Referee #1

- Referee 1 writes that such work has to be based on a good knowledge of the different climates of the world, more especially the Mediterranean climate. For this reason, the lack of the fundamental reference on Mediterranean climate variability ; Lionello et al. Ed, 2006 is unfortunate.

This reference has been added, p. 737.

- Other references are lacking such as Jalut et al. (2000), Bar-Matthews et al. (2000), Petit-Maire et al. (2005), which would have strengthened the basic knowledge on the Holocene Mediterranean climate dynamic.

Jalut *et al*., 2000, Bar-Matthews *et al.,* 2000 and Petit-Maire *et al.,* 2005 has been added in the references respectively in p. 750, 747 and 746.

- The study of the seasonality of precipitation and its evolution in the Mediterranean basin implies to clearly define what is a Mediterranean climate.

The text has been corrected: "The present-day Mediterranean climate is characterised by a strong seasonality, with warm to hot, dry summers and mild wet winters (Quézel and Médail, 2003; Lionello *et al*., 2006)."

- And consequently, in this study, to indicate when the climate was or not Mediterranean.

Unfortunately this paper did not seek to strongly constrain the values of what we consider to be "Mediterranean" climate, preferring to define the climate parameters qualitatively. It is possible to more clearly define the reconstructed climates as Mediterranean or not for example using the Koppen system, but to do so would add significantly to the length of the paper (both in describing the methods and by lengthening the results). We do use qualitative assessments throughout, however, we define this climate regime and describe the transition in section 3.2: "Warm, moist conditions are also evident from the pollen-based climate reconstructions during this period (Figs 3 and 4). They indicate the establishment of a seasonal "Mediterranean" rainfall regime with hot, dry summers and cool, wet winters (PWinter: 200 mm, PSummer: 75 to 100 mm)". And in section 3.4.2: "According to the results of our study, precipitation seasonality increased strongly during this period, with winter precipitation attaining a maximum at both sites and summer precipitation simultaneously reaching a minimum (PSummer: 75 mm)."

- At 6000 cal BP winter precipitation is dominant while summer precipitation decreases. This agrees with the increasing aridification described by Jalut et al. (2008). Unfortunatly, a careful analysis of the curves also shows opposite responses of the models during some periods and the reliability of the conclusions is questionable (i.e. PSummer and MTCO curves in the Alboran sea between 10,800 and 12,500 cal BP). But in the Aegean sea MAT and GAM models indicate increasing precipitation at the end of the event only and in the Alboran sea PLS and GAM models show variations similar to the previous and following periods. Similary, the authors define H1 as cold and dry but fail to emphasize the regular and strong increase in MTCO indicated in the two sites by the three models during its last millennium. P.9, the interpretation of the Younger Dryas is not clear. If, as generally admitted, wet summers characterize a continental. As a consequence, the conclusive sentence: "The three methods produce patterns that show similar trends throughout the

pollen records of both sites" have to be reconsidered. Based on a careful observation of the curves, the interpretations need to be more qualified.

We agree with the referee about some "visual" differences reconstructed among quantitative reconstructions, depending on the considered time period. Given the large error inherent in pollen-based climate reconstructions, it is often the search for trends between models, rather than absolute trends across all models that are important. There are several examples of points in the reconstructions where models vary in the overall trend. Preliminary investigations indicated that these are the results of models overfitting a single pollen taxa. PLS in particular is sensitive to this artefact, and thus in cases where PLS is poorly matched to the NMDS/GAM and MAT outputs we have confidence that it is often a function of statistical artefacts.

The methodology comparison and the differences are discussed in section: "4. Comparison of methodologies applied, and reliability of the models can be obtained from the differences between model outputs". As stated in the concluding paragraph, these three methods produce the same trends. Following the referee suggestion, we have reconsidered the sentence in the conclusion "The three methods produce patterns that show similar trends throughout the pollen records of both sites" by "The three methods produce patterns that show roughly similar trends throughout the pollen records of both sites. Some discrepancies can be seen in the amplitude of the climate reconstructions given that each method has their own set of advantages and limitations (Birks and Birks, 2006; Brewer et al., 2008)".

In addition, statistical validation tests to check the reliability of the three models were performed on the modern pollen dataset.

- The Small number of Mediterranean taxa in the pollen diagrams is not discussed. Similarly, the dominance of the deciduous Quercus in the pollen diagrams is not discussed while in table 1 only the genus Quercus is indicated.

