

[<https://doi.org/10.69646/aob260907>]

[*Invited Lecture*]

Continentality Indices as a Common Language for Climate and Society: A Precipitation Seasonality - Case Study Babušnica (Serbia) - Sofia (Bulgaria) 1961-2020

Jelena Svetozarević^{1*}

¹Climate, Atmosphere and Water Research Institute at Bulgarian Academy of Sciences, Sofia, Bulgaria

*Correspondence: jelena.svetozarevic09@gmail.com

Abstract: Modern climatology produces a large amount of data, while society experiences climate through concrete impacts: when it rains, how long the dry season lasts, and whether the water comes all at once or evenly. Simple quantitative metrics can bridge this gap. This study proposes four complementary indices describing precipitation concentration, seasonality and climatic continentality - PCI (Oliver), SI (Walsh and Lawler), PCD/PCP (Zhang), and Shver K - for monthly precipitation from Babušnica (485 m) and Sofia (550 m) for 1961- 2020. Both stations show a moderate-seasonal regime. Babušnica: mean 675.5 mm, PCI 11.38, SI 0.47, PCD vector 0.17, PCP 195° (July), K 52.9%. Sofia: 597.5 mm, PCI 11.72, SI 0.50, PCD 0.22, K 60.1% - more continental.

Comparing 1961-1990 vs 1991-2020, annual totals remain stable (Babušnica 674.3→676.8 mm; Sofia 576.3→616.1 mm). Concentration trends diverge: Babušnica shows a slight increase (PCI 11.34→11.43, SI 0.46→0.47) with a 14° shift of PCP to late May (188°→202°); Sofia shows a slight decrease (PCI 11.86→11.62, SI 0.51→0.49, PCD 0.24→0.20).

These indices translate directly into societal information: adjustments to the sowing calendar, irrigation needs, and seasonal water storage.

They provide a visual, understandable tool for agriculture, water management, and transboundary early warning and more.

Keywords: PCI, PCD/PCP, seasonality, continentality, precipitation, climate-society bridge

References

- Kendall, M.G., 1975. *Rank correlation methods*. 4th ed. London: Charles Griffin.
- Mann, H.B., 1945. Nonparametric tests against trend. *Econometrica*, 13(3), pp. 245–259.
- Oliver, J.E., 1980. Monthly precipitation distribution: A comparative index. *The Professional Geographer*, 32(3), pp. 300–309.
- Shver, C.A., 1976. *Atmospheric precipitation on the territory of the USSR*. Leningrad: Gidrometeoizdat.
- Walsh, R.P.D. and Lawler, D.M., 1981. Rainfall seasonality: Description, spatial patterns and change through time. *Weather*, 36(7), pp. 201–208.