We acknowledge Jonathan Holmes and the anonymous referee for their reviews and constructive comments that helped to improve this manuscript. We have revised it as described in detail below, and we hope that we have dealt with all suggestions in an adequate manner. For the corrections, we provide page and line numbers from the revised manuscript with track changes. The references cited can be found in the manuscript.

Referee 1 (Jonathan Holmes)

General comments This manuscript describes the enhanced isotope-enabled version of the MPI-ESM Earth-system model. Climate models associated with isotope diagnostics are becoming more common. They are an increasingly important component of the palaeoclimatological 'toolkit'. Given prevalence of isotopic proxies within palaeoclimate archives and the difficulties that are often associated with converting palaeoclimate proxies, including those based on stable isotopes, into estimates of temperature and precipitation, it makes sense to equip the models with isotope diagnostics rather than attempt to cover the proxies into more 'traditional' estimates of palaeoclimate. Comparison of different isotope-enabled models is well established through the Stable Water Isotope Intercomparison Group (Phase 2 - https://data.giss.nasa.gov/swing2/). Comparisons of isotope records from marine, ice core and terrestrial archives with output from isotope-enabled models have been completed for the present and past (see, for example, Sturm et al., 2010; Werner, 2010; Jones and Dee, 2018). Detailed descriptions and performance evaluations for new or enhanced models are important, hence this MS is well suited to CoP. The paper is well structured and generally well argued and written. I have a few specific comments on the content as well as some minor suggestions for improvement in the language, which are detailed below.

The authors begin with a well-reasoned account of the rationale behind isotope-enabled models. They then describe the isotope-enabled MPI-ESM model in some detail, along with the results of simulations for the pre-industrial and mid Holocene (=6ka) intervals and the modern-day and paleo-water isotope datasets used for model evaluation. They finally examine pre-industrial – 6ka differences in the data and in the model and compare spatial and temporal gradients in the atmosphere and oceans, which have particular relevance to the interpretation of paleo-isotope records.

I have general familiarity with isotope-enabled models, but do not have the technical expertise to be able to comment in detail on the model setup and simulations: I focus instead on the data-model comparisons.

Specific comments Page 2, line 30-32. You could also cite Pfahl and Sodemann (2014), which you cite elsewhere, and also Fröhlich et al. (2002), which additionally lists moisture recycling and evaporation of falling raindrops as controls on the deuterium excess. Also, isn't d a more usually symbol for the deuterium excess?
We added these references (p3, lines 5-6). Concerning the symbol for the deuterium excess, it is true that we find in the literature d or d-excess. We choose the second one for more clarity. We also changed the figure 4 accordingly.

Page 3 line 35 – page 4 line 4. You could add reference to the freshwater hosing experiments in HadCM3 (Tindall and Valdes, 2011) and the comparison of the results of those experiments with palaoe-isotope data from lake sediments (Holmes et al., 2016).
We added these references (p4, lines 7-9).

Section 2.3 Observation data. How representative of pre-industrial conditions are the observation data? The ocean water and GNIP data are certainly not pre-industrial: the speleothem data span the pre-industrial and the post-industrial period. None of the datasets could are exclusively pre-industrial. While this may not be a problem, the authors should at least discuss the mismatch and any implications.
It is true that this difference of climate state between the observations and our model results should be discussed. For the ocean, we do not expect big changes between pre- and post-industrial values because of the inertia of the system (p8, lines 32-34). Concerning the atmospheric GNIP data, our modeled temperature values could be lower than in the case of a present-day simulation. Of course, it means that our $\delta^{18}O$ values are maybe lower because of this different climate state. However, it would probably not significantly change the relationship between the water isotopes and the temperature (or precipitation) (p8, lines 23-26). For the SISAL speleothem data, the use of an extended modern baseline (1850–1990 CE) increases the data uncertainties by only ±0.5 ‰ (Comas-Bru et al., 2019) (p9, lines 13-14). We added these statements in the section 2.3 Observational Data.

