Point to point response (in blue)

We wish to thank the reviewer for the valuable comments. Following your review, we add figure 11 and text as follows.

The publication has made great progress. In the current version, ingredients of deep moist convection are now discussed. Particularly promising is the fact that a high-resolution model can be used to analyse the floods. I therefore recommend another iteration of the review to include one more figure derived from the model.

1. Thermodynamic profile derived from the model

I recommend to include a representative vertical profile for this case, e.g. derived from the model. Are there characteristics of heavy rain events, like modest CAPE, skinny CAPE profiles (e.g. small negative values of LI), high relative humidity at mid levels, a deep warm cloud layer due to a low lifted condensation level and a freezing level high above the ground (e.g. 3 km), weak CIN, weak flow and expected slow storm motion? Recognition of the mentioned characteristics can improve forecasts of such events, together with the given large-scale analysis and the presented MKI maps.

AU: We added two vertical profiles based on the COSMO model output (new Fig. 11), one corresponds to the Tzafit flood and the other to the major rain center that hit Beit Shean. On each profile we drew a line denoting the adiabatic cooling of air parcel lifted from the surface. In both of them the CIN is negligible and the air parcel is considerably warmer than its surroundings throughout several kilometers. This reflects high CAPE values (>1000J/Kg) and implies high vertical velocity within the convective clouds. Moreover, as mentioned in the manuscript, the tops of clouds of the three precipitative centers reached -50°C. According to the temperature profiles over the study region during the storm, this implies that these cloud tops exceeded an elevation of 9000 m. This finding can explain the exceptional rain rates observed in the three major rain cells. These notions appear now in section 3.3 and mentioned in section 4. As for the weak flow, it is already addressed in the text through the wind map and the motion of the rain clouds.

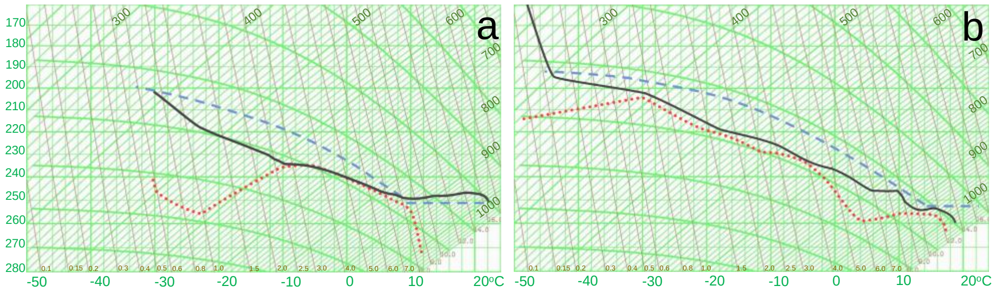

Fig. 11: Vertical profiles for (a) Tzafit (26 April 2018 0930 UTC) and (b) Beit Shean (26 April 2018 1230 UTC). The black lines denote temperature, the red dotted lines – dew point and the blue dashed lines show the adiabatic cooling of air parcels ascending from the surface.

2 .Convection initiation

It would be good to discuss the reasons that may have led to training storms over the southern location as shown in figure 9 (left). For example, due to the northerly low-level winds, there could be upslope flow at the southern end of the valley. Additionally, the developing mountain-valley circulation short after sunrise might have supported new storm development parallel to the mountain slopes at the western flank of the valley that led to the flood later at 9:35 UTC. It would add to the discussion of large-scale forcing.

AU: The upslope effect of the Tzafit valley on the rain cells imbedded in northerly winds is questionable, because the diameters of the precipitative elements (seen in Fig. 9a) are in the same order of the valley width from north to south. It could be identified in the integrated rainfall map (Fig. 9b), showing two pixels (of 2.5×2.5 Km) with the same maximum values: one in the bottom of the valley and other on the southern slopes. This signal seems too weak to be noted.

As for the mountain-valley circulation, we added it to the list of optional explanations for the Tzafit rain event in Section 4 as follows: "An optional factor that may explain the repetitive formation of rain cells north of Tzafit is a mountain-valley circulation (anabatic) uplift over the eastern slopes of the ridge that extends from Judean mountains southward (Fig. 1). This could be expected in light of the clear skies prior to this event, but did not find any signature in the output of the COSMO model".