We thank the referee for investing her/his valuable time to help us improve our work with her/his accurate suggestions. We have revised our manuscript, taking into consideration all the referee's comments. The parts in red have been added to the manuscript to improve our work.

1. Poor quality of the figures (maps): the maps are too small, with land boundaries difficult to visualise (particularly when covered by dark colours); for the maps in figures 5 to 8, the colour scale should have a label indicating what it is representing (ki).

We increased the figures' size and improved the general appearance as suggested, including the labels on the colorbars in the Figures 5 to 8 of the manuscript. Please see the following Figure 1 to get an impression. The manuscript has been modified accordingly.

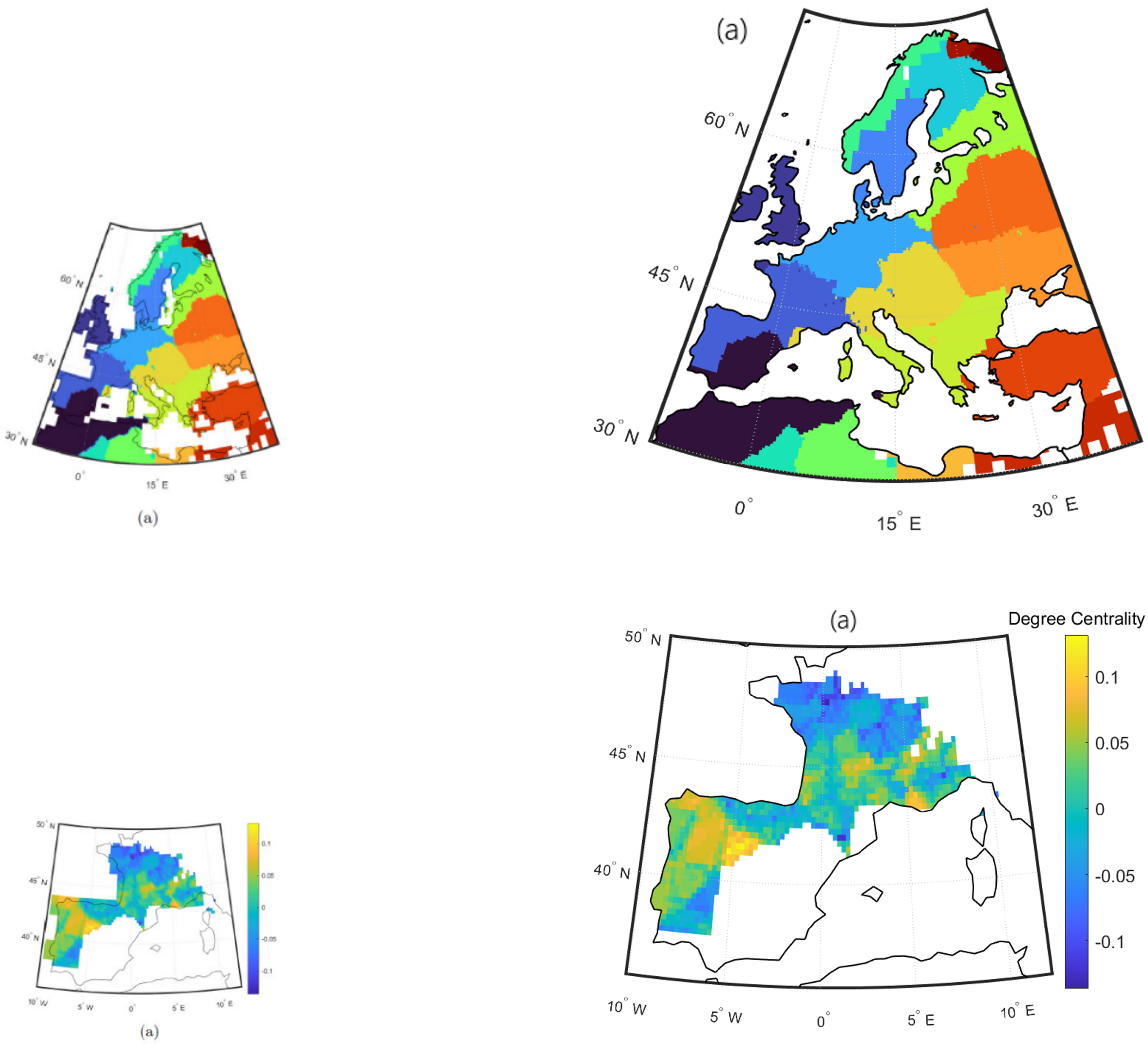

Figure 1: Appearance of map figures before (left) and after the revision (right).

