Review of 'Oceanic moisture sources contributing to wintertime Euro-Atlantic blocking' by Yamamoto et al. submitted to Weather and Climate Dynamics

General comments:

This is my 2nd review of this paper. The authors have responded to my previous comments satisfactorily apart from one that I have revisited below (comment relating to line 352 of the paper) and the language glitches that were present have been mainly removed. I have one remaining more major comment, but the rest are minor. This is an interesting paper on a topical subject and will be a nice addition to the WCD journal.

Major specific comments:

Section 4.3 In this section the proportion of the moist particles that satisfy the ascent criterion for being within a warm conveyor belt is calculated and the moisture sources of these particles determined. I don't find this section very useful and it is potentially misleading because the constraint that all the particles must end in a block (they are back trajectories from blocks) seems to have been forgotten. As an example, figure 11 is labelled as showing WCB occurrence and moisture sources. However, it more precisely shows the occurrence and moisture sources of the WCBs that terminate in blocks. This will be a subset of the full set of WCBs as, although most WCBs ascend into developing ridges, most of these ridges are unlikely to meet the blocking criteria used. Also, as noted in the text, unlike in Madonna et al. (2014) the particles identified as belonging to WCBs have not been constrained to be near cyclones meaning that some of the particles are likely to have been mislabelled as being in WCBs. Due to these limitations this section could be removed. At the very least the fact that Fig. 11 is only representative of a subset of WCBs (and also may include some particles that are not within WCBs) needs to be clearly pointed out both here and where the result is revisited in the conclusions (L448).

Minor specific comments:

Introduction, L45 It might also be worth mentioning that block onset has been shown to be sensitive to the forecast location and intensity of upstream cyclone (https://doi.org/10.1175/MWR-D-18-0226.1) which is linked to the importance of cyclones WBCs for block onset.

L126 Here you have added that "An additional criterion has been applied such that PV along the particles must remain below 2 PVU . . . in order to exclude those particles that stay in the stratosphere.". I don't think this is quite what you mean as it implies that there should be no particle PV values exceeding 2 PVU at any time. In Fig. 5 it is clear that PV does exceed 2 PVU for some particles. I think what you mean, based on your response to reviewer 1, point 2, is that have removed particles for which the PV exceeds 2 PVU throughout the tracking period.

Consistency between Figs. 3, 4 and 7 In Fig. 3 the contours of heat flux values are very small (maximum 0.1 Wm-2) whereas the heat flux values in Fig. 4 are about 40 Wm-2. From the explanation that has been added to the caption in Fig. 3 this seems to be due to the way the heat fluxes have been calculated in Fig. 3, particularly the division by the number of moist particles. I don't understand why the values are so small though. Fig 7 also shows total LHF along the moist particles (although split according to oceanic basin origin). Here the values are upto $\sim$9 Wm-2. The explanation of the relationship between the LHF values in these three figures needs to be improved.

Fig. 9 The three-dimensional averaged trajectory locations show a maximum pressure (at the start of the averaged trajectory) for the Pacific and Atlantic particles of about 800 hPa. Fig. 8 also shows this result. Presumably the reason that the averaged trajectory doesn't get down to into the boundary layer is because the particles are in the boundary layer at different times along the trajectory. This would be worth mentioning.

L352 You have added some text here in response to one of my earlier comments. However,it doesn't address my point that in comparing with the Madonna et al. (2014) you are not comparing like-with-like. Madonna et al. started forward trajectories at "all" lower tropospheric locations and found that a tiny (but important) 0.36% could be identified as WCBs. You are instead calculating what percentage of the moist particles that end up in blocks at 7000-8000 m asl can be identified as WCBs. Hence you have already inbuilt an ascent criteria by requiring the particles to travel from the boundary layer where there is positive LHF to this altitude (and also made it likely that many of these particles are likely to be in WCBs by requiring that they end in a block). It simply doesn't make sense to compare values.

L424 At the start of this conclusions section it would be helpful to readers to clarify that when you say that the particles are "released" from blocks you are calculating backwards (rather than forwards) trajectories. Also when you say that "with the moist particle percentages decreasing with altitude" you mean the altitude that the particles release altitude.

L160 The additional calculation of the dry and moist particles percentages for particles that travel ascend to the release altitude (n.b. backwards trajectories) from the boundary layer but are not associated with blocks is useful. The differences in the percentages compared to those for particles that are released in blocks is small although the statistical test indicates that they are different. Presumably the reason that the differences is small is due to the fact that may of these non-blocking particles are ascending into ridges that don't meet the blocking criteria. So what this study is telling us is the development and maintenance of blocks, rather than non-stationary ridges, is more likely if the particles that end up within them pick up a lot of moisture from the oceans. I suggest pointing out that distinction between blocking and non-blocking particles will be dependent on your blocking criteria and that non-blocking particles may well be ending up in a ridge that doesn't quite meet your blocking criteria (so leading to the relatively small differences in the percentages of blocking and non-blocking dry and moist particles).

Technical errors:

L130 "we" should be "as".

Fig. 4 caption This seems to repeat itself. You say that it shows information for "moist particles above the marine PBL or within/above the PBL over land, including those moist particles that are located within the PBL over land".

Caption fig. 3 Change "indicating the average LHF contributing" to "indicating the average SHF or LHF contributing"

L221 Change "averaged" to "averaging".