Page 13 Line 24 – rephrase, as it appears that low values are found both in dry and in humid regions if I interpret your results correctly.
Ok (p15, lines 1-3): 'Lowest values are found in dry regions like the southern Sahara between the latitudes 25° N and 10° N, Oman and Rajasthan (India) as well as over the Southern Ocean (between 2 and 6 ‰), which is…'

Page 13 Line 24 – Rajasthan (India)
Ok (p15, line 2)

Page 14 Line 19 – Not clear what you mean by 'on one side'
We removed this expression for more clarity (p15, lines 23-24).

Page 26 Line 3 – Isn't this quite surprising given that most rainfall occurs in summer in such regions?
As you can see in the figure 5 of the manuscript, the 6k-PI JJA average anomaly in precipitation over the African monsoon is more than 2 times bigger than the 6k-PI annual mean change in precipitation over the same area. For the $\delta^{18}O_p$, the difference between the JJA and annual mean anomalies is much smaller because these values are precipitation-weighted. It explains why we obtain a steeper mean $\delta^{18}O_p$- precipitation gradient ($\Delta\delta^{18}O_p/\Delta P$) with the annual mean values than with the JJA ones. This result is in agreement with the findings of Risi et al. (2010b). We added this explanation in the manuscript (from p26 line 16 to p27 line1).

Page 27 Line 1-2 – isn't there a similar pattern, but not as well expressed, in the Arabian Sea?

Yes, the runoff is also enhanced during 6k in this area. We added the following sentence in the manuscript (p27, lines 17-18): '… period (Section 3.2.2). This pattern, even if it is not as well expressed, is also visible in the Arabian Sea. The average…'

Technical corrections General The authors make common use of phrases that would undoubtedly disturb isotope 'purists': examples include 'depletion in isotopic composition' (p1, line 19), 'depleted isotopic values' (p1, line 22 and elsewhere), 'depletion of delta18Op' (p10, lines 9 and 11, and elsewhere) amongst others. I know that opinion is divided over such terminology and that some authors regards its use as heretical, whereas others regard such authors as puritanical pedants. I leave it to the present authors and editor to decide in this case. Table 2.1 in Chapter 2 of Principles of Stable Isotope Geochemistry, 2nd Edition, by Zachary Sharp (available for free download at https://digitalrepository.unm.edu/unm_oer/1/ provides careful guidance in case the authors wish to follow the purists, or should the editor compel them to do so!
We did our best to follow these recommendations. Especially, we corrected all along the text the expressions implying the words depleted/depletion and enriched/rich.

Specific Page 1 Line 12 and passim 'In link with' is a slightly strange phrase – 'linked to' would be better.
Ok

Page 4 Line 12 '. . .seasonal changes in insolation. . .' perhaps?
Ok (p4, line 21)

Line 15 Which part? The Monsoon domain? Clarify.
'So, the mid-Holocene is characterized by an enhanced seasonal contrast in the Northern Hemisphere with warmer summers in this part of the Earth, and by a strengthening of the African, Indian and Asian monsoons.' (p4, lines 23-25)

Line 21 'near-surface air temperature' Also 'ocean salinity'
We guess you mean line 31. It's corrected (p5, line 7).

Page 7 Line 28 '...are both at 0‰
Ok (p8, line 3)

Page 13 Line 24 'are found' rather than 'happen'
Ok (p15, line 1)

Line 31 'distinguish between' rather than 'distinct the'
Ok (p15, line 9)

Page 18 Line 12 Taylor
We suppose that you mean Talos instead of Talos Dome, done (p19, line 5).

Line 14 Siple Dome
Ok (p19, line 7)

Page 19 Line 18 ‘(not shown) is. . .’
Ok (p20, line 14)

Page 23 Line 21 ‘. . .a higher’
Ok (p25, line 6)