

Interactive comment on “Climate Change impacts the Water Highway project in Morocco” by Nabil El Moçayd et al.

Anonymous Referee #1

Received and published: 26 July 2019

Although the manuscript of et El Moçayd al. is well written (besides some spelling or grammar errors), I believe it does not fit in its current form in the scope the HESS journal. The analyses are rather simple and more important they do not provide new results. The manuscript reveals several trivial sentences, such as "change in runoff is largely sensitive to precipitation", which is quite expected in a water-limited environment such as in Morocco. As noted line 5, page 22, "the conclusions are similar to previous results".

There is no literature review about similar work in Morocco, while the results presented in the present manuscript can be already found in the following published papers:

Tramblay Y., Jarlan L., Hanich L., Somot S. (2018). Future scenarios of surface water resources availability in North African dams. *Water Resources Management* 32(4),

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1291-1306.

Filahi S., Tramblay Y., Mouhir L., Diaconescu E.P., (2017). Projected changes in temperature and precipitation in Morocco from high-resolution regional climate models. *International Journal of Climatology* 37(14), 4846-4863.

Marchane A., Tramblay Y., Hanich L., Ruelland D., Jarlan L. (2017). Climate change impacts on surface water resources in the Rheraya catchment (High-Atlas, Morocco). *Hydrological Sciences Journal* 62(6), 979-995.

Droogers P, Immerzeel WW, Terink W, Hoogeveen J, Bierkens MFP, van Beek LPH, Debele B (2012) Water resources trends in Middle East and North Africa towards 2050. *Hydrol Earth Syst Sci* 16(9):3101–3114.

Schilling J, Freier KP, Hertig E, Scheffran J. 2012. Climate change, vulnerability and adaptation in North Africa with focus on Morocco. *Agric. Ecosyst. Environ.* 156: 12–26.

Patricola CM, Cook KH. 2010. Northern African climate at the end of the twenty-first century: an integrated application of regional and global climate models. *Clim. Dyn.* 35: 193–212.

Some specific comments:

Section 4.1 is not really a "result" section, it is rather a presentation of the study area and data.

Section 4.3.1, before using TRMM precipitation, a validation against observed data would be welcome.

Moreover, no validation of the RCM simulations is provided with observations.

The figures are not clear, such as figures 7 8 9 10.

Recommendations:

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An interesting contribution of this article would be to provide an assessment of changes in runoff sensitivity coefficients (to precipitation and evapotranspiration changes), for both the historical periods and the RCPs. For instance, the coefficients of equation 2 could be computed with each RCM simulation and for different time periods and basins, to evaluate the spatio-temporal patterns and how they evolve in time, taking into account the inter-model spread in RCM simulations. In addition to reference Penman evapotranspiration, they could also analyze the actual evapotranspiration simulated by the RCMs. This requires substantial work and re-submitting a reshaped manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-238>, 2019.