We thank the Reviewer for their positive comment and careful review, which helped improve the manuscript. Please find our answer to comments in blue as well as suggested text changes in green.

Significance and relevance

This manuscript refers to the penultimate deglaciation* (time interval of 13000 years; from 140 to 127 thousands of years before present, 140k-127k). The authors provide a thorough compilation –although they designate their effort as a 'non-exhaustive selection'– of their own previously published work, with records already worked and published by others. Their work has key contributions in North Atlantic meltwater flux possible scenarios and discussion on sea level and proxy record chronologies, which appear to be published here for the first time (documented in supplementary material). While this may not appear to be very exciting to an informed reader, in the case of the penultimate deglaciation, an effort such as this is not only laudable but very necessary. Reading the manuscript, the amount of information available for the period in question may seem accessible. However, until very recently, the penultimate deglaciation was a kind of messy interval, due to chronological issues and the lack of resolution in proxy records. When working at decadal-to-centennial time scales, these circumstances were preventing any precise characterisation of triggers, including modulation of a sustained deglaciation a signal, amplification –e.g. through ocean, sea/land ice, vegetation feedbacks– and globalisation –e.g. through sea level rise.
* I'd suggest keeping the designation as "penultimate deglaciation" as far as possible, rather than "termination II" or "TII" or "T2" [as mentioned in the Introduction]; the latter seems restricted to a very technical, specific aspect of the wider climate it is intended to characterise.

We thank the Reviewer for their positive comment and for putting our work into context. In the revised manuscript we have taken out the term "Termination II". We are now only referring to the penultimate deglaciation with the acronym "PDG".

And p4, L26:
"The penultimate deglaciation (~138-128 ka, referred here as PDG), which represents the transition between the penultimate glacial period (MIS 6, also referred to as Late Saalian, 160-140 ka) and the LIG (also referred to as MIS 5e in marine sediment cores) (Govin et al., 2015),"

Categorizing the paper
In this study, experiment protocols for transient simulations of the penultimate deglaciation [orbital, Berger1978, greenhouse gases, from Petit1999 to Köhler2017, ice-sheets, from Tarasov2012 to Briggs2014; sea level, from Stein1993 to Grant2014, bathymetry, orography and fresh-water] together with comprehensive characterisation of paleodata for continental climates [Antarctica and Greenland ice cores, Corchia cave, Chinese caves and loess, Monticchio and Ioannina lakes] and oceanic environments [Red sea sites, ODP984, ODP983, ODP980, MD95-2010, MD95-2042, MD01-2444, ODP976,

SU90-03, U1308, CH69-K09, ODP1063, MD02-2488] do conform a complete manuscript that should certainly be of interest to the reader.
Both science and presentation (TEXT, 9 FIGURES and 4 TABLES; 5 SUPPLEMENTARY TABLES) are sound.

We thank the Reviewer for their positive comment.

Organisation and length of the manuscript are satisfactory
The protocols contain sufficient detail. The main technical notes have already been addressed by REV1. Additional comments improve important aspects (greenhouse gases by P. Köhler and sea level by K. M. Grant). Authors have prepared the profiles on the most updated compatible time scales available (WD2014, AICC2012, Corchia2018, etc [see below]). Interpretations and conclusions are justified by data. The manuscript requires hardly any improvement and my overall recommendation is that the subject merits publication with only minor revision. Below are a few suggestions, grouped in four aspects:

1. Appropriateness. Is the subject suitable for publication in CP?, or GMD?
Authors have clear objectives when working on the subject of the penultimate deglaciation: as part of the Past Global Changes (PAGES)- Paleoclimate Modelling Intercomparison Project (PMIP) working group on Quaternary Interglacials, (i) they are setting up a protocol to perform transient simulations of the penultimate deglaciation under the auspices of PMIP, phase 4; (ii) their efforts are unbeatably connected with the "PMIP4 working group on the last deglaciation" in the short term and (iii) they are ultimately promoting a "DeglaMIP working group" in the long term (for the next phase of the Coupled Model Intercomparison Project (CMIP)? Following the publication of Ivanovic2016, at least four co-authors (R.F. Ivanovic, L.J. Gregoire, M. Kageyama, L. Tarasov) form part of the deglaciation PMIP working group to coordinate efforts to run transient simulations of the last deglaciation. Additionally, one of executive editors of the GMD journal, D. M. Roche, would appear to be interested in ensuring that this "penultimate deglaciation" initiative is well channelized through the PMIP, and maybe CMIP? One of the co-authors of the current study (M. Kageyama) is coordinating the special issue 'PMIP4 [Climate of the Past (CP)/ Geoscientific Model Development (GMD) inter-journal SI]' for which the manuscript is intended. In my view, this special issue is an ideal framework for the study. In this regard, the subject would be suitable for CP (for their compilation of variability in geological archives to describe the past time interval in question, from 140k to 127k). However, my advice would be, in the benefit of both authors and readers, that the manuscript be definitely transferred to the GMD journal format (designed for public discussion of description, development, and evaluation of numerical models of the Earth's system and its components, including project protocols).

