

# Review: egusphere-2026-2031. Scale dependence of precipitation structure ... (Tsoi, Männik and Rikka)

## General comments

This interesting paper extends from previous studies the use of Tweedie distribution for studies of precipitation. It concerns seasonal and spatial aspects from the point of view of hydrology, as well as influence from data source (radar composites vs. rain gauges). It is well structured and written, with clear presentation of results, again stressing how the statistical framework with Tweedie distribution can be used and interpreted in a precipitation context.

My recommendation is **accept after minor revision**, if the authors consider the remarks raised below.

## Specific comments

- Estimation of Tweedie distribution, in particular the power parameter  $p$ : Please give more details. In Abstract is mentioned (line 13) “using ordinary least squares”, and similarly in Section 3.1 (from line 140). What software was used? In the R package `tweedie`, developed by Dunn, estimation is performed by profile likelihood. The numerical work can sometimes lead to problems in the maximisation routines as pointed out by Dunn and Smyth (2018), Section 12.3.2). Please discuss briefly in more detail the numerical framework applied.
- Section 4.2, line 204: The site Kuusiku is chosen as a representative station, with illustrations in Figures 4-5. Did the authors check the behaviour at sites nearby, so tha it is truly representative? Moreover, could the location of this be marked in Figure 1 with a certain symbol, or colour? (At line 205, the text says, perhaps vague, “lies between the two radar sites”).
- Section 4.2, line 221: The text says “The JJA distribution is more broadly spread ...”. I had to check Figure 5 in quite detail to verify that. Perhaps a somewhat less strong statement could be done: “The JJA distribution is somewhat more broadly spread ...”.
- Section 4, line 298: “...indicating that  $p$  estimated from the radar composite at station locations is higher ...”. Indeed, Tables 2 and 3 show that. However, taking the spreading, in form of IQR, into account, are they “significantly” higher? The IQR values are not negligible in its magnitude, compared to the median values. It would be of interest if the authors consider a suitable statistical test.

## **Technical corrections**

The paper is very well written, I found no errors in language or mathematical formulae. Graphs are clear with good visibility.

## **References**

Dunn PK, Smyth GK (2018) *Generalized Linear Models With Examples in R*. Springer-Verlag