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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "The Climatology, precipitation types and atmospheric conditions of extreme precipitation events in western Turkey" *by* Bulent Oktay Akkoyunlu et al.

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In this study, precipitation characteristics (PCs) causing extreme precipitation events (EPEs) are mainly investigated for the western part of Turkey by using Lamb Weather Type (LWT) approach and Radar outputs. In addition to the usage of high spatial resolution meteorological network, the authors divided the PCs as sea-effect, cyclonic and convective EPEs by using methodologies based on LWT. The scientific point of view of this manuscript is really worth to evaluate and this manuscript should be accepted after some minor revisions given below.

-To explain the characteristics of the precipitation events, the usage of the LWT should

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be explained in more detail for the two different regions of Turkey

Thanks for your alert. In this study, we used objective version of LWT and in accordance with your suggestions, we added new figure (Fig. 1a) and we rearranged this part together with explaining the usage of LWT and its equations in the section 2.3.

-There are some deficiencies in discussion part of the study. I suggest to the authors focusing on different studies based on precipitation mechanism over Eastern Mediterranean Basin and discuss their results with the others.

According to yours and the other reviewers suggestions, we developed results section by adding new references and we discussed our results with the precious ones.

-Finally, I recommend to use radar outputs for some specific convective cases by using the movements of the precipitation bands to emphasize the topographical importance of the region.

You are right. We supported convectivity with radar by given an example related to 28 September 2015.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-29/nhess-2018-29-AC3-supplement.pdf

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2018-29, 2018.

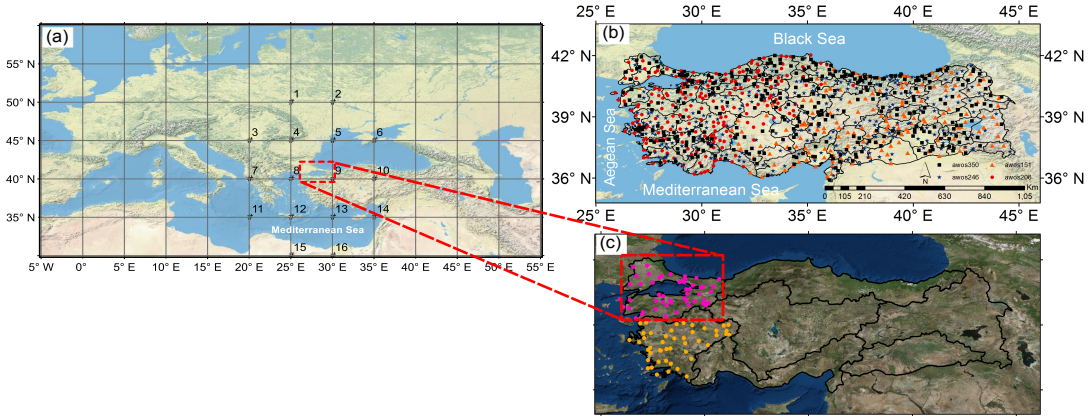

Figure 1. (a) The 16 MSLP grid points used in the Lamb Weather Type analysis. The dashed rectangle covers the Marmara Region. **(b)** The distribution of totally 953 automatic weather observing systems (AWOS) over Turkey depending on the four projects (AWOS 206, 151, 246 and 350) and **(c)** the locations of the 51 (pink points) and 47 (light brown points) AWOS stations, at Marmara and Aegean regions. Hourly precipitation data of these 97 stations were provided by the Turkish State Meteorological Service (TSMS) for the period of 2006-2015.

Fig. 1.

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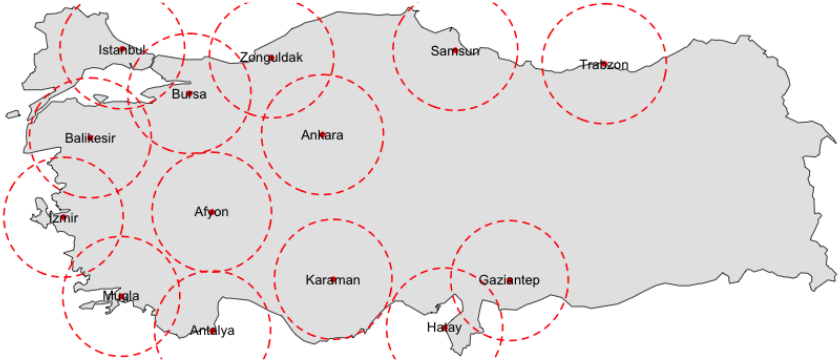

Figure 2. The distribution of 14 radar network over Turkey. Precipitation products of six radars (Istanbul, Bursa, Balikesir, Izmir, Mugla, and Afyon), which were taken from TSMS were evaluated manually to describe the characteristics of the precipitation types.

