Erratum to: Estimating reliability and resolution of probability forecasts through decomposition of the empirical score

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Unfortunately, the paper “Estimating reliability and resolution of probability forecasts through decomposition of the empirical score,” *Climate Dynamics*, 2012, contains a few errors. Corrections for these errors are provided here.

The ignorance score

In the relations (20–22), ρ_d and r_d have to swap places. The correct reading of these relations is

$$\mathbf{e}(\bar{\pi}) \cong \mathbf{e}(\bar{o}) + \frac{K-1}{2N}, \quad (20)$$

$$\sum_{d=1}^D \mathbf{d}(\bar{\pi}, \pi^{(d)}) \rho_d \cong \sum_{d=1}^D \mathbf{d}(\bar{o}, o^{(d)}) r_d - \frac{(K-1)(D-1)}{2N}, \quad (21)$$

$$\sum_{d=1}^D \mathbf{d}(\gamma^{(d)}, \pi^{(d)}) \rho_d \cong \sum_{d=1}^D \mathbf{d}(\gamma^{(d)}, o^{(d)}) r_d - \frac{(K-1)D}{2N}. \quad (22)$$

The Brier score

Below Eqs. (23–25), the definition of v_d should read $v_d = 1 - (1 - \rho_d)^N$, as in the appendix.

Immediately after that, it is claimed that the term in brackets on the right-hand side of Eq. (24) is never negative, which would imply that the empirical resolution overestimates the true resolution. For the Brier score, this statement is wrong in general, and the proof (unnumbered equation just after Eq. 25) is faulty. It is assumed that the entropy $\mathbf{e}$ is convex, while in fact it is concave. However, it is worth noting that the term in question is positive for many choices of $\pi^{(d)}, \rho_d, d = 1 \cdots D$. To make this more precise, note that for the Brier score, $\mathbf{e}(p) = 1 - \sum_k p_k^2$. Therefore, the relation

$$\sum_d \mathbf{e}(\pi^{(d)}) v_d \geq \mathbf{e}(\bar{\pi}) \quad (23)$$

evidently holds under the condition that the $\pi^{(d)}$ live in a sphere of radius $\sqrt{1 - \frac{\mathbf{e}(\bar{\pi})}{\sum_d v_d}}$, centered at the origin. A simple calculation shows that $\mathbf{e}(\bar{\pi}) \leq \frac{K-1}{K}$, while the v_d are very nearly equal to one, unless N is very small, as discussed. We can conclude that the empirical resolution overestimates the true resolution if the $\pi^{(d)}$ are restricted to a sphere of radius no more than $\sqrt{1 - \frac{K-1}{KD}}$.

It is maybe worth mentioning that although the empirical decomposition does not necessarily overestimate the resolution term, it *does* overestimate the potential score (see Eq. 30); statements in the paper to that effect are correct.

Finally, a minor error occurred in the appendix: The plus symbol in the unnumbered, displayed equation immediately preceding Eq. (32) should be a minus symbol.

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