The manuscript will be withdrawn from Climate of the Past and a revised version will be submitted to Geoscientific Model Development.

As a separate, technical note: In the Acknowledgment section, the acronyms for authors PCT and RFI do not fit exactly with any author, at least as referred in the author list as it stands now under the title.

Names in the author list have been amended.

2. Cooperation between modellers and data producers/curators, for chronologies and details in particular

There have been previous efforts to simulate the complete interglacial sequence or part of it. The authors correctly identify them [e.g. Bakker2013, Loutre2014, Goelzer2016, Otto-Bliesner2017, Stone2016] because they have undeniable knowledge on the subject. It is not the first time they have worked on deglaciations [e.g. Menviel2011, Menviel2018, Capron2014, Capron2017; Govin2015] and about fifty percent of the authors have direct experience with PMIP4-CMIP6 protocol papers featured in the above special issue [e.g. for the past1000 [Jungclaus2017], midHolocene and last interglacial lig127k [Otto-Bliesner2017], lgm [Kageyama2017], and midPliocene-eoi400 [Haywood2016]. The novel aspect of their current efforts is to merge this previous knowledge in order to have an accurate evaluation of uncertainties and limitations when describing environmental changes of the penultimate deglaciation. Thus, this manuscript is an example of PMIP as a forum for discussion of experimental design and appropriate techniques for comparing model results with paleoclimate reconstructions.

Some brief notes:
Tables S1 and S2 A manuscript in prep. [Drysdale, R., et al., Phasing between North Atlantic sea-surface temperatures and the intensification of the East Asian monsoon across Termination II, In Prep, 2018] for the Corchia speleothem in the Mediterranean is referred to for the time-scale of sites in the North Atlantic and Western Mediterranean. If the paper in not publically available at the time the present manuscript is published, I'd suggest that authors remove the reference in preparation and point to a different reference already peer-reviewed. For instance, are the age models going to change significantly from the chronology available in the recent publication Tzedakis2018, NATURE COMM, 9(1): 4235? In any case, please update references and clarify.
We have removed the reference to the manuscript of Drysdale et al., in preparation and instead are pointing to Tzedakis et al., (2018).

"For this current study, we carried out high-resolution measurements of d18O and Mg across the TII section of CD3, and anchored the CD3 chronology to CC5 by synchronising their d18O profiles. This enabled the Mg series of CD3 to be placed on the U-Th chronology of the 2018 Corchia Cave stalagmite stack (CCSS18, Tzedakis et al., 2018). "

Figures 8 and 9 and Tables 3 and 4 The discussion about phases and chronological uncertainties is very interesting [i.e. values given are Corchia Cave records, 700 years (2σ); ODP976 up to 1600 years on average (Table S2), AICC2012 chronology, 4000 years (2σ), etc]. It is clear that the synchronisation and alignment efforts made to keep consistency will minimise these uncertainties and provide credibility to the reasoning behind Figures 8 and 9. For these figures, could the phases defined in Tables 3 and 4 be shown here somehow?
The phases will be added as bands of colour in figures 8 and 9.

Also I do not follow the meaning/significance of the letters above each record (from A to X) in Figure 9. Please clarify with appropriate explanations whether in the figure caption (perhaps not recommendable because they are complex enough) in existing Tables 3 and 4 or in an additional new table.

The letters [A] to [X] refer to the major changes identified in the paleoclimatic records obtained through RAMPFIT or BREAKFIT. This is indicated in the legend of Table 3. This sentence was also added to the legend of Figure 9 for clarity.

This study can help to dig into the details of the sequence of events under discussion, not only defining two periods, one of slow deglaciation (140k, 136k and 134k) and one of rapid deglaciation (132k, 130k and 128k), but the succession of the detailed environmental variables involved. Please make the connection of these environmental changes (designed with letters?) in paleo-reconstructions with the possible scenarios of the transient simulations/sensitivity experiments considered in the study in a way understandable to a wide audience.

In section 8.3, we have added some new paragraphs describing in more details the environmental changes occurring during the deglaciation:

"Little change occurs until the beginning of phase 1 at ~136.4 ka, after which a cooling phase is identified in a few records of the North Atlantic (Fig. 8 and Fig. 9a, major change [A]). This also corresponds to reduced monsoon activity as recorded in Chinese speleothems (Fig. 9d [M]), and the initiation of the Antarctic warming (Fig. 9h [W]).

The short-lived warming event in the North Atlantic associated with phase 2 (Fig. 9a [B]) is also identified in the Chinese speleothems as a slightly wetter interval (Fig. 9d [N]). Other environmental records might not have the necessary resolution to record this multi-centennial-scale event.