2. The physical interpretation of the results would significantly enhance the relevance and quality of the paper; an attempt to identify the regional climate systems associated to the identified patterns, and an interpretation of the patterns based on atmospheric transport processes would be beneficial. What would explain the distinct behaviour of the western Iberia coastal areas and Biscay/France coastal zones?

Every region has its own precipitation regime, which is in turn affected by different atmospheric processes and patterns, whose influence also changes according to the specific time scale. For this reason, we point out that each of the showed regional source-sink system should be studied separately in detail from a climatic perspective, crossing expertises from different fields, which is beyond the scope of this study. Nevertheless, we revised our work with possible explanation of the patterns we found.

1. SPI-3 regional spatial networks.

   Figure 5a and 5b of the manuscript (Figure 2 here):

   The role of Portugal as source could be explained by two main reasons: on the one hand, this area is on average the rainiest one in the Iberian Peninsula and thus it is more sensitive to dry conditions; on the other side, it is strongly affected by the North Atlantic Oscillation and the East Atlantic pattern, two important atmospheric processes which influence the Iberian precipitation regime [1].

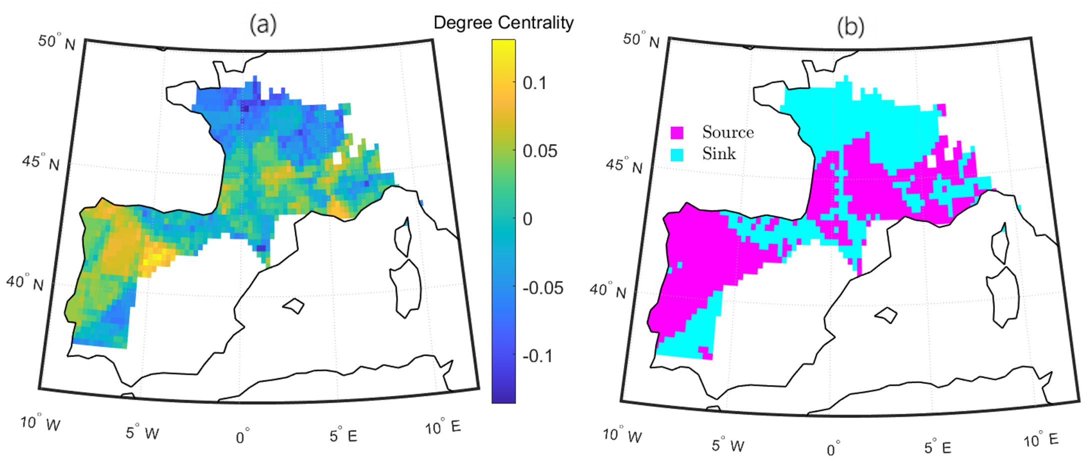

Figure 2: Two regional spatial networks from the SPI-3 Europe meteorological drought network. Degree centrality (a) and source-sink system (b).

   Figure 5c and 5d of the manuscript (Figure 3 here):

   As shown by [4], precipitation patterns over central Europe are largely controlled by atmospheric cyclones: consequently, the evolution of meteorological droughts in this region may be directed along cyclones' tracks. A further investigation into the average patterns of the various cyclone types may help in clarifying better this matter.

2. SPI-6 regional spatial networks.

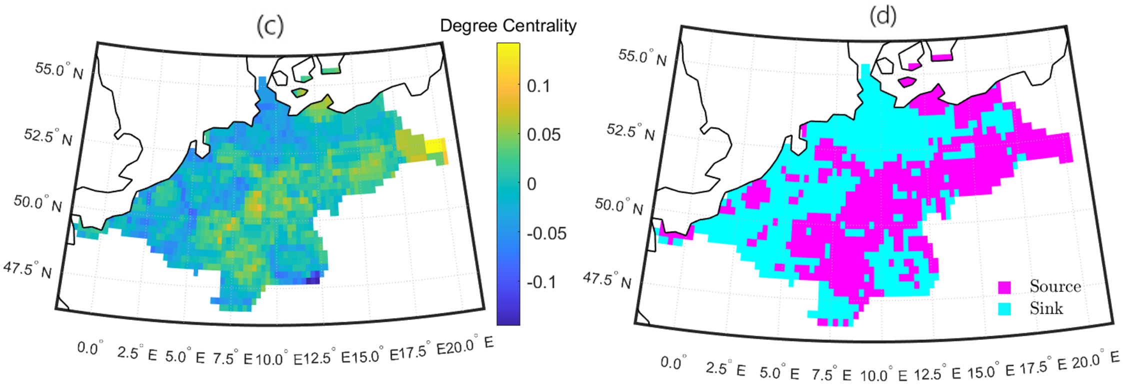

Figure 3: Two regional spatial networks from the SPI-3 Europe meteorological drought network. Degree centrality (c) and source-sink system (d).

