Answer to Hailong Wang

Comment:

Thank you for submitting the revised manuscript. While all the comments and concerns from both referees are addressed, I found the use of units (mm/day or mm/h) for total precipitation in the study domain is confusing, for example, in Figures 4-8, Table 1 & 3 and the main text. It appears to be a sum of the precipitation rate in all grids within the domain, which I don't believe is often used for total regional precipitation. It might need to be converted to total mass of water with the area information included in the calculation. Please revised the figures, tables, and text accordingly.

Answer:

Dear Hailong Wang,

we greatly appreciate your comment. As far as we know, the specification in mm/h or mm/day over a larger area is a common method. We specifically screened the literature relevant for our topic and found that Boisvert et al., 2018; Gimeno et al. 2015; McCrystall et al., 2021; Rüdisühli et al., 2018; Viceto et al., 2022, (all cited in our manuscript), Pithan and Jung (2021), Boisvert et al. (2021), as well as the Atmospheric river studies by Gimeno-Sotelo et al. (2018, 2019) use the same units for precipitation as in our study. The only exceptions were the studies carried out by Richard Bintanja where the amount of precipitation is multiplied by the area to get the unit km^3. Since most publications use the unit mm/h or mm/day and also none of the reviewers addressed this point we would prefer to keep the unit in our study as it is.

Sincerely
Melanie Lauer – in the name of all authors

New references:

Boisvert, L., Grecu, M., & Shie, C. L. (2021). Investigating Wintertime GPM-IMERG Precipitation in the North Atlantic. *Geophysical Research Letters*, *48*(20), e2021GL095391. DOI: 10.1029/2021GL095391

Gimeno-Sotelo, L., Nieto, R., Vázquez, M., & Gimeno, L. (2018). A new pattern of the moisture transport for precipitation related to the drastic decline in Arctic sea ice extent. *Earth System Dynamics*, *9*(2), 611-625. DOI: 10.5194/esd-9-611-2018

Gimeno-Sotelo, L., Nieto, R., Vázquez, M., & Gimeno, L. (2019). The role of moisture transport for precipitation in the inter-annual and inter-daily fluctuations of the Arctic sea ice extension. *Earth System Dynamics*, *10*(1), 121-133. DOI: 10.5194/esd-10-121-2019

Pithan, F., & Jung, T. (2021). Arctic amplification of precipitation changes – The energy hypothesis. *Geophysical Research Letters*, *48*(21), e2021GL094977. DOI:10.1029/2021GL094977