

University of Lodz

**Department of Hydrology
and Water Management**



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**Multiannual variability and homogeneity
of drought streamflow deficit – genetic determinants**

**Euromediterranean Network of Experimental and Representative Basins
13th Biennial Conference ERB 2010 on
*Hydrological Responses of Small Basins to a changing environment***

Seggau Castle, Austria - September 5-8, 2010

Question

- Hydrological droughts and low flows
- Impact on the areas with restricted water resources and adverse structure of water balance
- Multiannual analyses – improvement of hydrological extremes prevention strategies and support for water resources management during restricted alimentation periods

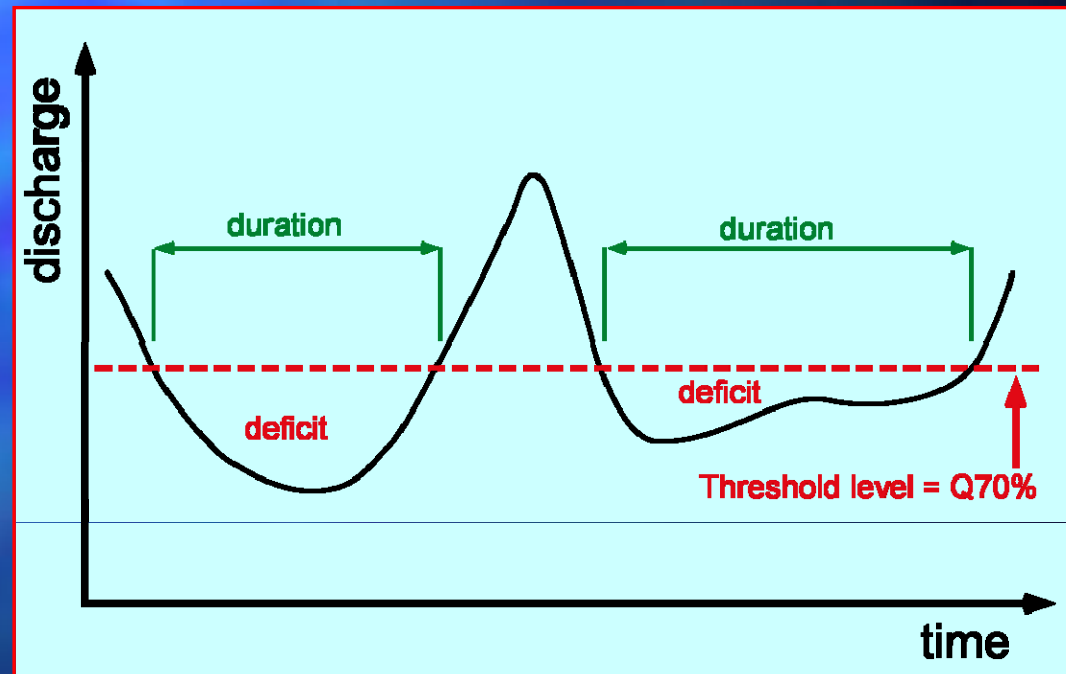
Method

Threshold level method.

It assumes that a period with streamflow below established level is a low flow period. Its two basic parameters are:

- low flow duration (number of days)
- deficit volume (m^3)