This article presents the pollen-based reconstructions on two pollen-marines cores. The pollen diagrams and table 1 summarize palynological results that led to these quantitative reconstructions of climate. For more details about the vegetation changes and the palynological results, its better to refer to the papers by Kotthoff *et al.* (2008a and 2008b) and Combourieu-Nebout *et al.* (in press). This is mentioned in section 2.1., p. 739.

- And the term « temperate forest » is not defined.

As written in section 2.1., p. 739, the temperate forest includes *Quercus, Alnus, Betula, Populus, Salix, Carpinus* and *Fagus*.

- During the Bølling/Allerød period deciduous oak forests are dominant. Evergreen Mediterranean taxa are poorly represented. What kind of climate was present at time?

During this period, the pollen-based reconstructions indicate in Alboran and Aegean Sea: "Warm, moist conditions are also evident from the pollen-based climate reconstructions during this period (Figs 3 and 4).", p.742.

- The marine data do not seem sufficiently informative and continental pollen data have to be used to define the climate. In the pollen diagrams, herbaceous and/or chamaephytic

taxa (Artemisia, Alboran sea and Asteraceae, Aegean Sea) are dominant. Nowadays they are present both in cold and warm steppes. At this level of determination they only indicate open dry environments. Similarly, Chenopodiaceae are generally well represented in dry environments. In core SL 152, their percentages are lower than 10% and in the Alboran sea also frequently lower than 10%. Because of these low values the drought intensity have to be discussed.

The question of the drought intensity has been treated for the Younger Dryas in the section 3.3: "However, these interpretations should be treated with caution since the underlying climate reconstructions may also be a result of bias in the modern pollen dataset: *Artemisia*-dominated pollen assemblages are today predominantly found in Asian steppes (including Tibet and Kazakhstan) characterized by low annual precipitation and precipitation maxima in the spring or summer. This study should confirm this interpretation: the wet conditions reconstructed for the borderlands of the Aegean Sea during the Younger Dryas are probably due to the seasonality regime of the modern semi-desert modern pollen assemblages." And concerning the palynological analyses, the results of the core ODP 976 has been developed by Combourieu-Nebout *et al.* (in press) and for the core SL 152, by Kotthoff *et al.* (2008a and 2008b). *Chenopodiaceae* are well and more present in the both cores during the cold events of the Lateglacial. The same results have been observed by Fletcher and Sanchez-Goñi (2008) in Alboran Sea, Rossignol-Strick and Planchais (1989) in Tyrrhenian Sea and Combourieu-Nebout *et al.* (1998) in Adriatic Sea.

- In the Aegean core, the identification of the Lateglacial short events between Bølling and Younger Dryas is not always convincing on the basis of the pollen data. Refering to the papers where it was defined, a short discussion of the chronology would be useful as well as a reference to the recent Lateglacial chronology (Lowe et al., 2008).

A new paragraph has been added in the section 3.4.4: "The timing of these short-lived events differs slightly between the two cores. This variation may come from the statistical uncertainties associated with the age model. These uncertainties are linked to each age model and dependent to the precision of measurement of radiocarbon dates, marine reservoir effects and a lack of precision in the calibration models. But it is necessary that the timing and duration of local climatic events be established independently of the ice-core record in the site records (Lowe *et al.,* 2008)."

- p.11, the sentence : "Jalut et al. (in press) reconstructed a similar pattern in the Aegean and Alboran Seas with short dry summer periods since the beginning of the Holocene that correspond to present-day Mediterranean conditions." Is not clear. In the cited paper, the period 9500-7500 cal B.P. clearly belongs to the humid Holocene, during S1. This is coherent with the data of Allen et al. (2007) and Rossignol-Strick (1999).

We agree with the referee. In our paper, the period 9,5-7,5 kyr B.P. appears to be a wet period: "The early Holocene (9,5 to 7,5 kyr B.P.) was characterized by high temperatures and moist annual and winter conditions in both the western and eastern Mediterranean regions.". The winter precipitation attain a maximum and summer precipitation simultaneously reach a minimum. Jalut *et al.* (in press) describe the same type of results: " The first (11 500-7000 cal BP) was mostly humid…" and "Various regional climates prevailed such as an attenuated oceanic type in the Western and Central

Mediterranean, characterized by short dry summer periods and abundant precipitation in autumn, spring and winter (supre-Mediterranean type)."

