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Interactive comment on "An update of IPCC climate reference regions for subcontinental analysis of climate model data: Definition and aggregated datasets" *by* Maialen Iturbide et al.

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Along the next lines, the different comments posed by the reviewer SC1 are reviewed point by point.

Comment: The new system of regions has many good features, and improves upon the previous system in many ways, well done.

Response: We thank the referee for the time devoted to review our manuscript, and the positive feedback provided.

Comment: I have a specific comment about the regions for Australia. Currently the

scheme includes three regions for Australia: north (NAU), central (CAU) and south (SAU), with each zone covering the breadth of Australia. In my judgment, this doesn't reach a useful classification, since these zones don't form meaningful boundaries in terms of the current climate, or the projected climate change signal in temperature, rainfall and extremes. In particular, the CAU zone includes both the hot, persistently dry desert interior of the continent, and the subtropical east coast (see Figure 1 below). These are climatically very different regions in the current climate. For projected climate change, the signal is different in the two regions for some variables (e.g. currently the CMIP6 multi-model mean projected change for winter rainfall is for increase inland and decrease on the east coast). Along with climatic reasons, there are practical reasons for distinguishing these two sub-regions. A large segment of the Australian population lives on the east coast, whereas the interior is very sparsely populated, so it is not useful to provide information that averages the current climate and climate change projections over the east coast and inland. I would like to propose two possible solutions to the current proposed system (Figure 2a) for your consideration. First is the inclusion of a fourth region for Australia, eastern Australia (EAU), resulting in a system similar to the four broad regions used in the Australian national climate projections (Figure 2b). The second solution is to adjust the boundaries of the three regions to include the northern part of the east coast into NAU, and the southern part into SAU. The border between NAU and SAU at the east coast can be the boundary between subtropical and temperate zones (approximately the NSW-Queensland border).

Response: Thank you for your comment and for the detailed motivation for the change proposed. In the original manuscript we already mentioned that (page 5, lines 28-29) "The possibility to include a new region for eastern Australia to treat separately this wetter region was also considered, but was not implemented due to the limited size of the resulting region". We agree with the reviewer on the need to separate central and eastern Australia and have revisited the idea of including a new region for Eastern Australia (EAU) following the referee's suggestion 2b in Figure 2 and a similar suggestion from another reviewer (SC2, see Fig. 1). We have checked the size of the

proposed region and it is bigger (it contains over 20/100 gridboxes for 2°/1° resolution) than other regions included in the original proposal. Therefore, EAU will be included as an additional region in the revised manuscript.

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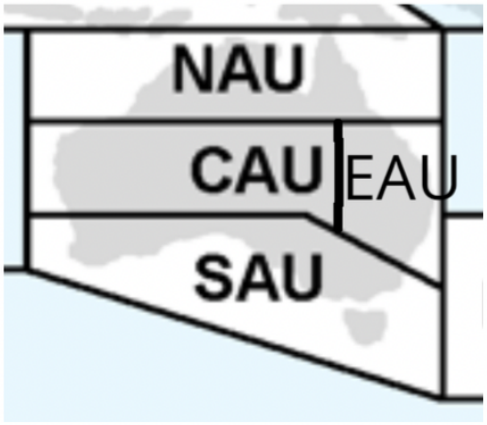

Fig. 1.