The threshold
percentile 70
flow duration curve



Study area and data

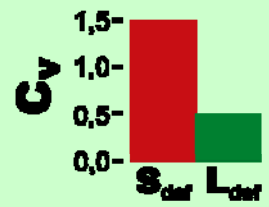
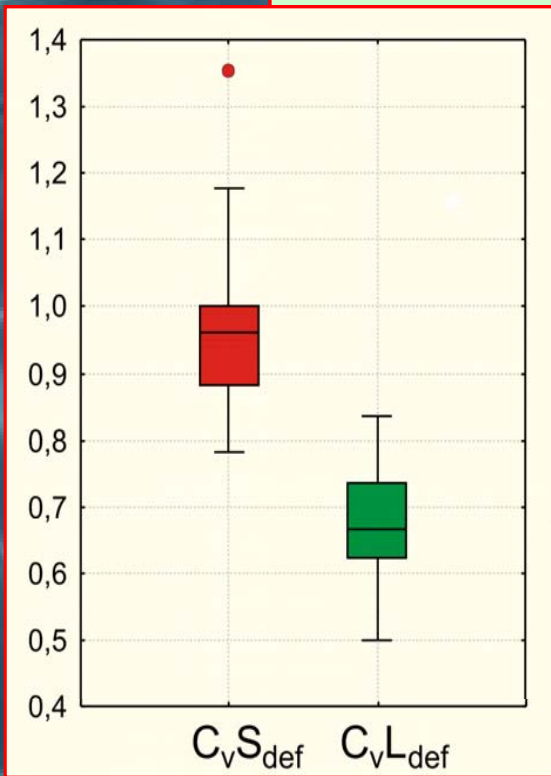
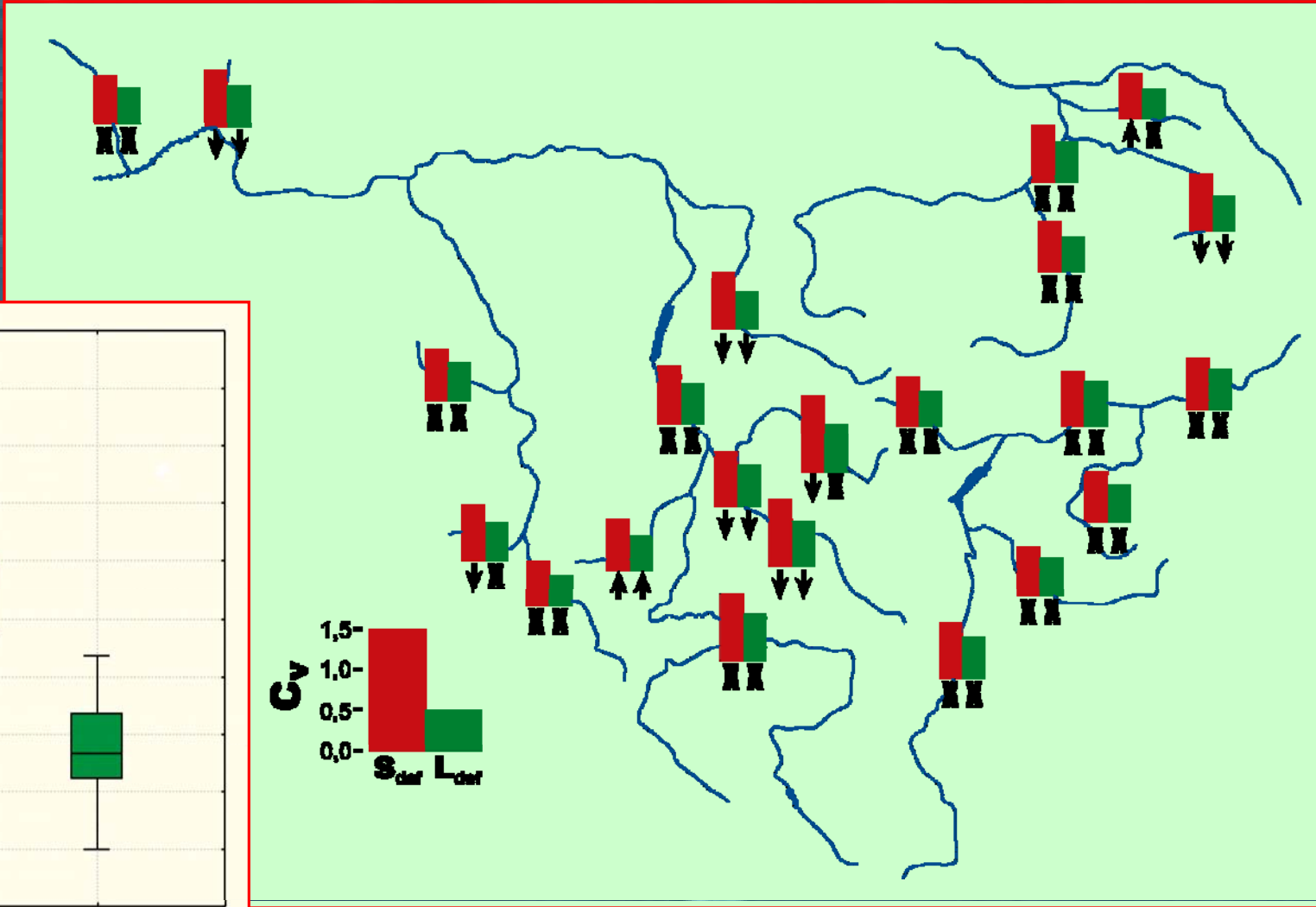
There were selected 22 water-gauges situated in basins of the Warta, the Pilica and the Bzura rivers.