- From Soreq Cave, Bar-Matthews et al. (2000) emphasize the existence of wet summers during Sapropel 1, which excludes Mediterranean climate conditions in the studied area. These results do not agree with the results presented here which suggest the installation of a Mediterranean climate (p.11, Holocene optimum): "precipitation seasonality increased strongly during this period, with winter precipitation attaining a maximum at both sites and summer precipitation simultaneously reaching a minimum (PSummer: 75 mm)". These have to be discussed.

Following the reviewer, we have added new few sentences and references: "This pattern differs from results obtained for other geographical regions, for example in Northernmost Europe (Allen *et al.,* 2007), and in the Eastern Mediterranean (Rossignol-Strick, 1999; Bar-Matthews *et al.*, 2000) which found abundant year-round moisture with higher precipitation during the summer. Reconstructions focusing on the mid-Holocene climate (6 kyr BP) for Europe also show that the climatic response varies along a north-south gradient (Cheddadi *et al.,* 1997; Davis *et al*., 2003; Cheddadi and Bar-Hen, 2009), and also between the eastern and western Mediterranean (Brewer *et al.,* 2009) ".

- In fig. 1, the names of the climatic stations are not indicated (city, alt).

The figure caption 1 has been reworded: «Inserts show modern climate conditions, calculate with the freeware tool NewlocClim, for both sites with temperature and precipitation for each month (Gommes *et al*., 2004). The ten meteorological stations that have the smallest distance are used for the calculation of the curves for each sites».

- In fig. 2, GeoTü, Quercus ilex is missing.

On the site SL 152, Quercus ilex were counted separately and taken into account in the quantitative reconstructions of climate. The figure 2 has been corrected.

Referee #2

A. Using the term « Heinrich event 1 » is confusing here, since the cores discussed in this paper do not contain IRD. Consequently, it is more correct to use « Oldest Dryas » here as this has been defined originally as a pollen zone.

Corrected in the text and the figures.

- Throughout the paper, also terminology for periods defined in Greenland Ice cores (e.g. GI-1c2 in Table 1) is used alongside with bio-zones. I suggest using consistent naming for climatic events.
According to Table 1, the Older Dryas lasts from 13,500 to 13,400 years BP. This timing is inconsistent with the cooling phase labeled as Older Dryas in Figure 3 and 4. In figure 3, the Oldest Dryas is placed around 14 kyr BP, in figure 4 it is positioned between 14.0 and 13.5 kyr BP. It is essential for a manuscript dealing with many different climatic phases to use a consistent naming and timing of these phases. Please revise.

The oscillation depicted between 13,6 to 13,2 kyr B.P. (also shown in the Jura mountains from the Lake Lautrey, Magny *et al.,* 2006) has been firstly named GI-1c2 by Brauer *et al.* (2000). Therefore, we keep the same terminology. Other oscillations have been named in this paper by the bio-zones names. The Table 1 has been corrected, and the Older Dryas has been established between 14,1 kyr B.P. to 13,8 kyr B.P.

B. Related to the previous point: In Figure 3, 4 and 5, different climatic phases are designated by grey bands. These grey bands do not follow defined time limits based on for instance the Greenland Ice cores. Instead, the star t and ending of climatic phases is based on the interpretation of the local climate reconstructions. The authors suppose a correlation with the reference records in which the climatic phased were originally defined. As a consequence, the timing of a climatic phase differs between the two cores in this study. If we take the example of the 8.2 ka event: according to the grey banding in Figure 5, in the Aegean Sea it is expressed by changes in climate from 8.2 to 8.0 kyr BP, while in the Alboran Sea the star t is at 8.5 kyr BP and lasts until 8.15 kyr BP. This raises several questions. Are these differences in timing real? Do they reflect leads/lags, or are these due to uncertainties in the age models? And how are the star t and end times of the different climatic phases actually defined? Furthermore, Figure 5 shows clearly that the different reconstruction methods suggest quite different climate anomalies around the timing of the 8.2 ka event. What reconstructed curve is used for the definition of the local '8.2 ka event expression' (i.e. the grey bands), or is the average reconstruction used? And is this definition applied consistently throughout the paper? How do the authors know that it is an expression of the 8.2 ka event if the three methods are not consistent? Could the response also reflect an artifact of the applied method?
All these questions are also relevant for other climatic phases, especially the brief and subtle Holocene climatic cooling episodes. In my view, the authors should be very careful with their claims to have found 'strong climatic links between the North Atlantic and the Mediterranean', given the uncertainties in timing and climate response. I suggest to only make such claims for links when all methods show a consistent response and when the timing is similar (within dating uncertainty) to the timing in the reference record. Consequently, I suggest revising Figures 3, 4, 5 as indicated and adjust the text accordingly.

