

## ***Interactive comment on “Hydrological drought typology: temperature-related drought types and associated societal impacts” by A. F. Van Loon et al.***

### **Anonymous Referee #2**

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#### General comments:

The aim of this article is twofold: (1) to introduce two new types of drought, characterizing droughts related to ice and snow, (2) to analyze the socio-economic impacts of past droughts. The paper is both well documented and well presented. The main weakness is the lack of link between the two points (see e.g. P10489, the authors switch abruptly from the drought typology to the socio-economic impacts). The coherence of the paper suffers from the lack of reported impact related to snowmelt/glacier droughts. The publication of this paper as it stands may be premature in the light of the current extension of the databases. At least, the 2003 event observed in Norway, (possibly) similar to

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the described 1949 drought, can be obtained from the EDII (Figure 11). It should be included in the discussion to ensure a minimum link between the two sections. The title should be modified (too general compared to the contents of the article).

In details:

P10474: how the end of the snow melt is computed?

P10474: “If needed . . . versa”: the choice of the increase seems subjective. Was it applied for all the basins? If not, why? Is there any consequence on the correlation analysis? The physical meaning of the temperature is lost. In fact, the useful information is the rank of the explanatory variables. Another way would have been to use empirical non exceedance frequencies.

P10475: are historical droughts well reconstituted? We do not know if the analyses consider either simulated or observed discharges. I suspect that observed discharges are examined. An additional analysis should consider simulated discharges. This could be a manner to verify whether the differences between the two countries and the lack of expected links between drought and meteorological conditions are due to biases in hydrological modellings.

P10476: statistics may be wrong (see comments on Figure 5)

P10481: how was this selection made? Which proportion of the inventoried events do they represent?

Table 4: can you define what rogations are.

Table 5: droughts of type C are of type A in Figure 11. This is confusing.

Figure 2 and Figure 3: the way drought is defined, is not consistent with the way events are defined in section 3.3

Figure 5: two dots are missing in the graph  $P_{winter}$  against  $Q_{spring}$ . These two dots are located around (1, 1) in the graph  $T_{winter}$  against  $Q_{spring}$ . Why? Does it mean

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that some of the figures in Table 3 are wrong?

Figure 11: there is a gap between 1800 and 1920. Why? Why is the dashed line used for 1921? No automatic procedure is available (yet) for applying the hydrological drought typology (P 10486). Does it mean that by default, events that do not fully respect criteria defined in Section 3.3 are not snowmelt/glaciermelt droughts?

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