Figure 6a and 6b of the manuscript (Figure 4 here):

While it seems clear that the separation of Norway from the rest of the Scandinavian Peninsula arises from the blocking action of the Norwegian mountains, the linkage between northern Ireland and Norway at this accumulation period is unforeseen; nevertheless we anticipate the prominent role of atmospheric rivers moving through the Norwegian sea and the Scandinavian pattern, which leads to dry conditions over the northern part of the continent during its positive phase [2].

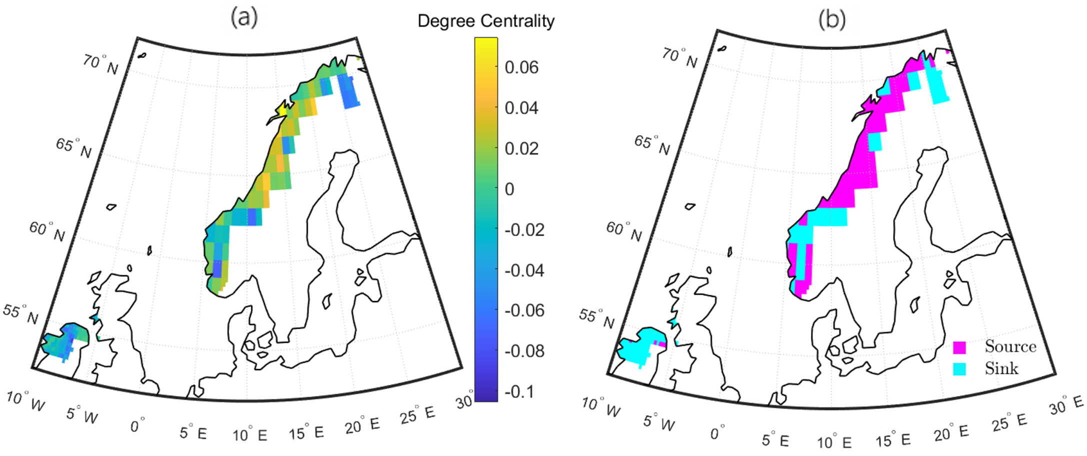

Figure 4: Two regional spatial networks from the SPI-6 Europe meteorological drought network. Degree centrality (a) and source-sink system (b).

Figure 6c and 6d of the manuscript (Figure 5 here):

While the North Atlantic Oscillation represents a remote driver of precipitations over Turkey, the Mediterranean and the marine Polar air masses are direct causes of rainfall in this region [7], and their west-east direction suggests a key role in droughts' diffusion as well.

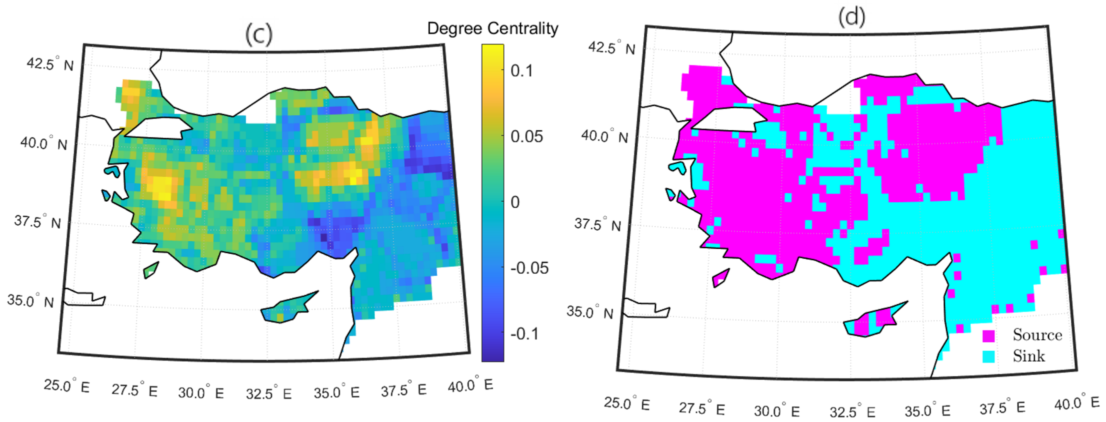

Figure 5: Two regional spatial networks from the SPI-6 Europe meteorological drought network. Degree centrality (c) and source-sink system (d).