The presence of events and their interpretation is based on observed climate changes from pollen and according to established quantitative reconstructions. Following on from this interpretation of these events are defined as corresponding to certain events recognized in the North Atlantic. Nevertheless, these links are hypothetical and presented as such throughout this paper. As for the differences observed between our sites they may come at a time of uncertainty due to model age, but also a lag time of registration of these events between East and West Mediterranean. This type of analysis and study also explains the choice to work from two sites along a gradient.

A new paragraph has been added in the section 3.4.4: "The apparent timing of these short-lived events differs slightly between the two cores. This variation may be due to statistical uncertainties associated with the age models for each core. These uncertainties are dependent on the precision of radiocarbon dates, marine reservoir effects and on the calibration models themselves. Because of these uncertainties we established the timing and duration of these climate events independently (Lowe *et al.,* 2008)."

The text has been corrected: "The results obtained with three methods shows at least three rapid and abrupt short-term events which punctuate the Late-glacial interstadial in the Alboran and Aegean Seas at 14,1-13,9 kyr B.P., 13,5-13,4 kyr B.P. and 13-12,6 kyr B.P, and may be related to the Older Dryas, Greenland Interstadial-1c2 (GI-1c2) and the Gerzensee Oscillation respectively (Rasmussen *et al.,* 2006; Brauer *et al.,* 2000)."
"In the borderland of the Aegean Sea, the warming trend was interrupted by a short-lived cooling indicated by the MAT method between 11,4 and 10,9 kyr B.P. (Fig 4) that may be related to the Preboreal Oscillation (PBO; Björck *et al.,* 1997),".

"At both sites, the amplitude of variations associated with the 8.2 ka event is stronger for the PLS model and comparable for MAT and NMDS/GAM model. In Alboran Sea, the same variation has been observed with the PLS and NMDS/GAM. In Aegean Sea, the trend of the event is difficult to observed, because the PLS anomalies are more marked."

C. Figure 3, 4, 5. I would suggest to remove the average curves from these figures, as the average has no meaning (i.e., it is not more reliable than the individuals curves), and it makes the figures hard to read.

The average curves have been removed on the figures 3, 4 and 5.

D. Section 2.1. This section should be extended and should summarize in words the main phases seen in the pollen diagrams.

A new paragrah has been added in the section 2.1: "Both cores have high proportions of *Artemisia, Chenopodiaceae* and *Ephedra* to 14,7 kyr B.P. Temperate forest species are all found in low proportions (*Quercus, Alnus, Betula, Populus, Salix, Carpinus* and *Fagus*, all <10%). From 14,7 to 12,5 kyr B.P., pollen taxa associated with deciduous forests increase to 45%, and the semi-desert taxa such as *Artemisia* decrease rapidly. During the Older Dryas, GI-1c2 and Gerzensee Oscillation, semi-desert taxa increase and the temperate forest taxa decrease slightly. Between 12,5 to 11,7 kyr B.P., during the Younger Dryas an increase of *Artemisia, Chenopodiaceae* and *Ephedra* are associated with a decrease of *Quercus*. From 11,7 to 4 kyr B.P., *Quercus* and temperate forest taxa increase to 70%. During short-lived events (possibly corresponding to the Preboreal Oscillation and the 8.2ka event) the *Cichorioideae* and *Chenopodiaceae* increase slightly."

E. Three methods have been applied to reconstruct temperature and precipitation. I am not an expert in these methods, and to me it is unclear from the manuscript how these methods deal with uncertainty. It would be useful to discuss this issue. In addition, Figures 3, 4 and 5 do not include uncertainty estimates. In these figures, a lot of wiggles can be seen, but without uncertainty estimates it is unclear if these wiggles represent noise or real climate anomalies. In my view, it is thus essential to provide uncertaintly estimates, also to see if the claimed correlation to North Atlantic climate events can be substantiated.

In both figures, three curves represent the three methods. The additions of the error bars (two curves for each method) make reading difficult. The error bars are not shown in the figure, for clarity. And the errors on the model, notably for the PLS, are constant.

