

Corrigendum note on *Non-linear aggregation of subgrid-scale orography roughness*

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1 Background

In the previous HIRLAM Newsletter, Sattler (2004) describes a method for the aggregation of subgrid-scale orographic roughness length $z_{0,SSO}$. The article outlines also features of an aggregation method used in the HIRLAM reference versions 6.1.1 (HIRLAM, 2004) to 6.2.2, which uses an approximated method, referred to as the linearized aggregation. The two mentioned methods are compared in the article, and the advantages of the non-linear method are outlined. Figures 2, 3 and 4 of Sattler (2004) show aggregated fields of $z_{0,SSO}$. The Figures 2 and 3 of this article depict $z_{0,SSO}$ as aggregated by the reference system version 6.2.1 using the linear approximation, the latter figure of which is based on a different HDF file for the North Pole area. The Figure 4 of the article depicts the $z_{0,SSO}$ -field aggregated with the non-linear method using a set of HDF files, that covers similar regions as in the non-linear case, but which includes the parameters to apply the non-linear method instead.

2 Corrigendum

There is a difference between the above mentioned figures 2/3 and figure 4, which goes beyond the difference due to linear—non-linear aggregation. This is not mentioned in Sattler (2004), because it was not known to the author at the time the article was written. This difference is due to the scaling of the subgrid-scale orographic roughness

$$z_{0,SSO} = a \left[\frac{1}{2} \sqrt{\frac{n_0 + n_{p,T}}{A_T} \sigma_{so}^2} \right]^B, \quad (1)$$

where a and B denote the scaling paramters. The values for a and B are originally (Undén, 2002):

$$a = 0.4038, \quad B = 0.715. \quad (2)$$

With the introduction of the linearized method for aggregation of $z_{0,SSO}$ the values from (2) were used, a and B were, however, interchanged. This

means that the fields of the figures 2 and 3 of Sattler (2004) actually refer to the scaling

$$a = 0.715, \quad B = 0.4038., \quad (3)$$

whereas the field from figure 4 of Sattler (2004) refers to the scaling as in (2). In order to see the effect of the difference due to a different scaling, Fig. 1 shows the $z_{0,SSO}$ -field determined with the linearly approximated method, i.e. as in figure 3 of Sattler (2004), but now with the scaling (2) as in the non-linear case. The figure shows that the flat areas seem underestimated, while the mountains often may be overestimated. The spurious structures over Greenland are still there, because they are not related to the scaling. The little contrast over Greenland between the inner area and the coast still remains, too, when comparing Fig. 1 to the figure 2 of Sattler (2004).

Even though the interchanged scaling parameters lead to a significantly different field for $z_{0,SSO}$, this has no significant influence on the structure of the field as such, and the conclusion drawn by Sattler (2004) does not change by this.

References

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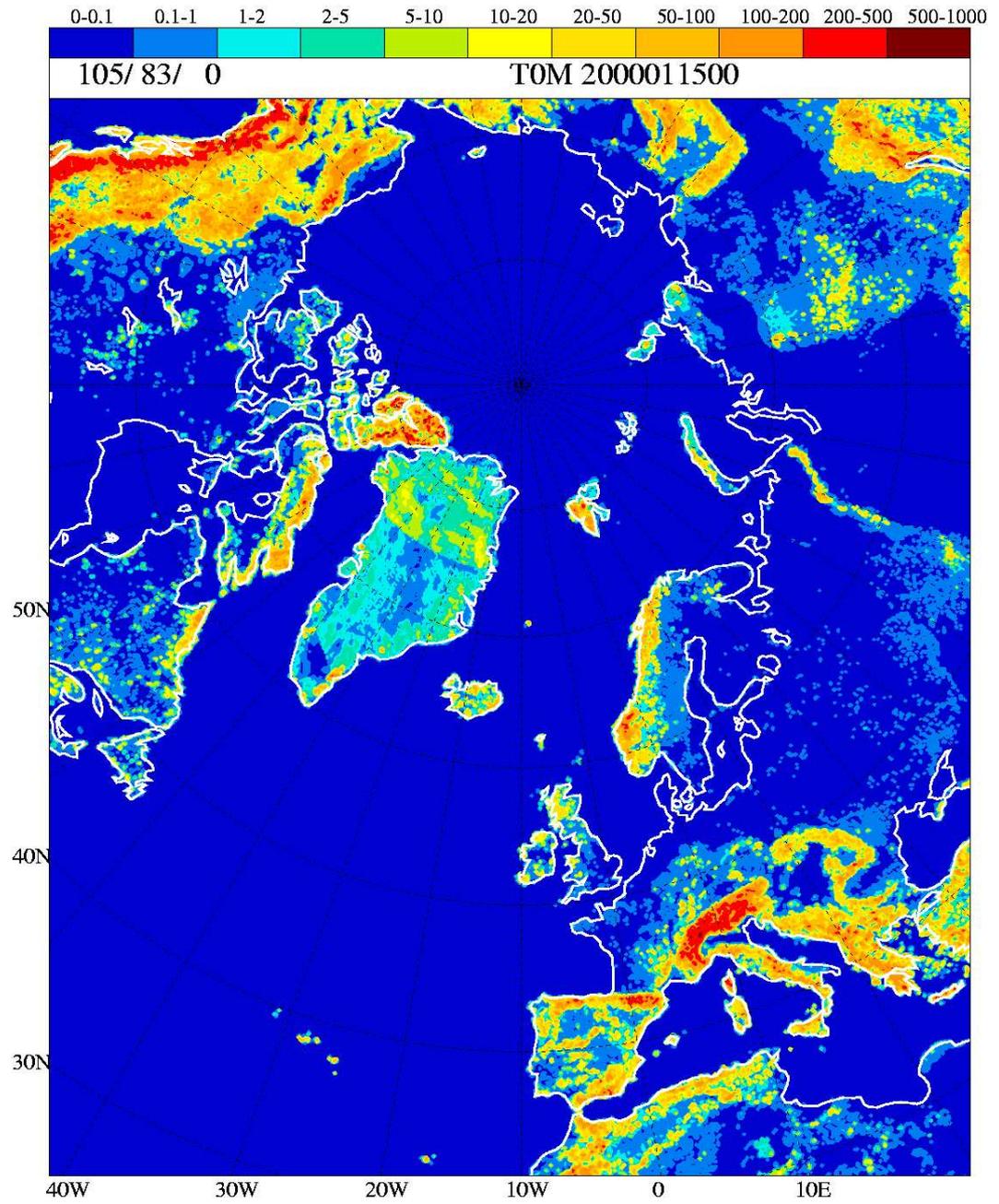


Figure 1: $z_{0,SSO}$ in cm aggregated using the linear approximation as in figure 3 of Sattler (2004), but using the scaling of (2).