Study area and data

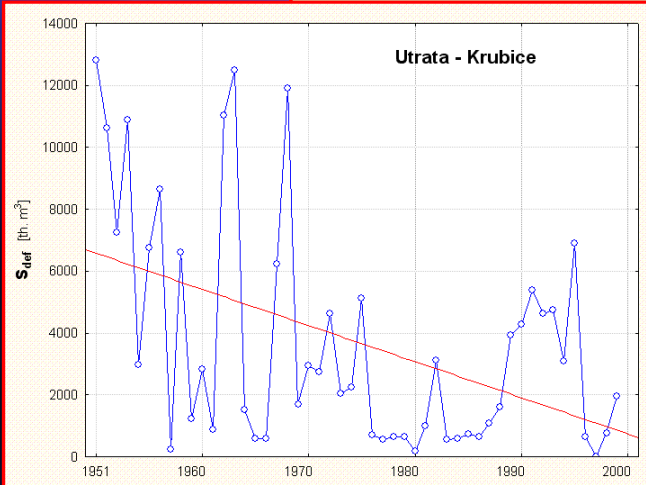
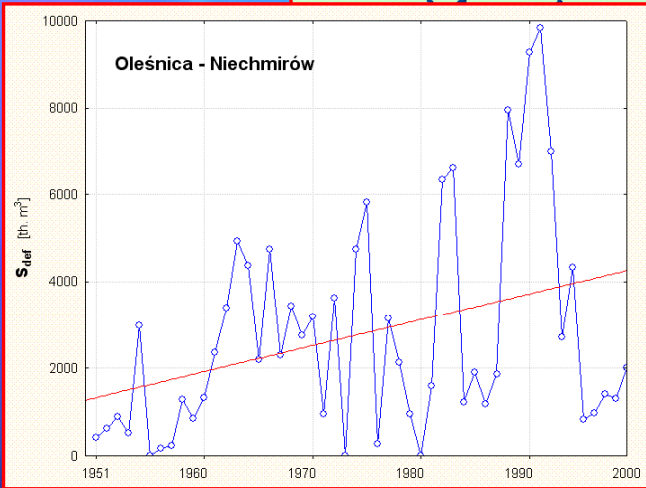
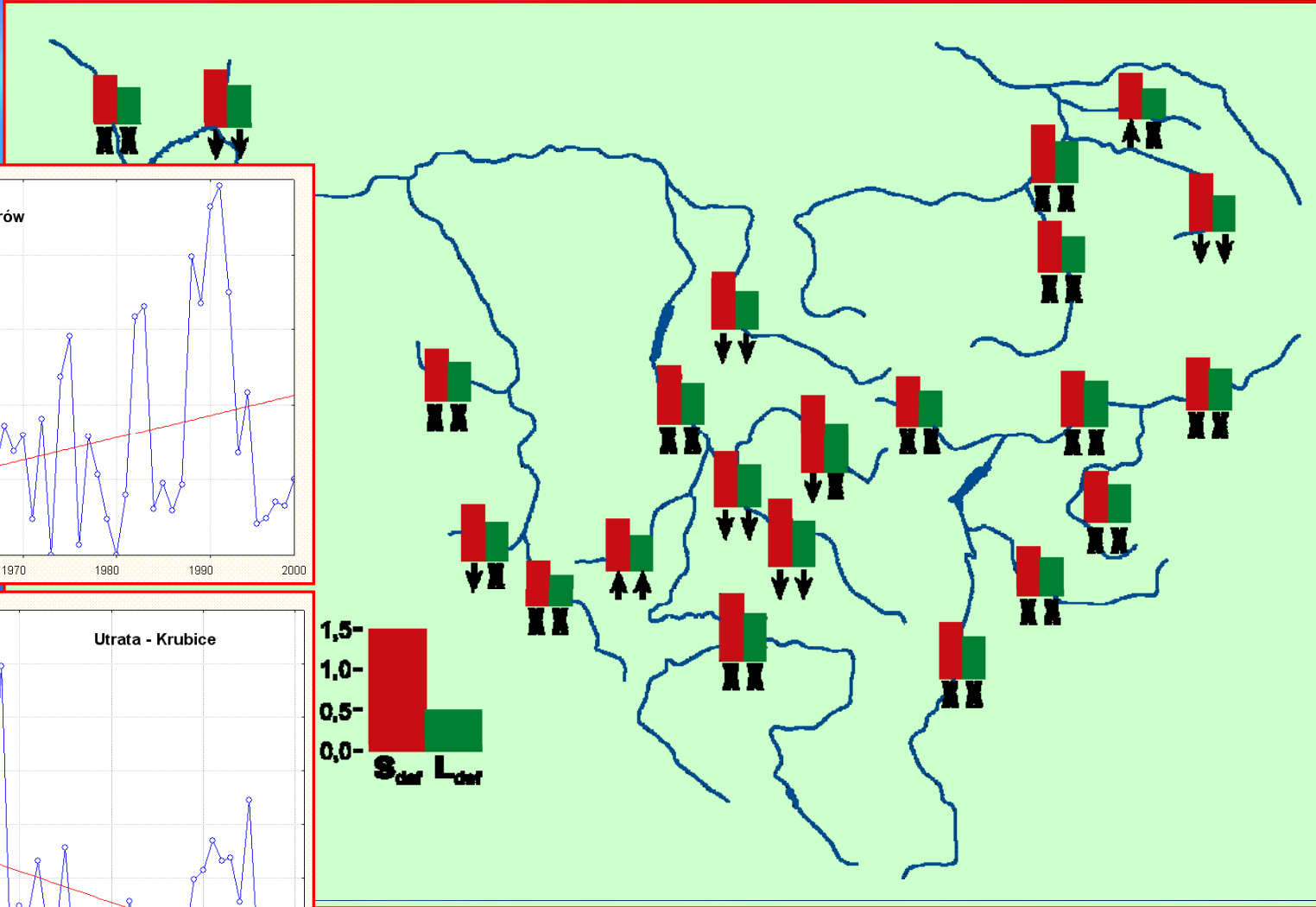
- Input vectors: daily discharge series for the observation period **1951 - 2000**, measured by Institute of Meteorology and Water Management.
- Output series: streamflow deficit volume (S_{def}) as well as number of days with streamflow deficit (L_{def}) in yearly step

