Review of "On the role of moist and dry processes for atmospheric blocking biases in the Euro-Atlantic region in CMIP6" by Dolores-Tesillos et al.

General comments:

This study investigates the representation of atmospheric blocking in eight CMIP6 models and relates negative biases in the blocking frequency in the Euro-Atlantic region to biases of the background flow, dry dynamics and moist diabatic processes. They show that a too zonal and equatorward shifted background flow and an underestimation of the WCB outflow in the central and eastern North Atlantic contribute to the underestimation of the blocking frequency.
The results are very interesting, the method is appropriate, the paper is well written, and the storyline is clear. Most of the below comments can be addressed with some additional explanations and rewording.

Major comments:

1) You argue that the too zonal and too far equatorward flow explains the negative blocking bias, but couldn't it be the other way around, i.e., that the negative blocking bias leads to a too zonal and too far equatorward flow?

2) I would find it helpful if you could discuss in more detail the limitations of using a machine learning method to identify WCBs in climate models. Which additional biases could arise from this method? Maybe you could also discuss in some more detail the differences between the WCBs identified with ELIAS2.0 and those identified by Joos et al. 2023 based on trajectory calculations. Furthermore, in Section 3.4 it would be helpful if you could add more details on how the ELIAS2.0 WCB identification method works.

Minor comments, wording and typos:

3) Lines 58-59: "however, this link is found when applying anomaly block indices" – I have difficulties to follow here, can you explain what you mean?

4) Lines 70-71: I would move the reference to Schemm, 2023 to the end of the previous sentence.

5) Line 73: Shouldn't it be downstream "of"?

6) Section 2: Could you briefly explain how Palmer et al. (2023) quantify the ability of the models to represent blocking frequency? Without having read this paper, I find it confusing that in Table 1 the models termed unsatisfactory are regarded as being adequate. Also, could you motivate a bit better why you excluded CMIP6 models with inadequate blocking representation from your analysis? In which regard are they inadequate? It would be interesting to know whether they exhibit the same biases as the ones you are investigating, did you look into this a bit?

7) What do the abbreviations in the third column of Table 1 (Member) stand for?

8) Line 110 and references: Marco Rohrer et al. should be Rohrer et al.

9) Line 125: "featuring a Rossby Wave breaking" – I don't understand what you mean here.

10) Line 156-157: "the" is missing before Madden-Julian Oscillation and "a" before WCB.

11) Line 168: delete "the" in front of ERA5

12) Caption Fig. 2: I assume that for the zonal wind the mean is shown and not the mode, but it is not specified in the caption.

13) Line 200: "north Atlantic" should be "North Atlantic". And I would always write "North Atlantic" and not just "Atlantic" (e.g., lines 203, 216, 265, etc.).

14) Figs 2c,d and lines 204-205 and Figs. 2: How can it be interpreted that the highest dZ/dy of the mode and of the mean over western Europe are located in different regions?

15) Line 205: "South Europe" should be "Southern Europe"

16) Line 225: I assume you mean Fig. 2?

17) Fig. 4: e,d in the third line should be e,f

18) Line 270: "see green contour farther to the black …" This part of the sentence is difficult to understand, consider rephrasing.

19) Line 281: According to Fig. S1f in Joos et al. 2023 there aren't any strong biases in the WCB outflow over eastern Europe, but rather over western and central Europe and the eastern North Atlantic.

20) Line 288: "ascending trajectories by the WCB activity" – strange wording, I would just write "ascending WCB trajectories"

21) Why do you discuss Fig. 5 at the end of Section 5 and not already in Section 4.3? I would find it easier to follow if you showed these results before the discussion in Section 5.

22) Fig. 5b: Why is the eddy heat flux maximum located north of the WCB inflow maximum?

23) Line 313: misrepresenting – better: misrepresented

24) Line 369: which yellow region do you mean?