau Vilkaviškio.
N-NO3: distinct seasonal cycle (different from west)



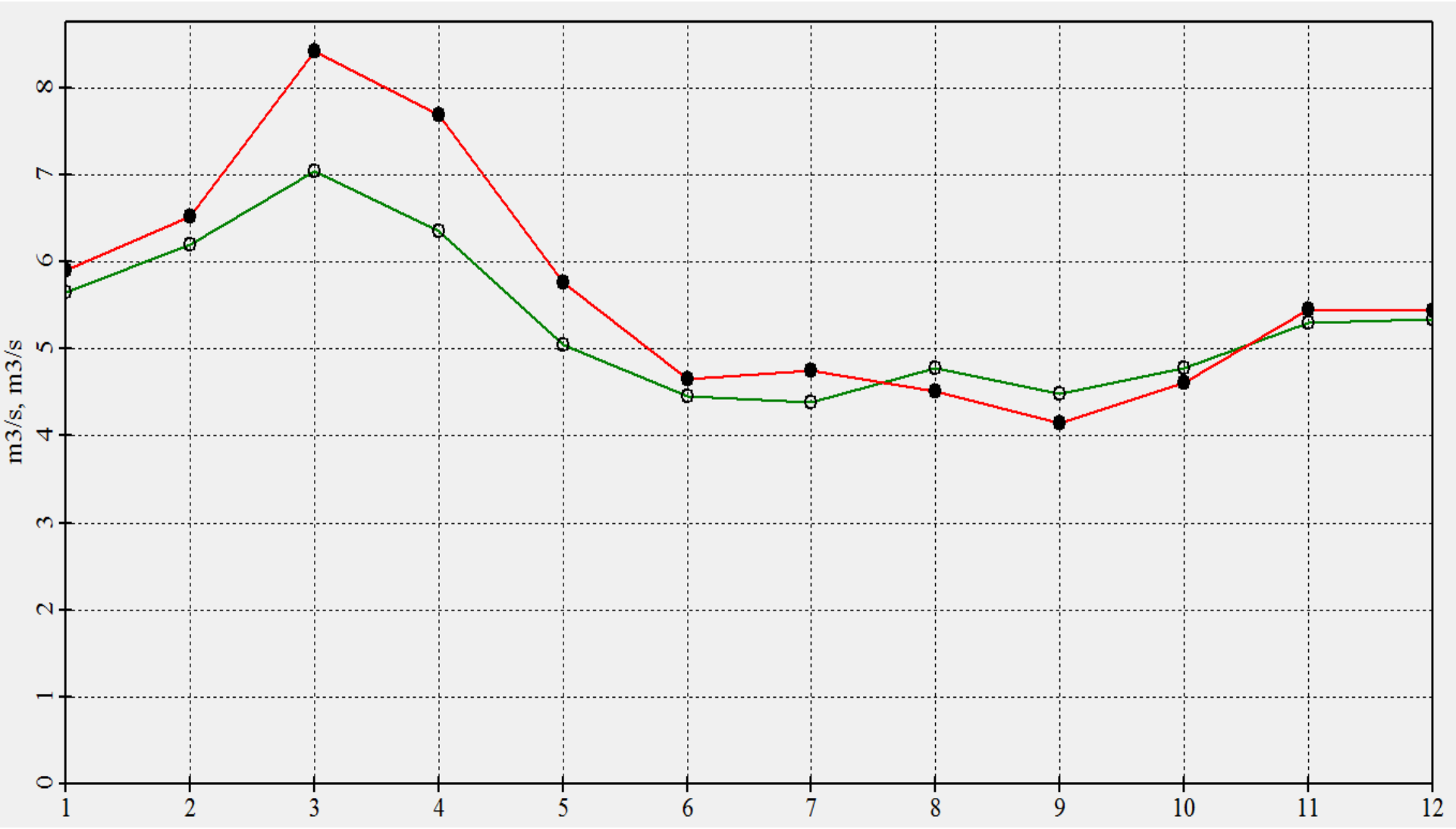
CALVAL: Central WQ, Šeimena - žemiau Vilkaviškio.
P-PO4: effect of point-sources.