Fig. 2.

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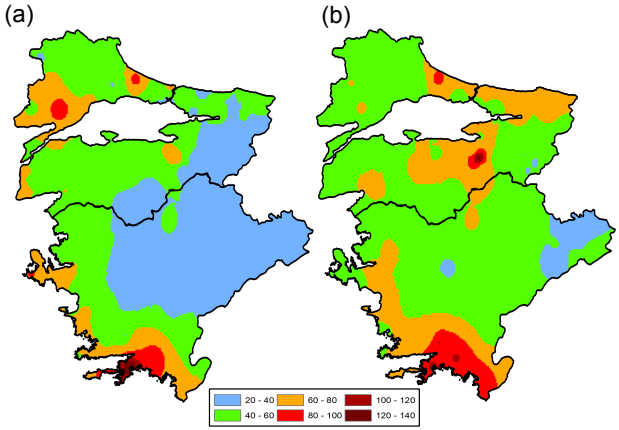

Figure 3. (a) Maps show the threshold values (in mm) of the stations during 2006-2015 when precipitation exceeded the 90th percentile generating an EPE. **(b)** the contribution of total EPs of a station to its annual mean precipitation (mm).

Fig. 3.

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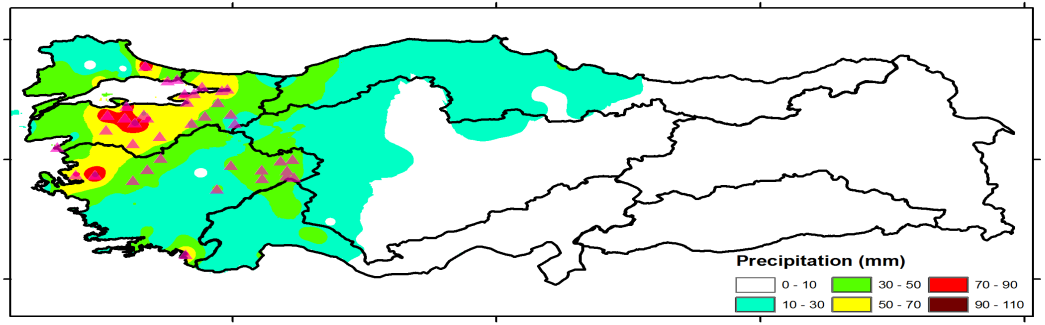

Figure 4. Daily total precipitation amounts over Turkey on October 28, 2010 (mm, in shaded) and the stations exceeding their 90th percentile threshold (triangle).

Fig. 4.

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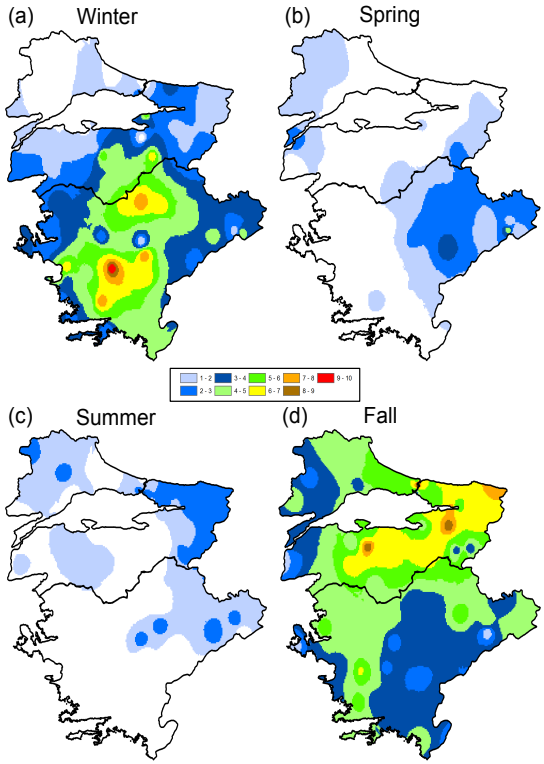

Figure 5. Seasonal distribution of the counts of the days for the stations when precipitation exceeded their 90th percentile during an EPE case for **(a)** winter, **(b)** spring, **(c)** summer, and **(d)** autumn seasons.

