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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Climatic and extreme weather variations over Mountainous Jammu and Kashmir, India: Physical explanations based on observations and modelling" *by* Sumira N. Zaz et al.

Anonymous Referee #1

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Grammar throughout very poor, I suggest that subsequent revisions of the manuscript are proofread by a native speaker of English.

L49-50: This sentence is weirdly structured, and at any rate probably not necessary.

L58-60: These sentences need support from references: Dimri's 2015 review (doi:10.1002/2014RG000460) and Hunt et al 2018a (doi:10.1175/MWR-D-17-0258.1) would be good places to start.

L62: A reference to WD seasonality would be useful for the reader. Hunt 2018b (doi:

10.1002/qj.3200) has such a climatology, as do many studies by e.g. Dimri.

L67: You introduce the abbreviation PS here, but then don't use it again until the conclusion (where you reintroduce it anyway). I would remove it.

L72: PV is not necessarily conserved on isobaric surfaces.

L77-92: This entire paragraph has no references. Consider e.g. Rasmussen and Houze 2012 (doi: 10.1175/BAMS-D-11-00236.1), Romatschke and Houze 2011 (doi: 10.1175/2010JHM1311.1), Houze and Rasmussen 2016 (https://atmos.washington.edu/MG/PDFs/Houze-etal_Uttarakhand-Flood.pdf), Martius et al 2012 (doi:10.1002/qj.2082) and references therein.

L98: Dee et al 2011, not 2001.

You introduce the idea of WDs being important for the kind of events considered in the study, which then goes on to look at observed climate change. Why not include a short discussion on previous work that looks at the relationship between the two? E.g. Das et al 2002 (Current Science), Shekhar et al 2010 (Annals of Glaciology), Kumar et al 2015 (Atmosfera).

L186: Link incorrect.

Tables 1 and 2: This is not the correct way to perform statistical tests. You must decide on a null hypothesis, a sensible confidence value for significance testing, and then determine whether the evidence is sufficient to reject the null hypothesis at the selected confidence level. No doubt your results are significant, but you must not present them like this. If you feel the reader will benefit from these details, I will consider accepting a table of p-values, so long as the usage is clearly justified in the text.

L223-238: Lots of spaces between words seem to be missing (true throughout the manuscript but especially bad here).

Tables 4 and 5 are rather massive. I'm confident that you can substantially reduce

them in size by omitting data of low relevance, or otherwise they should be demoted to supplementary.

L273: 42 mm per what? Season?

Fig 2: Text in subfigures is too small to read. Perhaps it would be clearer to present the orography in grayscale, and then have the cross colours related to the temperature changes. Text sixe fine in Fig 3, but the other point on clarity still applies.

L291: You should state whether these correlation coefficients are significant.

L300-307: What does this paragraph (and associated figure) add to the discussion? If the purpose is to show that WRF well captures the climate features of the region, then you should state that and the implications. Personally, I think it could be removed.

L327: It is convention to refer to this as the 1997-98 El Nino

L350: Also Dimri and Dash 2012 (doi: 10.1007/s10584-011-0201-y)

L367: You say the rate of warming has been especially high in the last forty years and then have two references to twenty-year-old papers.

Fig 4: Why are some of the data smoothed and others not?

L406: And Lau and Kim 2012 (doi: 10.1175/JHM-D-11-016.1)

The first and third paragraphs of Sec 4.5 (though you have it labelled as 4.3) might be better placed in the introduction, but I will leave this up to the authors.

Fig 6: Difficult to tell the lines apart, could you use colour? At present, it is difficult to distil any useful information from this. This analysis could benefit from including discussion of western disturbance frequency, if possible.

L466: “due to the effect of climate change” – how have you deduced this?

Fig 13: 700 hPa is quite a low level to be looking at Rossby wave activity, what is the structure at higher levels?

L446-532: I feel that the text in this section is overly explicit, and could be easily reduced for improved readability.

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