Multiannual variability and tendency



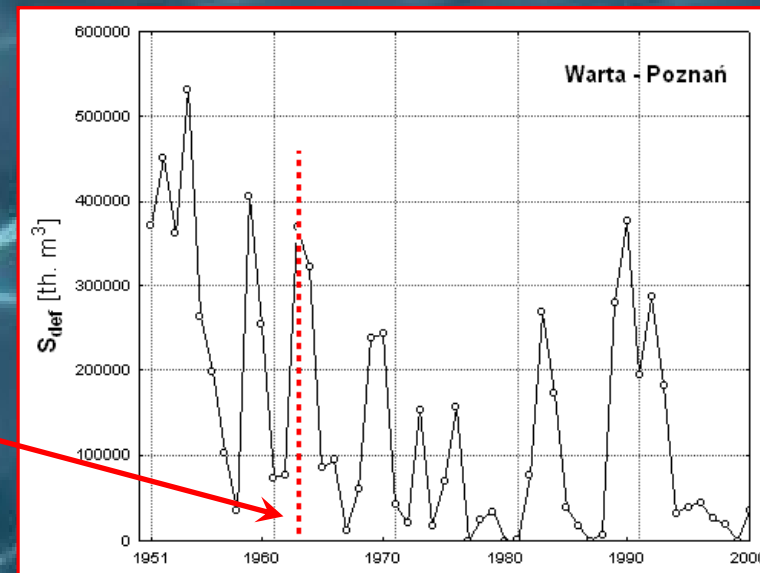
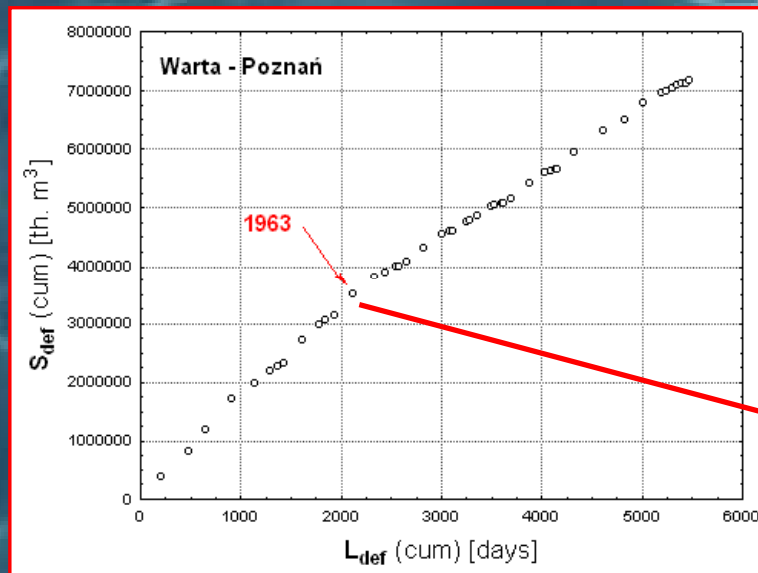
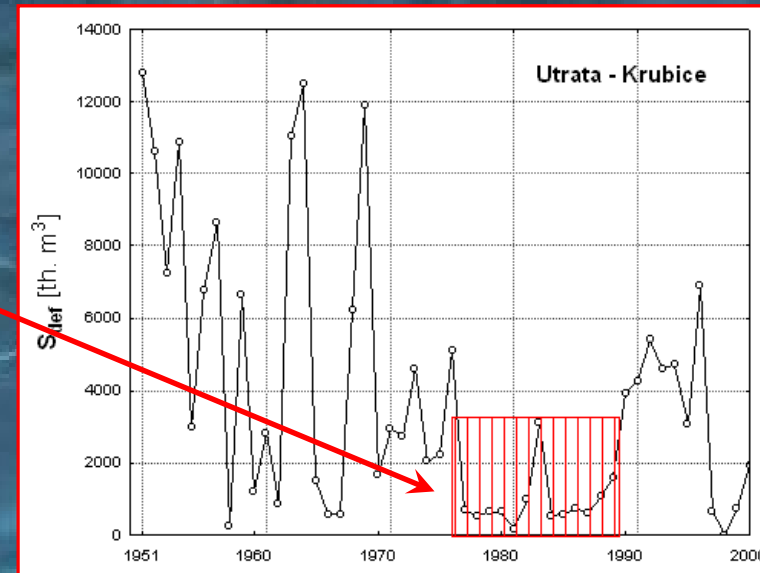
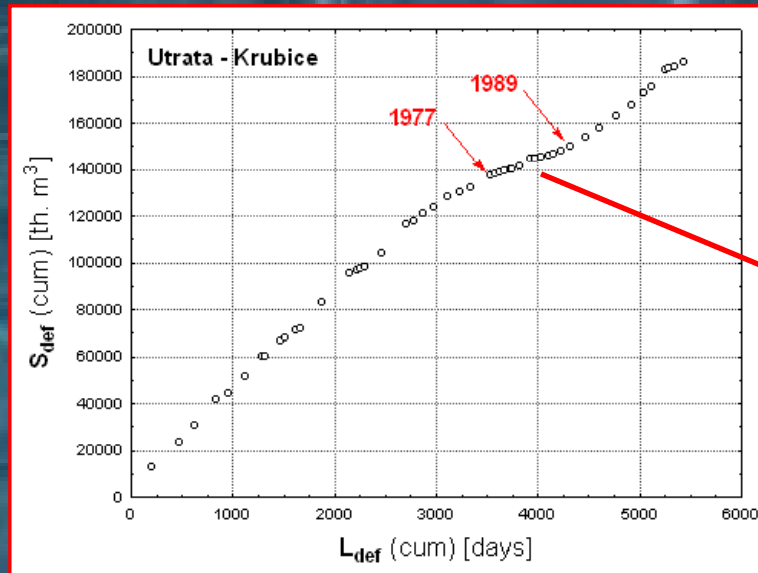
STREAMFLOW DEFICIT