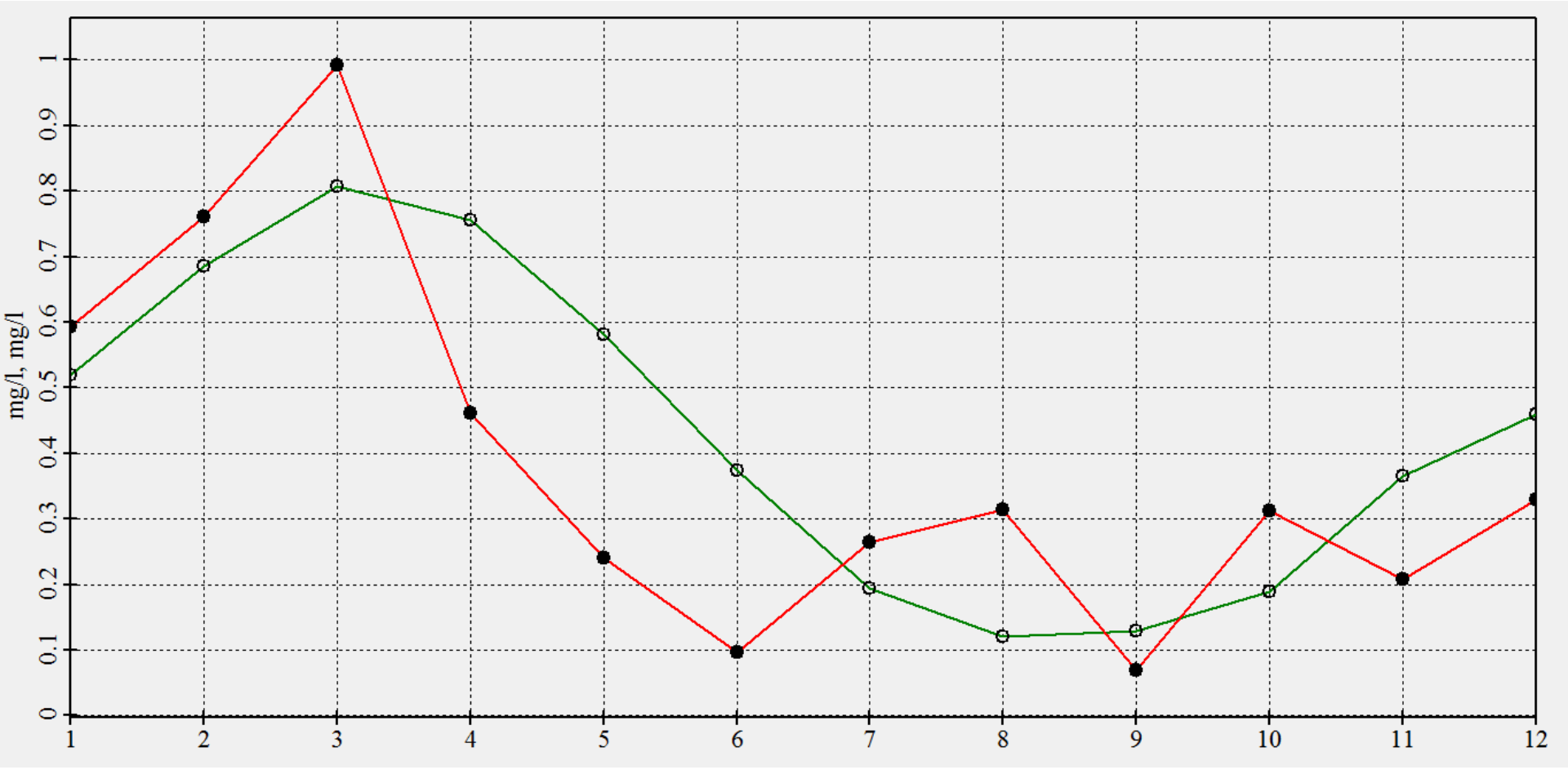
CALVAL: SE Hydrology, Ūla-Pelesa-Zervynos



CALVAL: SE Hydrology, Ūla-Pelesa-Zervynos. Dominance of baseflow.



CALVAL: Southeast WQ, Strėva - žemiau Semeliškių.
N-NO3: less distinct seasonal cycle



Thanks for attention !