RESPONSE TO REFEREE 2

We would like to thank the referee for his comments about our work.

The paper is in general well written, although some work on the English seems to be necessary. for instance, 2.2.1 par. 20- "Contrary to the globe, the domain is no periodic" could be replace by "contrary to the global model ARPEGE, the RCM grid is not periodic" 2.2.2 "the best possible" by "the most realistic representation of the climate of the simulated period "

The text of the revised manuscript has been modified according to the modification proposed and the English has been checked throughout the paper

Some points about the text: 1. The region of study shows a complex orography and in order to explore the influence of resolution could be more insightful a 25 km simulation.

Even if we agree with the reviewer on the potential utility of this 25km run, we recall that the simulations performed here are very costly in terms of computer power and it is not easy to add other runs at intermediate resolution. In addition, the 50km to 25km added-value have been already checked in the frame of the ENSEMBLES FP6 project where twin ERA0-driven runs were performed at that time. It would be somehow redundant to re-run a 25km RCM. The choice of the resolutions 50km and 12km is moreover the official choice of the WCRP CORDEX program and using this pair of runs in the current study will allow a better comparison with forthcoming studies based on Euro-CORDEX or Med-CORDEX simulations. We recall here that our results indicate that the precipitation distributions are much better reproduced with the simulations at 12 km than at 50 km.

2. In the paper Saeed, F., Hagemann, S., Saeed, S., & Jacob, D. (2013). Influence of mid-latitude circulation on upper Indus basin precipitation: the explicit role of irrigation. Climate Dynamics, 40, 21-38. doi:10.1007/s00382-012-1480-3. is shown that evapotranspiration from water masses, including irrigation could be important for a good simulation of precipitation. It is not clear in the text if this fact has been explored in this paper.

The impact of irrigation surfaces in the RCM is not taken into account. This capacity is not yet state-of-the-art for GCM or RCM and under developement for the ARPEGE-Climate and ALADIN-Climate model. In addition, it is worth noting that the catchment of the Makhazine dam cannot be

compared by the Indus River, because of its size and also the climatic regime. In this catchment, most of the precipitation is occurring during the cold season (the winter), with relative low evapotranspiration by comparison to the summer months. Therefore it is likely that the feedback on precipitation by irrigation and water masses is much lower in the case of this catchment.

3. For model validation, given the scarcity of observations, some high resolution

gridded datasets as E-OBS, TRMM, CMORPH, PERSIANN, etc might have been used

This is a very interesting point. Indeed TRMM data (approx. 25 km resolution) or RFE (approx. 10 km resolution) could be used at least for the recent years in addition to the station data. However our results indicates that the areal precipitation computed from the available rain gauges in the catchment is already enough to obtain good hydrological modelling results. Yet, we are currently testing some merging approaches for rain gauges and satellite data, to obtain better estimates of the spatial distribution of precipitation.

However it must be noted that some products such as TRMM have lower accuracy above 30°N. In addition, EOBS should be used with care in North Africa, indeed as shown on Figure 1 in Haylock and al. 2008, there are only 18 stations with precipitation in the whole Morocco country that are used to build the gridded dataset (4 stations in Algeria and 16 stations in Tunisia).

Haylock, M.R., N. Hofstra, A.M.G. Klein Tank, E.J. Klok, P.D. Jones and M. New. 2008: A European daily high-resolution gridded dataset of surface temperature and precipitation. J. Geophys. Res (Atmospheres), 113, D20119, doi:10.1029/2008JD10201

4. A more detailed description of methodology in section 3 could facilitate the reading

of the text

It is not clear if the reviewer refer to the whole section 3 (6 pages) or to a specific sub-section in particular. We tried to explain the methods as clear as possible, in particular we added more information in section 3.2.2