Multiannual variability and tendency



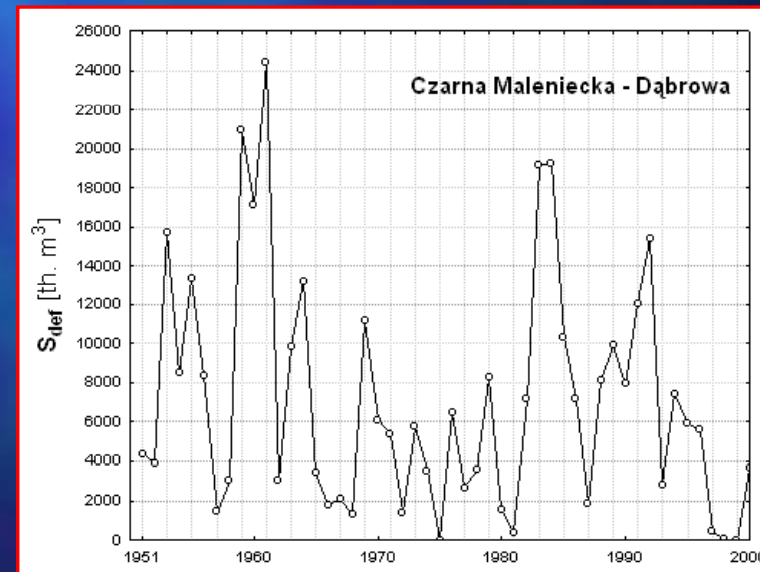
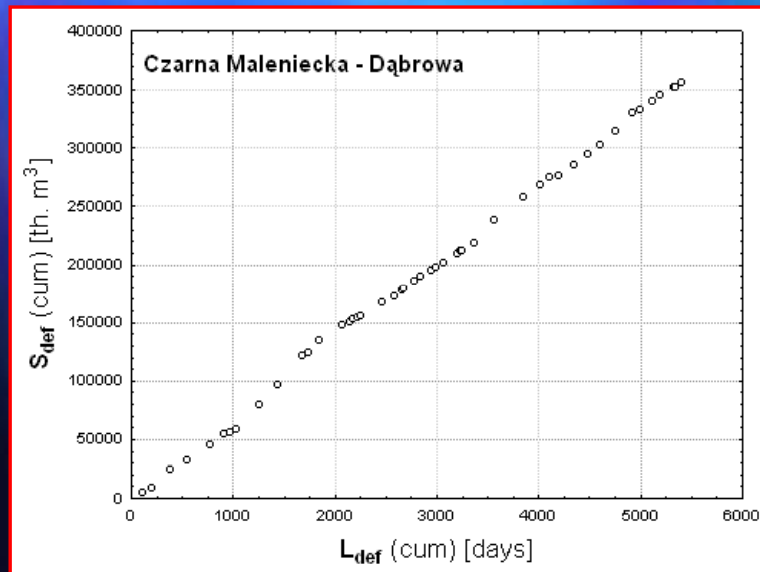
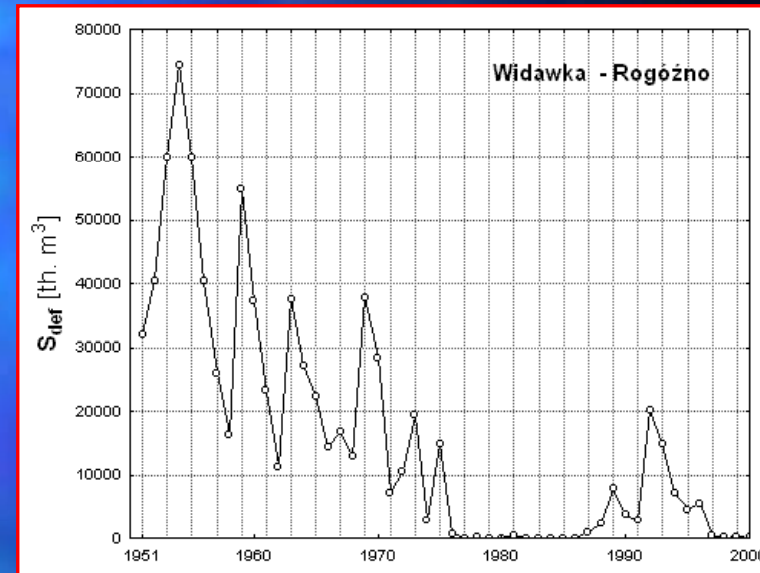
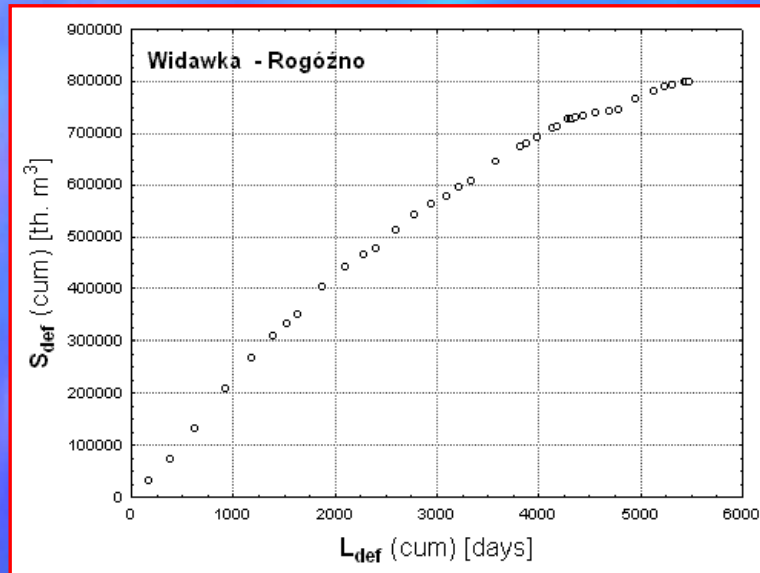
STREAMFLOW DEFICIT

