



Circular characteristics of the dates of occurrence of winter maximum river flows in the Upper Vistula river basin

Agnieszka Rutkowska (1) and Silvia Kohnová (2)

(1) Department of Applied Mathematics, University of Agriculture, Kraków, Poland, (2) Department of Land and Water Resources Management, Slovak University of Technology in Bratislava, Bratislava, Slovakia.

The dates of occurrence of winter maxima river flows are studied in several dozen catchments in the Upper Vistula river basin. The catchments have mixed snowmelt/rainfall regime with winter maxima generated mostly by snowmelt.

For every catchment, the long-term series of dates of occurrence is transformed to circular data. Then, the temporal homogeneity of the dates is studied using statistical methods. Spatial differences between catchments in circular characteristics like direction and concentration parameters are also evaluated.

Substantial parts of the Upper Vistula river basin, especially its southern, mountainous part, have a very high flood potential. Thus, studies concerning flood events tendencies and homogeneity of the dates of occurrence of seasonal floods are needed from the point of view of flood risk assessment.

References

- [1] Burn, D. H., 1997. *Catchment similarity for regional flood frequency analysis using seasonality measures*, J. Hydrol., 202, 212–230, doi:10.1016/S0022-1694(97)00068-1, 1997.
- [2] Köplin, N., Schädler, B., Viviroli, D., and Weingartner, R., 2014. *Seasonality and magnitude of floods in Switzerland under future climate change*, Hydrol. Process., 28, 2567–2578, doi:10.1002/hyp.9757.
- [3] Parajka, J., Kohnová, S., Bálint, G., Barbuc, M., Borga, M., Claps, P., Cheval, S., Dumitrescu, A., Gaume, E., Hlavčová, K., Merz, R., Pfaundler, M., Stancalie, G., Szolgay, J., and Blöschl, G., 2010. *Seasonal characteristics of flood regimes across the Alpine–Carpathian range*, J. Hydrol., 394, 78–89, doi:10.1016/j.jhydrol.2010.05.015.