EGU25-356, updated on 19 Jan 2026
https://doi.org/10.5194/egusphere-egu25-356
EGU General Assembly 2025

Study of freezing rain in Belgrade from 1949 to 2022

Nemanja Kovačević, Katarina Veljović Koračin, and Suzana Putniković
Univesity of Belgrade, Faculty of Physics, Institute of Meteorology, Belgrade, Serbia (nemanja@ff.bg.ac.rs)

A paper examines the climatology of freezing rain events in Belgrade (Serbia) in the period from 1949 to 2022. This phenomenon occurs from October to March, most frequently in January and December, mostly at night (00–07 local time), and lasts up to 2 hours in 62% of cases. The onset of freezing rain events occurs most frequently between 00 and 01 local time (~ 16 %). The second maximum of these events is between 06 and 07 local time (~ 11 %). The vertical temperature profiles for days with freezing rain show that 60.42 % of all events have a characteristic “warm nose” at altitude (near the 850 hPa level), below which there is usually a temperature inversion and a supercooled layer of air near the ground. This result is consistent with the study [1], which found that in 30–40% of all vertical soundings there was no “warm nose” above the supercooled air layer on the ground. This study shows that the number of freezing rain events has decreased over time, which can be attributed to climate change. The analysis of the surface maps shows that freezing rain occurs under the same conditions as the local Košava wind: with almost meridional isobars and a typical southeasterly flow with strong pressure gradients between the low pressure area in the western Mediterranean and the anticyclone in the east. The analysis of the upper-level maps shows a wind shear with an almost westerly flow, which also indicates warm air advection in the analyzed layer.

[1] Carrière, J.-M., Lainard, C., Le Bot, C., Robart, F. 2000. A climatological study of surface freezing precipitation in Europe, *Meteorol. Appl.*, **7**, 229–238.

Keywords: freezing rain, climatology, Košava

Acknowledgement: This research was supported by the Science Fund of the Republic of Serbia, No. 7389, Project: "Extreme weather events in Serbia - analysis, modelling and impacts” - EXTREMES