Homogeneity

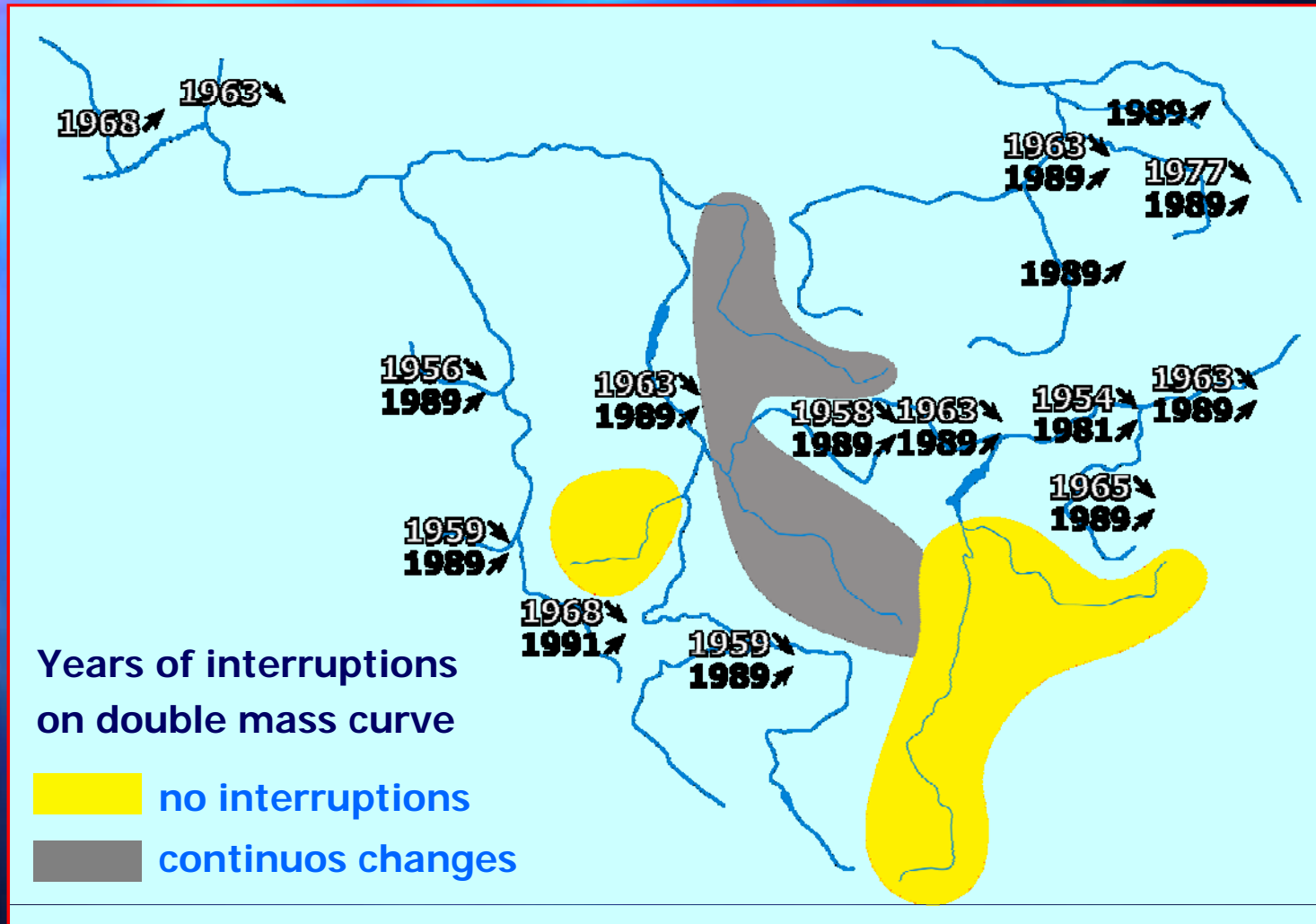


STREAMFLOW DEFICIT

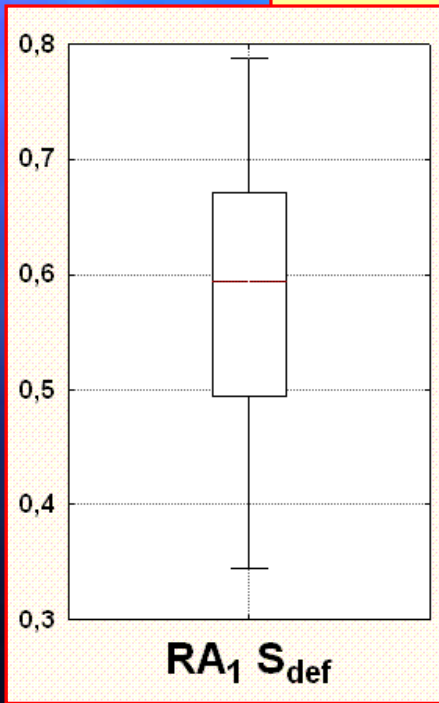
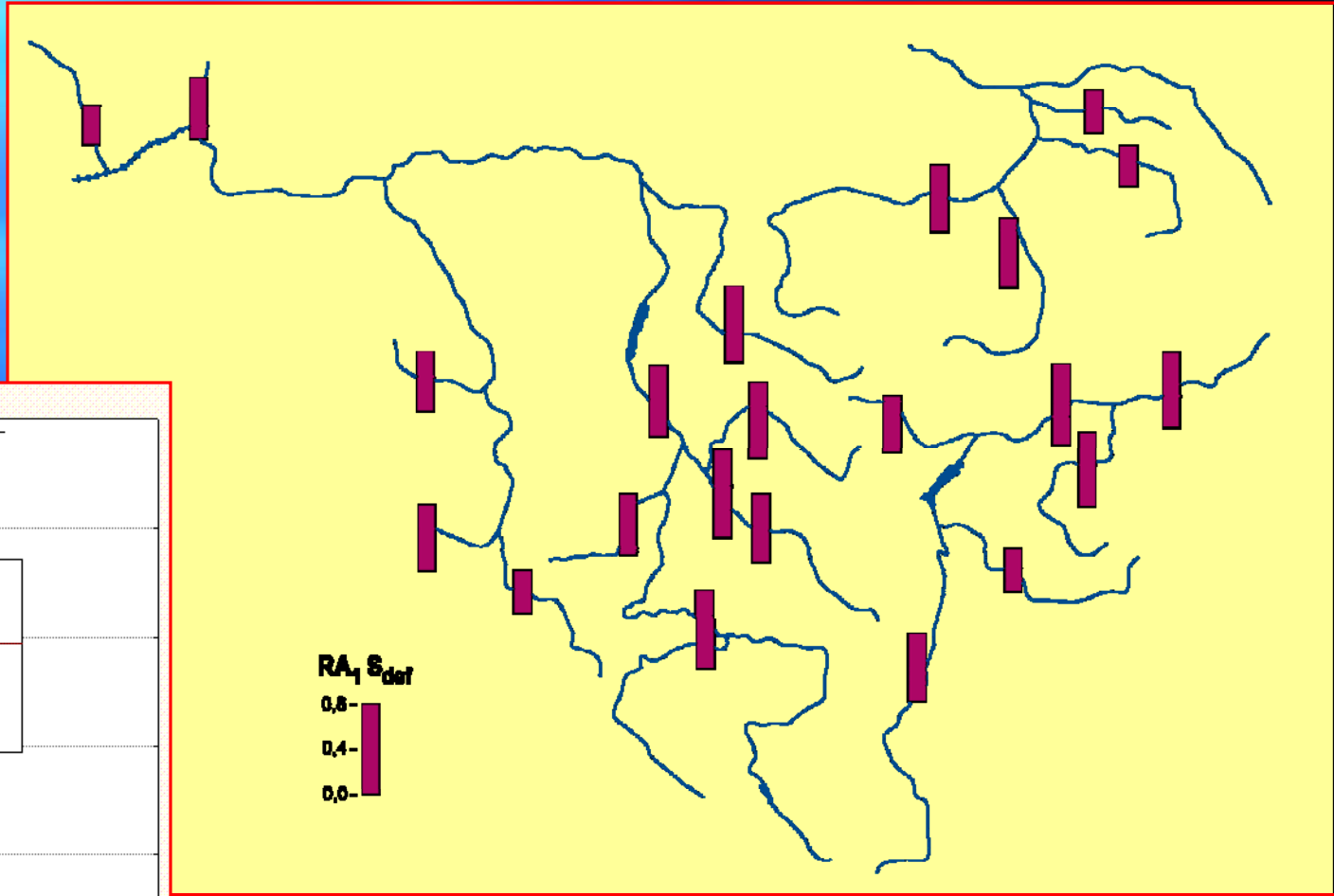
Homogeneity