Fig. 5.

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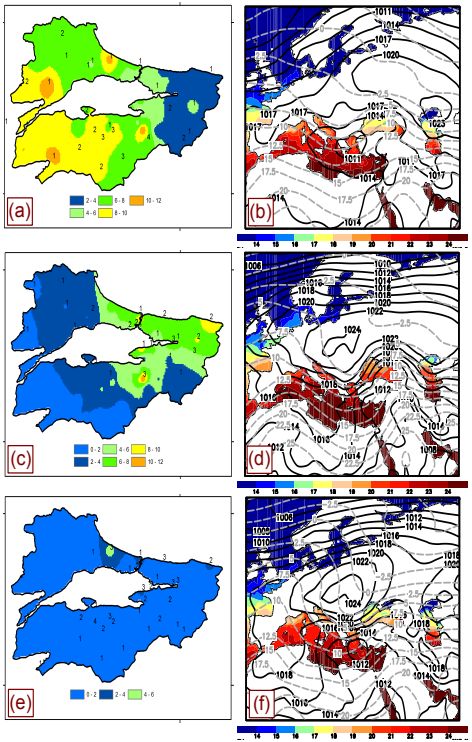

Figure 6. (a) Daily mean precipitation values of cyclonic precipitation types (mm, shaded) and the counts of EP days for the stations of Marmara during the autumn of 2006-2015. **(b)** Composites of the daily mean sea level pressure (MSLP, solid lines), sea surface temperature (SST, colored), and air temperature at 850-hPa (dashed lines) for the average of 18 extreme precipitation days over Marmara. **(c)** same as **(a)** but for the sea-effect (NE) precipitation types. **(d)** same as **(b)** but for the 14 extreme precipitation days. **(e)** same as **(a)** but for the convective (E) precipitation types. **(f)** same as **(b)** but for the 11 extreme precipitation days.

Fig. 6.

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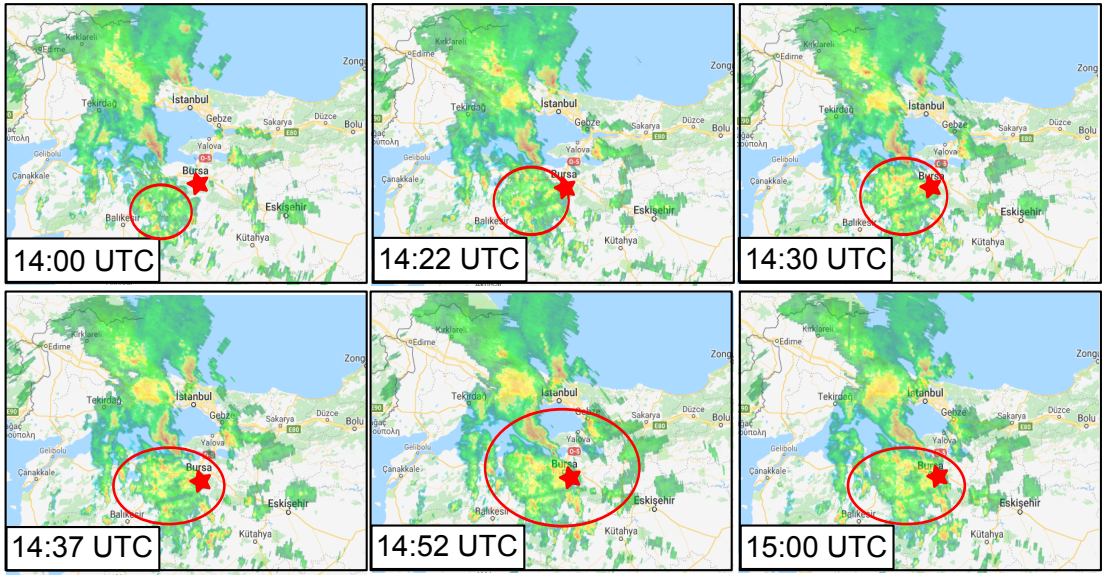

Figure 7. Balikesir radar PPI (Plan Position Indicator) image of the Marmara Region on 28 September 2015. Red star marks the Mt. Uludag.