The interest of the state in this case is limited. In addition, the quality of the method is discussed in section 4 and table 2.
In section 4., this paragraph has been added: " Model error is calculated as the root mean squared error of prediction using leave-one-out cross validation for each method (Table 2). It is clear that a number of factors affect the predictive ability of each reconstruction method (for example Telford and Birks, 2005; Goring et al, 2008) thus, as statistical assumptions are violated, model performance will likely decline. Since it is difficult to predict the response of models to non-analogue conditions, especially for the multi-parameter climate data we are examining, we use model RMSEP as a guide to overall error. In general model error is large, this is in part a function of pollen-based climate models in general, but also of the extremely broad scale of Europe. The error terms incorporate error from across the continent, and thus may be inflated. It appears that MAT provides the best fit to underlying climate parameters. PLS regression appears to provide the lowest fit to the climate data for all parameters, with NMDS/GAM providing intermediate results."

F. I propose including a critical comparison with the MTWA reconstructions of Davis et al. (2003) for the Mediterranean area. In their reconstruction, MTWA shows a long term warming trend over the course of the Holocene, with the period 8 to 6 kyr B.P. being significantly cooler than today. This strongly contrasts with the results presented here showing mostly warmer summer conditions in the early-to-mid Holocene.

This paragraph has been added in the section 3.4.3: "The MTWA anomaly for both sites during the mid-Holocene is between 0 and +1°C. These results are in agreement with the summer anomalies presented by Davis *et al.* (2003) in SE Europe but slightly different than those for SW Europe where the temperature anomaly is around -2°C. Davis *et al.* (2003) use a modified Modern Analogue Technique (Guiot, 1990), using Plant Functional Type scores (Prentice *et al.,* 1996) to match fossil assemblages to modern analogues. The larger data set used in the current study and the methodological differences may ultimately explain the differences between the current study and those of Davis *et al.* (2003)."

- Davis & Brewer (2008) have recently suggested that their Holocene warming trend is a response to the latitudinal insolation gradient. According to their hypothesis, the latitudinal insolation gradient is a very important climate forcing that has also dominatedclimate response during the previous interglacial. The results presented here by Dormoy et al. appear to contradict this hypothesis and it would thus be interesting to provide a discussion of this issue.

This reference has been added in the section 3.4.3, in the paragraph:" Davis and Brewer (2009) found a summer temperature anomaly of -1,5°C in Southern Europe. They explain the pattern of cooling in South Europe and warming in North Europe, by a latitudinal insolation gradient. Davis and Brewer (2009) indicate that temperature sensitivity to both the latitudinal insolation gradient and to ice cover forcing may therefore offer an alternative perspective not just on orbital forcing of high latitude warming, but also on orbital forcing of low latitude climate. Just as in Davis *et al.* (2003), the reconstructions are performed for more than 500 sites and grouped into several regions, across Europe."

G. Page 753, lines 18-20. This statement is surprising to me, since there are huge differences between the different reconstructions shown in Figure 3, 4 and 5. For instance, according to Figure 4, during the Preboreal the MTCO was about -15°C according to the PLS method and around 0°C according to the MAT method. And estimates for PWinter ranged from less to 50 mm to more than 300 mm. If all three methods are performing as well or better than other methods (as the authors state), it implies that the Preboreal climate is very uncertain for the Mediterranean region, as it could have been anywhere between much colder drier than today and quite similar to today. In my view, it would be very helpful if the authors could provide a kind of ranking of the different methods in terms of suitability for reconstructing climate in the Mediterranean region at this spatial scale?

The text has been modified as follows: "From this, we can conclude that the models used here perform well, and that there is no significant spatial bias in our pollen-based climate models. According to the results from modern and fossil data, the MAT and NMDS/GAM methods seem provide better results than the PLS method, which appears to provide spurious values in non-analogue situations."
It is difficult to provide a kind of ranking of the different methods in terms of suitability for reconstructing climate because all methods provide good result but with a difference on the quality in accordance with the type of data, with the pollen samples are spatially sparse or local pollen variability. We hope to incorporate a ranking mechanism in future papers, however, at this time the RMSEP remains our only available option.

Minor Points :

1. Why are ages express in yr BP instead of kyr BP ? In my view, using yr BP suggests a degree of accuracy in the age models that cannot be warranted. I suggest using kyr BP. In addition, a consistent notation should be used. For instance, on Page 748, the following notation are used : cal yr BP, yr, years, yrs BP, yr BP.

The ages has been corrected as « kyr B.P. » everywhere in the text.

2. In figure 1, the average monthly temperature and precipitation curves are shown for the two regions. On what data are these curves based and for what period do they represent the average? Please also provide references.

The figure caption 1 has been reworded: "Inserts show modern climate conditions, calculate with the freeware tool NewlocClim, for both sites with temperature and precipitation for each month (Gommes *et al*., 2004). The ten meteorological stations that have the smallest distance are used for the calculation of the curves for each sites."