Homogeneity

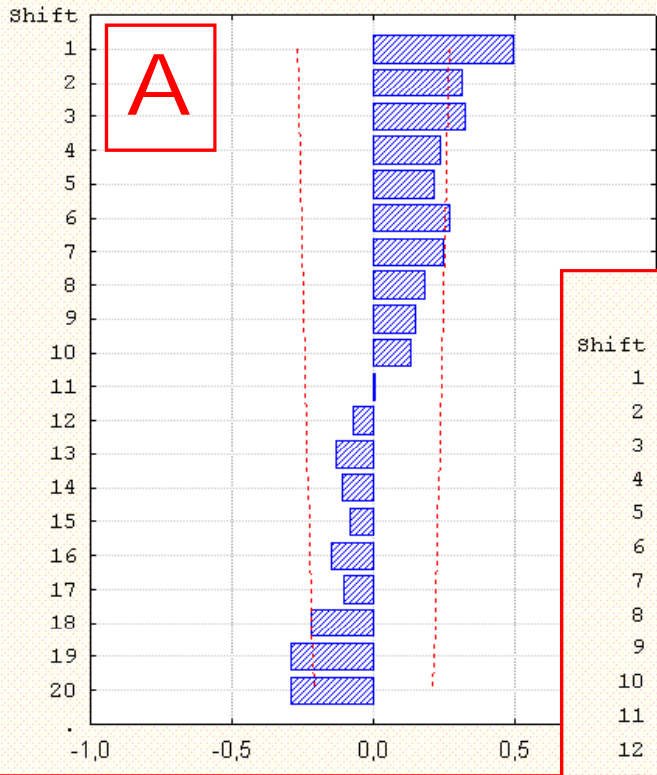


Multiannual inertia - autocorrelations

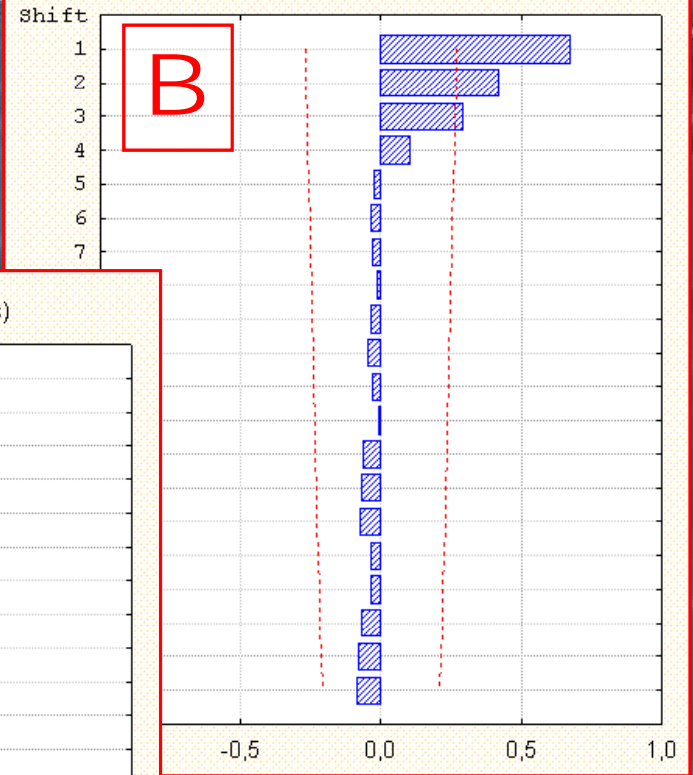


Multiannual inertia - autocorrelations

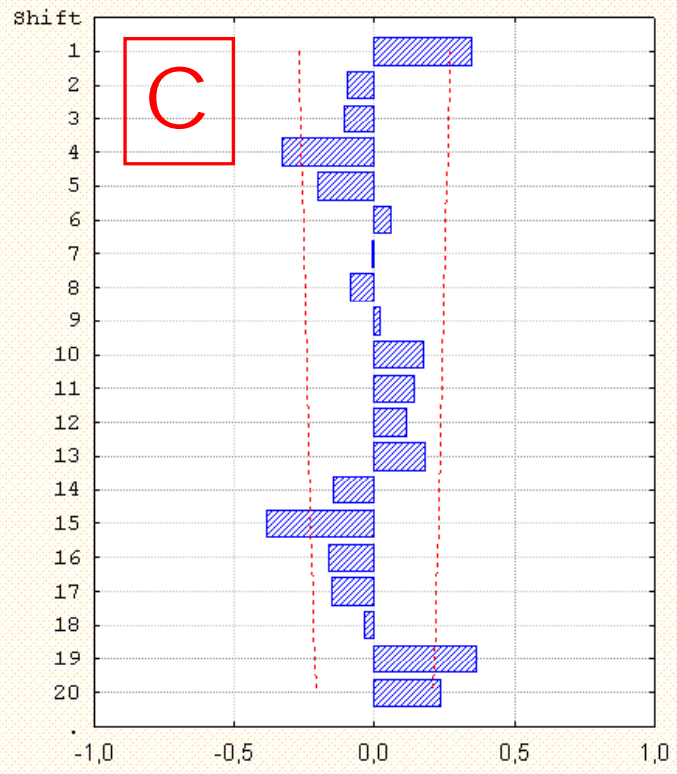
Wolbórka - Zawada (years)



