

Dear Authors, This paper is very interesting. It gives a real added value in dry spells perspectives. For me methods are ok and results are robust enough. I'm not fully familiar with all the different concepts of evapotranspiration and I guess that it could be the case of other readers of the journal you chose for publication. That's why I have some questioning that maybe could improve the universality of the paper.

We would like to thank you for this positive evaluation of our manuscript.

As the evapotranspiration is the central point, and when I read the paper, I have some wondering that maybe could directly discuss in your paper: Why using ET₀ instead of PET? Or could you explain more what is ET₀? And what is the added value of using ET₀ instead of PET?

As noted in the Harris et al. 2014 paper describing the CRU dataset, they used a variant of the Penman–Monteith method, the FAO (Food and Agricultural Organization) grass **reference evapotranspiration** equation (based on Allen et al., 1994).

The two terms PET and ET₀ are often mistaken or reversed (many authors, in particular in the hydrological science literature are in fact using ET₀ but they call it PET). The potential evapotranspiration is the evapotranspiration from a hypothetical crop surface with adequate water and only influenced by the atmospheric conditions. Hence, the available water in the soil does not limit potential evapotranspiration. The reference evapotranspiration concept was introduced in the late 1970s to avoid ambiguities that existed in the definition of potential evapotranspiration, related to a specific crop and its development stage. Reference evapotranspiration is defined as the rate of evapotranspiration, only influenced by the atmospheric conditions, from a clipped grass-surface having 0.12 m height and bulk surface resistance equal to 70 s m⁻¹, an assumed surface albedo of 0.23 (Allen et al., 1994), and no moisture stress.

Therefore ET₀ represents the evapotranspiration for a given surface (grass) when PET is basically equal ET₀ modulated by a crop coefficient (K_c) that can vary with the different vegetation covers. To compare between different sites it is often more efficient to use ET₀, also since the estimation of crop coefficients for each station location could be difficult, in particular since the K_c varies in time during the year.

We added in the manuscript =

“In the CRU dataset, the ET₀ is computed from a simplified version of the FAO Penman-Monteith (FAO-PM) equation (Allen et al. 1998) that uses data of air temperature, sunshine duration, vapor pressure deficit and a climatology for wind speed. The detail for the computation is given in Harris et al. (2014). By comparison, Potential Evapotranspiration (PET) is the evapotranspiration from a given crop surface, requiring the use of crop coefficients that can vary in time due to the development stage of the vegetation. The use of ET₀ allows the comparison between stations and does not require estimating local crop coefficients.”

I well understand that it's mainly in summer that evapotranspiration become crucial in term of dry spells definition but precisely, in summer in the

Mediterranean area the vegetation is really weak? So why using ET0 that is based on a homogeneous and quite dense vegetal cover? To summarize, the paper is really nice but maybe adding some extra information's about ET0 and why ET0 could improve it somehow.

This is an interesting comment, however we feel like it is already addressed in the discussion section, second paragraph. In this part, we indicate that indeed the fixed vegetation cover may not be really realistic, and further work could consider the evapotranspiration simulated by land surface schemes, able to represent vegetation dynamics. We added some elements in the discussion to better stress this point and added the recent reference of Quintana-Seguí et al., 2019 who show the current discrepancy between different land surface model simulations over the Mediterranean.