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Interactive comment on "Bias-corrected and spatially disaggregated seasonal forecasts: a long-term reference forecast product for the water sector in semi-arid regions" *by* Christof Lorenz et al.

Anonymous Referee #1

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The authors implemented and evaluated the performance of an bias-correction and spatial-disaggregation (BCSD) approach to seasonal precipitation, temperature and radiation forecasts of the latest long-range seasonal forecasting system SEAS5/ECMWF. The method was applied in four different semi arid basins of the World: the Karun (Iran), the São Francisco (Brazil), the Tekeze-Atbara and Blue Nile (Sudan, Ethiopia and Eritrea), and the Catamayo-Chira (Ecuador and Peru).

The proposed approach was compared to the ERA5-Land/ECMWF and outperformed it in terms of spatial resolution (from 36 km to 0.1°) and spatial patterns agreement.

Also, according to their results, it remarkably reduced lead-dependent drift effects. It would be important to have an idea of the proposed approach relative performance to systems that are available for those regions, but I recognize the amount of work this would demand. Thus, I only suggest the authors to include in their paper a brief comment on the information available to water managers in these four regions. I commend the authors to made freely available the SEAS5 BCSD forecasts (from 1981 to 2019) to the public through the World Data Center for Climate (WDCC), which is hosted by the German Climate Computing Center (DKRZ) in Hamburg, Germany.

My main concern about this paper is not on the method itself, since that was clearly demonstrated its improved performance relative to the competing method, but it is on the raised constraints to the usefulness of seasonal forecasts, particularly in developing countries. The authors point out that there are, based on the literature, different reasons for the effectiveness usefulness, among them: 1. proper communication and application of these forecasts (White et al., 2017); 2. credibility, legitimacy, scale, cognitive capacity, procedural and institutional barriers, and available choices (Patt and Gwata, 2002).

However, the problem goes far beyond these issues: 1. Too much emphasis on the infrastructure solution, which overshadows the importance of preparedness, for example, contingency plans for specific sectors. The focus on developing countries is on the increase of the water supply, but little, or none, effort is undertaken on demand management; 2. There is an institutional challenge in terms of the need for more collaboration among institutions, in particular, when they belong to different levels of administration. Most institutions operate the same way when they were created and they have to face new challenges (environment, society, ...); 3. The water management system does not reach the local level, even this impacting the large management systems. In some regions the density of small (unmonitored) dams is of the order of 0.6 dams/km2. At this scale, farmers use water as long as it is available. When water is no longer available, they look for new sources.âĂŃ There is an urgent need for rethinking

the water governance at this level: more engagement of municipalities and local communities is necessary. In my opinion, the key for disaster preparedness and adaptation is governance at local level, in particular, in dealing with extreme events.

I would add to this list that is key to understand the decision making process for these basins: What is the decision calendar in these basins? What decisions are made and on what basis? What information has the potential to be used for the studied basins (depending on the water system, the interest in the forecast is specific)? How could the information produced be incorporated? Another point, is the forecast issued in a moment compatible with this decision calendar (in some systems this is simply not possible*)? It would be important to include a discussion on these points for these basins. In my view, the promise of the usefulness of seasonal forecasts has been largely due to not trying to answer these questions before designing the information system based on seasonal forecasts.

In my view the topic is of interest of reader of ESSD and the paper does represent a significant contribution for this journal. However, since the authors highlighted the constraints in the effective usefulness of seasonal forecasts, I stress the importance in introducing some discussion on the points raised by this reviewer. —- *Note: It may be necessary the combination of scenario drawing in the moment the decisions are made and revisit such decisions in the moment the climate forecast system can provide useful information to the water sector.

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