Weather and Climate Dynamics

Corrigendum to

"Large spread in the representation of compound long-duration dry and hot spells over Europe in CMIP5" published in Weather Clim. Dynam., 4, 309–329, 2023

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During manuscript preparation, errors were made in the "Methods" section of the paper, specifically regarding Eqs. (5) and (6) in Sect. 3.3 and in the calculation of μ in Eq. (7) in Sect. 3.4. In the following, these errors have been corrected.

Therefore, this results section should read as follows:

$$\text{Psa}_{g,\text{DS}} = P\left(\text{Spell}_{g,\text{DS}}(t+1) = 1 | \text{Spell}_{g,\text{DS}}(t)\right.$$
$$\left. = 1 \cap D_{\text{AS}}(t) \geq 5\right), \tag{5}$$

where $D_{\text{AS}}(t)$ indicates the total duration of the anticyclonic system that overlaps with this day. $\text{Psa}_{g,\text{DS}}$ therefore represents the survival probability of a dry spell when it co-occurs with an anticyclonic system whose total duration is at least 5 d. In the next step, the odds of a dry spell surviving when an anticyclonic system is present, $\text{Psa}_{g,\text{DS}}/(1-\text{Psa}_{g,\text{DS}})$, are compared with the climatological survival odds of dry spells, $\text{Ps}_{g,\text{DS}}/(1-\text{Ps}_{g,\text{DS}})$, by calculating an odds ratio (OR):

$$\text{OR}_{\text{DS}} = \frac{\text{Psa}_{g,\text{DS}}/(1-\text{Psa}_{g,\text{DS}})}{\text{Ps}_{g,\text{DS}}/(1-\text{Ps}_{g,\text{DS}})}. \tag{6}$$

The value of OR_{DS} indicates how the odds of dry spell survival change when an AS spell is present at the same time. For example, a value greater than one indicates that the AS spell enhances the dry spell survival probability. This ap-

proach demonstrates the relationship between anticyclonic conditions and the day-to-day persistence of dry spells.

3.4 Estimation of duration return levels

We estimate return levels (RLs) for the duration of dry spells that have an estimated return period (RP) of 5 years. We choose to look at RLs with a RP of 5 years so that we focus on dry spells that may be impactful but also frequent enough to draw robust conclusions.

RLs are estimated using a parametric approach in which we fit an exponential distribution to the duration of all dry spells and anticyclones that exceed 5 d. The use of the exponential distribution is common for modelling the probability of dry spells (Serinaldi et al., 2009; Manning et al., 2019). The RL (d) for a RP (T) of n years is estimated as

$$d = F^{-1}\left(1 - \frac{\mu}{T}\right), \tag{7}$$

where F^{-1} is the inverse of the fitted cumulative distribution function (CDF) and μ is the exceedance rate, calculated as $\mu = \frac{N_Y}{N_E}$, where N_E is the number of dry spells exceeding a duration of 5 d and N_Y is the number of years.