Fig. 7.

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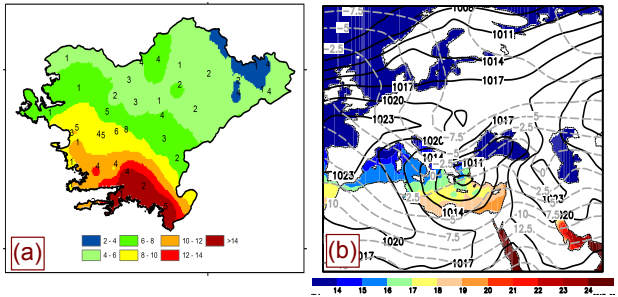

Figure 8. (a) Daily mean precipitation values of cyclonic precipitation types (mm, shaded) and the counts of EP days of the Aegean stations for the winter months during 2006-2015. **(b)** Composites of the daily mean sea level pressure (MSLP, solid lines), sea surface temperature (SST, shaded), and air temperature at 850-hPa (dashed lines) for the average of 35 extreme precipitation days over Aegean.

Fig. 8.

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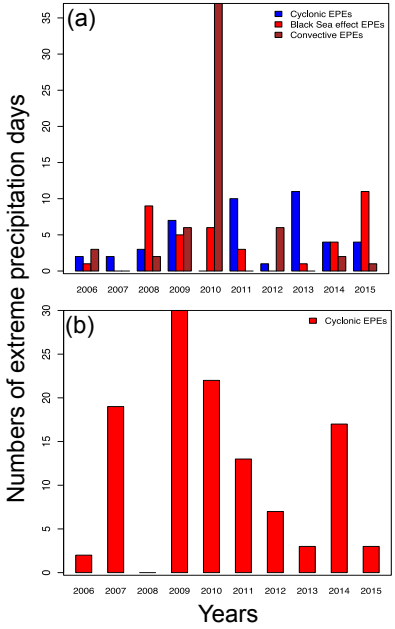

Figure 9. Annual distribution of the total counts of EPEs as well as precipitation characteristics for **(a)** Marmara in autumn and **(b)** Aegean in winter months.

Fig. 9.

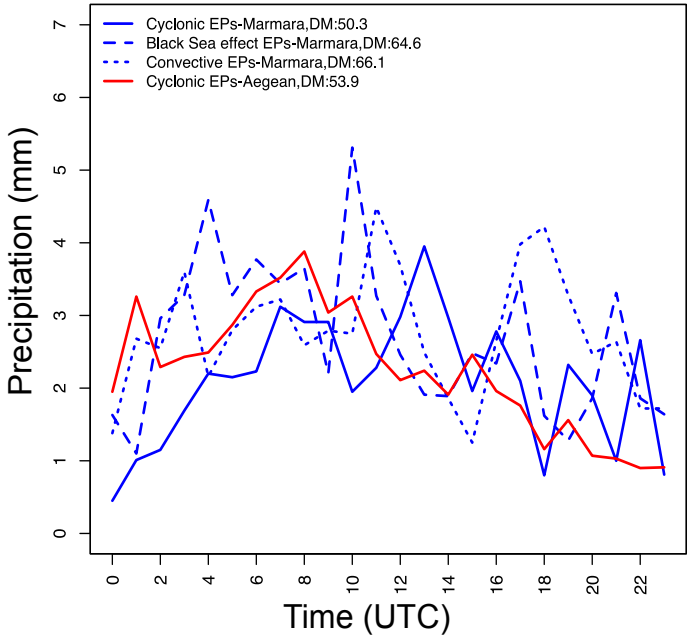

Figure 10. Average hourly precipitation amounts (mm) of EP days according to cyclonic, Black-Sea affected and convective types in Marmara for autumn and cyclonic EPs for Aegean in winter. DM indicates the daily mean precipitation amounts (mm) associated with the count of days ended-up with extreme precipitation.

Fig. 10.

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