

Interactive comment on “The European 2015 drought from a climatological perspective” by M. Ionita et al.

Anonymous Referee #2

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General Comments

I think overall this is a nice climatological overview of the 2015 drought. The comparison with 2003 is also a helpful step in understanding the nature of these droughts (I find the differences in their early development especially interesting), and highlights the challenges of predicting their evolution. While the authors do a good job of outlining the various potential mechanisms that may have led to the drought, the discussion largely reflects our current limited understanding of the causal mechanisms of such droughts, and the limitations of assessing causes from an observational-based study. The weak (if any) link to SST anomalies, the importance of anticyclones, and possible links to various large-scale atmospheric teleconnection patterns, some of which are themselves poorly understood (as well as the potential impact of the overall warming climate) all make understanding the ultimate causes of such droughts a challenge. It

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would be nice to see a follow-on modeling study that examined some of the potential causes outlined here in a more quantitative way.

Specific Comments:

While (as the authors note) the well known NAO and SCA patterns appear to play a role in the early and middle stages of the drought, the nature of the blocking pattern that appears to play a key role during August (the warmest month on record) is less clear. In that regard, the authors may find it helpful to take a look at Schubert et. al. (2011) concerning the role of Rossby Waves in summer climate extremes. One of the leading patterns found in that study bears some resemblance to the wave pattern that develops during August 2015.

On a more technical note, I think that since the focus is on the modern era (reference period only goes back to 1971) it might have been better if the authors had used an atmospheric reanalysis that assimilates upper air observations, rather than the 20th century reanalysis, which only assimilates surface pressure. While monthly means are well reproduced in that reanalysis, the results may be less accurate for sub-monthly values. In any event, it might be worth comparing the results in Fig. 7 with e.g. the results based on the older NCAR/NCAR reanalysis just as a sanity check.

Other details:

- please check the cost “5000 billion Euros [EEA, 2010].” – line 5, page 2
- line 18, page 3: “management” should be “managed”
- line 22, page 4: “to” should be “the”
- what is the reference period for the SST anomalies in Fig 5a?
- state the reference period for indices in caption of Fig 8 (1950-2000?)
- page 8 lines 25-28, should note that some studies indicate that the role of the Mediterranean Sea was largely passive in 2003 (e.g., Tomassini and Elizalde 2012)

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- “Siegfried et al. 2014” reference should be “Schubert et al. 2014”.
 - Figure S5 “As in Figure 9”, but for the period 1950 – 2015. should be “As in Figure 8”.
- “Warm Season Subseasonal Variability and Climate Extremes in the Northern Hemisphere: The Role of Stationary Rossby Waves,” Schubert, S., H. Wang, and M. Suarez. *J. Climate*, 24, 4773-4792, 2011.

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