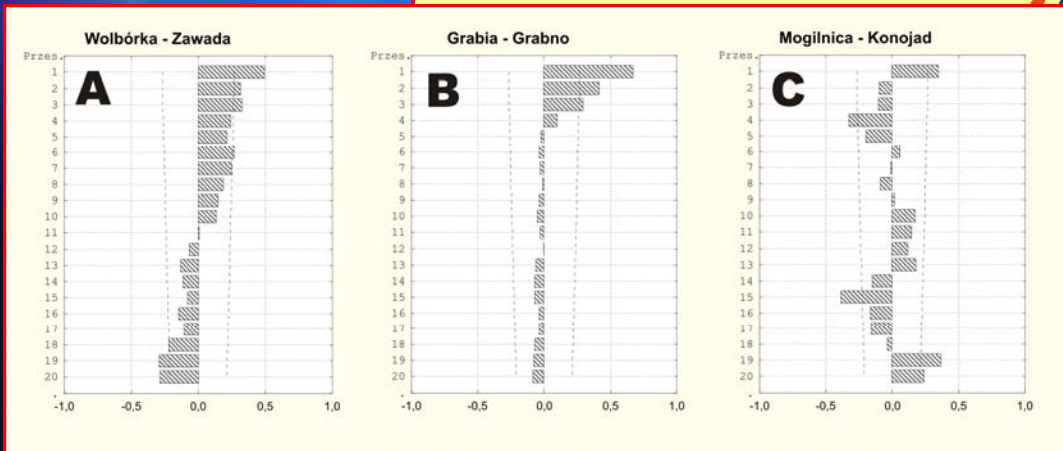
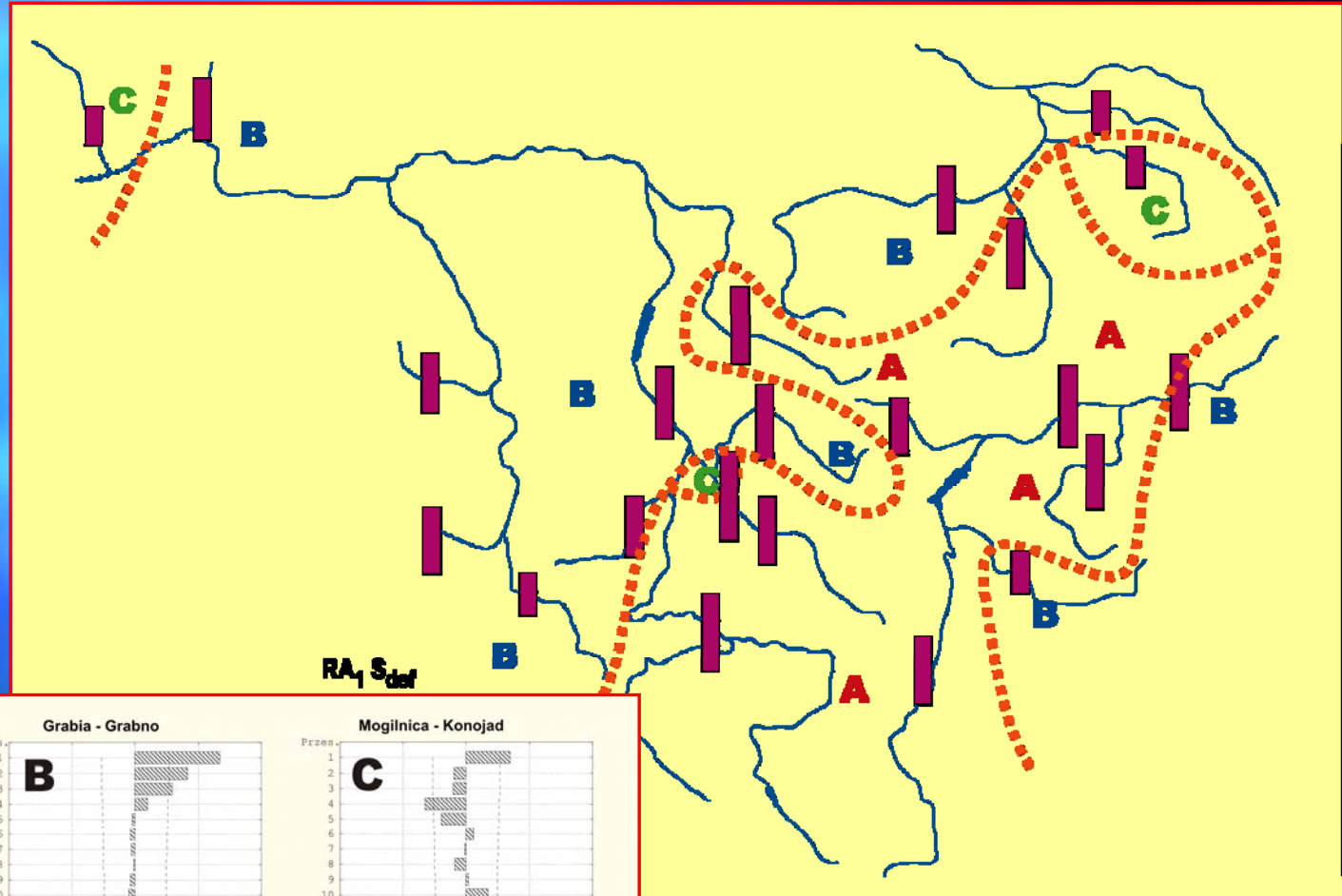
Grabia - Grabno (years)



Mogilnica - Konojad (years)



Multiannual inertia - autocorrelations



Closing remarks