The main phase of HS11, corresponding to phase 3, is associated with meltwater input and cold conditions in the North Atlantic (Fig. 9a [C] and 9c [I]), dry conditions over Europe (Fig. 9b) and Asia (Fig. 9d, interval between [O] and [P]), and warmer conditions at high southern latitudes (Fig. 9f, h).

The end of HS11 (phase 4) associated with a pause in the meltwater input (Fig. 9c [J]) and progressively warmer conditions in the North Atlantic and southern Europe (Fig. 9a [D, F] and 9c [K]) corresponds to a strengthening of the Asian monsoon (Fig. 9d [P] and 9e [Q]), and maximum warmth at high southern latitudes (Fig. 9f [R, S] and 9h [X]).

Interglacial conditions in atmospheric CO2 and CH4 as well as North Atlantic temperatures and ventilation are attained at about 128.5 ka (Fig. 8), which is also associated with warm and wet conditions in southern Europe (Fig. 9b [G], and 9c [L])."

3. Long term perspectives: relevance for a wider audience

The penultimate deglaciation is a particularly interesting period to understand in view of projected climates for the current century. Given that the slow orbital parameter movements are not going to change significantly, out-scaled variables such as meltwater flux at high latitudes and greenhouse gas emissions are supposed to gain relevance. If a DeglaMIP working group is intended for the next phase of the CMIP, please give the reasons why this could be of relevance to a wider audience, including for example, wider considerations on the carbon cycle and dynamic vegetation (in particular connected with

precipitation patterns), and comments on why this deglaciation led to a period warmer than the present one, with sea level likewise well above the present one.

We are setting the context for a wider audience in the abstract, where we are now adding a reference to meltwater fluxes:

"Considering the transient nature of the Earth system, the LIG climate and ice-sheets evolution were certainly influenced by the changes occurring during the penultimate deglaciation. It is thus important to investigate, with coupled Atmosphere-Ocean General Circulation Models (AOGCMs), the climate and environmental response to the large changes in boundary conditions (i.e. orbital configuration, atmospheric greenhouse gas concentrations, ice sheet geometry, and associated meltwater fluxes) occurring during this time interval."

A reference to vegetation changes was added in the Introduction:

"It is also crucial to comprehend the subsequent impacts of continental ice-sheets disintegration on the oceanic circulation and thus the climate, the terrestrial vegetation and the carbon-cycle system."

We have added in the Introduction, p2, Line 24:

"These long glacial periods were followed by relatively rapid multi-millennial-scale warmings into an interglacial state. These glacial-interglacial transitions represent the largest natural global warming and large-scale climate reorganisations across the Quaternary. Hence, they provide a great opportunity to study the interaction between the different components of the Earth System and climate sensitivity to changes in radiative forcing. "

The impact of the penultimate deglaciation on the climate and sea-level of the LIG is also mentioned in the Introduction:

"Transient simulations of the penultimate deglaciation could also help to understand the climate and sea-level highstand occurring during the LIG."

In the conclusion, we have added a reference to changes in vegetation cover and marine ecosystem:

"Transient simulations performed with Earth-system models that include a dynamic vegetation and a global carbon cycle model, would be particularly useful in assessing the impact of climate change on vegetation cover and on marine ecosystems."

We have reformulated the sentence p25, line 24:

"Transient deglacial simulations and associated model/paleo-proxy comparisons provide a great opportunity to understand the drivers and processes involved in one of the largest natural global warming period of the Quaternary."

4. Meet Data-Stewardship standards

This manuscript is part of a PAGES endorsed working group (QUIGS). Data stewardship is a central objective of PAGES, as part of the entire lifecycle of research, from production to archiving of data. This is also one of the reasons why PAGES has a Data Stewardship activity. Standards for the availability of modelling codes are less developed than proxy-paleo-data standards. However, they are currently being efficiently addressed at GMD

(see their code and data policy). Authors would have to find an appropriate data repository (re3data.org; ZENODO? other?) and obtain a 'data citation', which is important both for scientists and funding organisations and is different from their bibliographic citation. In addition to a standard literature citation, authors need a stand-alone data citation that has to be included in the publication's reference lists. Each curated dataset used in the manuscript is required to have a unique, persistent identifier, cited to credit original data generators. For this manuscript, I'd strongly recommend not using a landing page which can easily become obsolete in the near future (with PMIP5 and the beginning of CMIP7 in 2020, etc.), but creating instead a permanent site and pointing to it in the Data Availability section.

All the forcing files will be available on the PMIP4 website (https://pmip4.lsce.ipsl.fr/doku.php/exp_design:index) and the results of the simulations should be uploaded to the ESGF website. We are now including this in the data availability section.