3. SPI-9 and SPI-12 regional spatial networks.

   Figure 7a, 7b, 7c, 7d and 8a and 8b of the manuscript (Figure 6 and 7 here):

   As we already pointed out previously, the presence of long links in higher accumulation period networks contributes in connecting distant regions in longitudinal direction more than latitudinally, and the reason may lie in the propagation of Rossby waves.

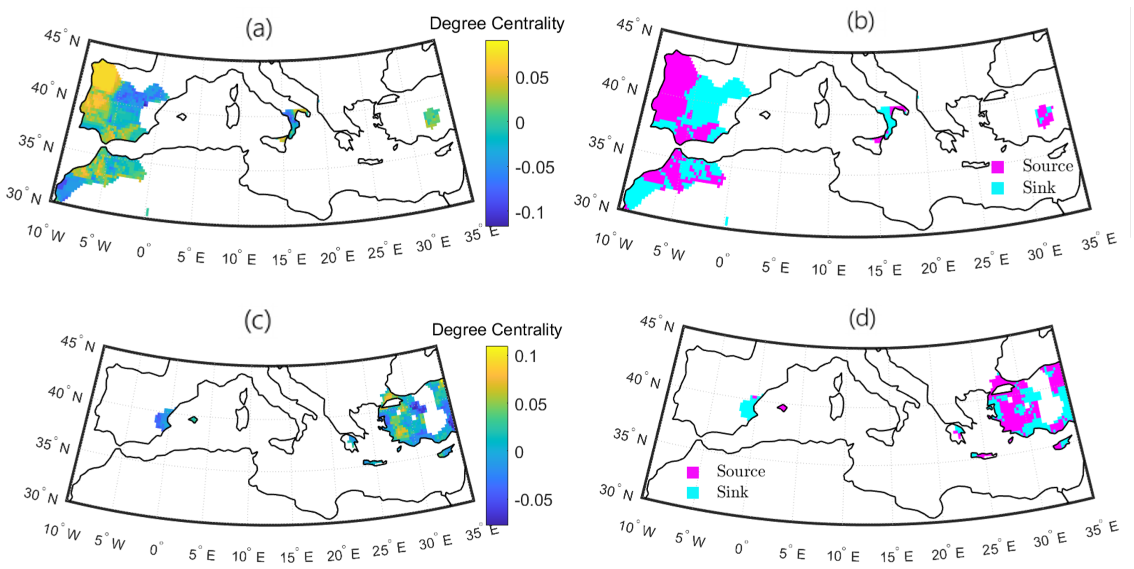

Figure 6: Two regional spatial networks from the SPI-9 Europe meteorological drought network. Degree centrality (a,c) and source-sink system (b,d).

Figure 8c and 8d of the manuscript (Figure 8 here):

The role of western France as source for the eastern part of the country seems to be confirmed by the increasing trend in meteorological drought events in this region, as reported in [8] too. [9] also show that the majority of meteorological

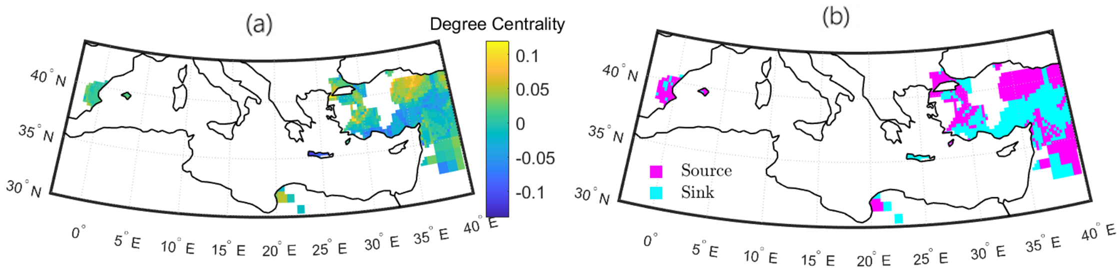

Figure 7: Two regional spatial networks from the SPI-12 Europe meteorological drought network. Degree centrality (a) and source-sink system (b).

drought events at the 12 months' timescale is located over the south and the eastern coast of France. As for Great Britain, the north and the central and southern part of the country consistently belong to different clusters in the SPI-6, 9 and 12 networks (see Figure 3 of the manuscript). This could be related to the NAO's impact in the UK, with positive correlation to precipitation in the north and negative in the south [6]. Moreover, the source's role of Wales and south England displayed here is consistent with previous studies [3, 5].