3. In Figures 3 and 4, yellow stars presumably indicate the modern conditions for the two cores, based on measurements. Please mention this in the captions.

The legend of the yellow stars in the figures 3, 4 and 5 has been added: « Modern values ».

4. Page 738. It is not clear to me why these two records have been chosen for this study, and not other cores with marine pollen records from the region. It would be helpful it some background information could be provided.

Page 738, line 21-22, "This study is based on two well-dated high-resolution pollen records from marine cores located along a West/East gradient across the Mediterranean Sea ".

7. Page 738, line 13-14. "A similar approach has been successfully applied to other regions and time intervals". Please provide a few references here.

The reference "Peyron *et al.*, 2005" has been added.

9. Page 739, line 9. "assuming a reservoir ages of 400-600 years". Delete "a" and please explain the range in reservoir ages. For instance, during what intervals was 400 years used and when 600 years, and based on what arguments? Also, include a reference to Figure 2 in this paragraph, as the 14C dates are shown in this figure.

The text has been changed as: "The dates were corrected assuming reservoir ages of 400 years in the core ODP 976 to account for ^{14}C reservoir age of the modern Alboran Sea surface water. And, the dates in the core SL 152 have been corrected by 400 years, except the ^{14}C date "12,430 yr BP" in depth 505 cm, following Siani *et al*. (2001). And in both cores, the dates were converted into calendar years after Stuiver *et al*. (1998) and Fairbanks *et al.* (2005)."

12. *Page 741, line 3. Please explain how summer and winter are defined for the reconstruction of PWinter and PSummer.*

P.741: "The three methods were used to reconstruct the annual precipitation (PANN), seasonal precipitation (PWinter is the sum of the precipitation occurring from December to February inclusive, and PSummer of the precipitation sum from June to August inclusive), mean temperature of the coldest month (MTCO) and mean temperature of the warmest month (MTWA). "

15. Page 743, lines 23-24. Please rephrase, because "MTWA anomalies" do not correspond to winter temperature values.

Reworded as follow: "In the Alboran Sea, winter temperature values of approximately -4°C during the Younger Dryas correspond to a strong decline in temperatures with MTCO anomalies of -10°C, while the anomaly of MTWA is around -6°C (Fig 3)."

16. Page 744, line 2. "Three distinct climatic phases". I do not see three distinct climatic phases during the YD in Figure 4. Please adjust.

Reworded as follow: "Hence, the MAT appears to indicate the presence of three distinct climate phases during the Younger Dryas (Fig 4) with colder conditions during the first and third phases between 12,6 to 12,4 kyr and 12,2 to 11,7 kyr B.P. (MTCO: -5°C and -2°C). The middle phase of the Younger Dryas, based on the MAT reconstruction, between 12,4 to 12,2 kyr B.P. shows an temperature increase of 3-5°C when compared to the colder phases.”

21. Page 749, line 6. “The duration of this event is 200 to 300 yr”. I suggest referring here to Thomas et al., 2007 (QSR 26, 70-81), who show that the event lasted about 150 years according to Greenland ice cores.

This reference has been included.

22. Page 750, line 23. “at 4, 5, 6, 7 and 8 are”. Presumably there is an age notation missing here.

Reworded as follow: “The short Holocene cooling events such as the events marked 4, 5, 6, 7, and 8 (Figs 3 and 4) are likely transmitted from the Atlantic Ocean to the Western Mediterranean Sea and the signal is amplified in the central Mediterranean settings (Cacho *et al.,* 2002).”

27. Page 752, lines 16-17. “Since pollen in the Alboran Sea, the pollen”. There is a verb missing here.

Reworded as follow: “In the Alboran Sea, the pollen comes from both Southern Spain and Morocco (with the presence of *Cedrus* from Morocco’s Mountains) thus there are likely to be less analogues in the European pollen dataset, potentially causing statistical artefacts in the reconstruction, and resulting in greater differences between the PLS model and the MAT and NMDS/GAM models.”

28. Page 753, lines 4-5. “In all cases PLS appears to perform relatively well”. On what argument is this statement based? Please explain.

Reworded as follow: “Although the PLS model has the highest RMSEP, it appears to be generally synchronous with the other models. However, the PLS model often has a much stronger amplitude in the pollen signal, perhaps an artifact of non-analogue climate parameters.”

The minor points 5, 6, 8, 10, 11, 13, 14, 17, 18, 19, 20, 23, 24, 25, 26, 29, 30 and 31, were taken into account and corrected in the text.