**Climate
of the Past
Discussions**

Interactive comment on "A regional climate simulation over the Iberian Peninsula for the last millennium" *by* J. J. Gómez-Navarro et al.

J. J. Gómez-Navarro et al.

jjgomeznavarro@um.es

Received and published: 1 February 2011

We thank the reviewer for his/her constructive comments on this manuscript. We have taken into account most of the reviewer suggestions. In this letter we will comment some of the more important modifications:

The general concern about the use of ECHO-G as driving model for the RCM simulations was already answered in the open discussion period by E. Zorita, coauthor of the present paper. This interesting discussion has been included in the description of the simulations in the present version of the paper, including the reference to the paper assessing the skill of ECHO-G respect to other models used in the model suit of the IPCC. We have also given more details on the flux adjustment employed in the GCM simulation. Nevertheless we have not further assessed the skill of ECHO-G in the cur-

rent version, since we believe that task goes beyond the scope of the present paper, which is intended to focus in the added value by the RCM to the GCM simulation. We acknowledge that the RCM parametrizations are not better in general than those of the GCM. Thus, we have removed these comments.

We have fixed the misplaced references, and added those suggested by the referee.

In general we have rewritten the sentences where the referee had troubles understanding our point.

Now we refer to E-OBS instead of ECA, and we have added the corresponding acknowledge.

The comparison between model and proxy reconstructions is direct, not using the PC-regression mentioned. It is now clearly stated in the text. Respect to the spatial resolution of these reconstructions, they are part of a gridded climate reconstructions over Europe, from which the Iberian sector has been extracted, and are based on a large set of proxy data. Nevertheless the number of proxy data over the Iberian Peninsula is limited. The rationale of the methods for climate field reconstruction is to take advantage of the climate teleconnections between separated regions that are observed in the present climate. It is thereby assumes that this teleconnections also held in the past and at longer timescales, but this assumption cannot be easily ascertained. Thus, the spatial resolution in the reconstruction basically stem from the spatial patterns of climate variability present in the observations.

We now refer explicitly to "temporal variability" instead of just "variability".

By internal variability in the model we mean the ability of the model to modify the synoptic scale features in large domains as our mother domain. We have clarified this in the text. We have added a new subsection in which we clearly evaluate the added value of the RCM respect its capability to reproduce a realistic link between NAO and precipitation. We compare it with the ECHO-G alone simulation and with observations.

In the NAO-related part, we have reduced our discussion to winter, when the forcing over the IP due to synoptic conditions is larger. The summer part has been removed from the discussion. There are no significant differences between the SLP pattern developed by ECHO-G and MM5. Thus, the NAO calculated within the context of ECHO-G is a very good approximation. This is reinforced by the fact that the link between this index (calculated in the ECHO-G simulation) and the precipitation (simulated by MM5) in the IP is close to the observations.

In general, we have been now more explicit giving numbers to all estimations of variability of series and correlation between them.

In Fig. 16 in the paper (Fig. 14 in the former version of the paper) is shown the averaged precipitation for the entire IP, since this mean field is highly correlated with NAO in the observations. In fact, the mean precipitation over the IP is in good approximation the mean precipitation only in the Northwest, since this is by far the wettest part of the IP. In Figs .11 and 15 we split precipitation because we are concerned not only in its temporal evolution, but also in its variability, which is very different in the two areas discussed in the text.

All minor comments on language and modifications of figures have been taken into account.

We hope these changes satisfactorily address the reviewer's points.

―――――――――――――――――