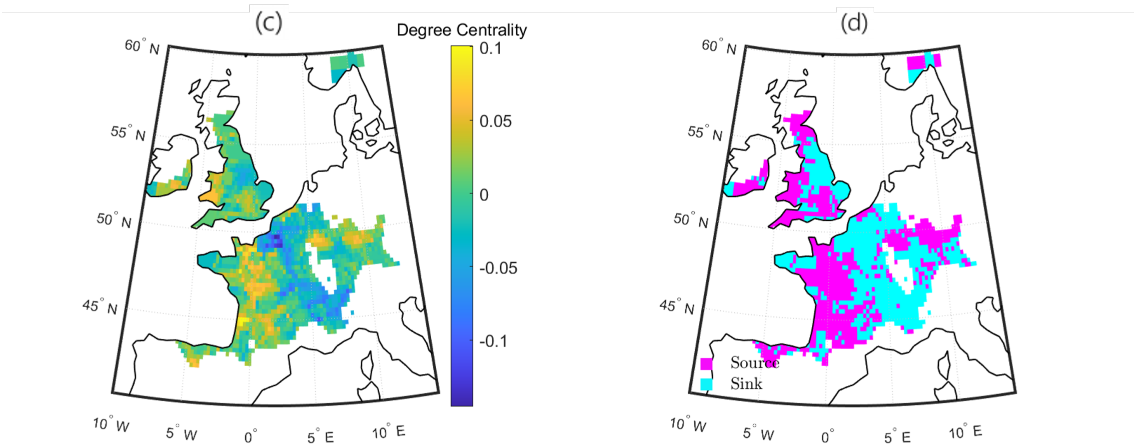

Figure 8: Two regional spatial networks from the SPI-12 Europe meteorological drought network. Degree centrality (c) and source-sink system (d).

Finally, we point out that every region has its own precipitation regime, which is in turn affected by different atmospheric processes and patterns, whose influence also changes according to the specific time scale. For this reason, each of the showed regional source-sink system should be studied separately in the future in more detail.

3. Minor comments.

We took care of every minor comment by accordingly modifying the manuscript.

References

[1] Gerardo Benito, Marıa José Machado, and Alfredo Pérez-González. “Climate change and flood sensitivity in Spain”. In: *Geological Society, London, Special Publications* 115.1 (1996), pp. 85–98.

[2] Cholaw Bueh and Hisashi Nakamura. “Scandinavian pattern and its climatic impact”. In: *Quarterly Journal of the Royal Meteorological Society: A journal of the atmospheric sciences, applied meteorology and physical oceanography* 133.629 (2007), pp. 2117–2131.

[3] HJ Fowler and CG Kilsby. “A weather-type approach to analysing water resource drought in the Yorkshire region from 1881 to 1998”. In: *Journal of Hydrology* 262.1-4 (2002), pp. 177–192.

[4] Michael Hofstätter et al. “Large-scale heavy precipitation over central Europe and the role of atmospheric cyclone track types”. In: *International Journal of Climatology* 38 (2018), e497–e517.

[5] Ian D Phillips and Glenn R McGregor. “The utility of a drought index for assessing the drought hazard in Devon and Cornwall, South West England”. In: *Meteorological Applications* 5.4 (1998), pp. 359–372.

[6] Muhammad Rahiz and Mark New. “Spatial coherence of meteorological droughts in the UK since 1914”. In: *Area* 44.4 (2012), pp. 400–410.

[7] Faize Sariş, David M Hannah, and Warren J Eastwood. “Spatial variability of precipitation regimes over Turkey”. In: *Hydrological Sciences Journal–Journal des Sciences Hydrologiques* 55.2 (2010), pp. 234–249.

[8] Jonathan Spinoni et al. “Meteorological droughts in europe: events and impacts-past trends and future projections”. In: (2016).

[9] J-P Vidal et al. “Multilevel and multiscale drought reanalysis over France with the Safran-Isba-Modcou hydrometeorological suite”. In: *Hydrology and Earth System Sciences* 14.3 (2010), pp. 459–478.