

Interactive comment on “Value of seasonal streamflow forecasts in emergency response reservoir management” by Sean W. D. Turner et al.

Anonymous Referee #3

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The paper contributes to a better management of storage reservoirs by the use of (synthetic) seasonal forecasts. A major focus of the work is the assessment of the impact of different operating policies (emergency response versus continually adjusted) in combination with forecast of different forecast skills. The general setup of the experiments addresses the long-term operation of a reservoir system (monthly time steps) in application to a drought management.

General comments: The research topic is highly relevant. The practical value of seasonal forecasts, either by the classical ESP approach or weather models, needs validation in application to the management of water resources. The presented methodology seems to be a suitable tool to address the skill of actual or synthetic seasonal forecasts, furthermore, the authors address approaches to generate synthetic forecasts with defined skills to conduct systematic experiments.

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My main doubts are as follows: The classification of “continually adjusted” and “emergency response” objectives is misleading and gets the paper into a wrong direction. In the way implemented, the “continually adjusted” objective is a constant setpoint (75%, see page 6, line 25) for the reservoir storage. This is a very unlikely parametrization for a storage reservoir with water supply objectives and an annual hydrological cycle. The motivation of such a guide curve is to shift water from the wet to the dry season in order to guarantee a reliable water supply under consideration of an uncertain, variable yield. On the other hand, the “emergency response” objective has the character of a (soft) constraint. Both are incomplete if used exclusively and actual reservoir operation typically include both elements among others for flood control, recreation, hydropower etc.

After the introduction into seasonal forecast, the synthetic forecast used in the experiments are disconnected from the actual products available. You should address the skill of actual seasonal forecast products as a benchmark for the synthetic forecast used.

The paper may get published after major revisions. My advice is to give up the classification of “continually adjusted” and “emergency response” objectives and focus on the added value of seasonal forecasts of various skills in application to the reservoir management application.

Detailed comments:

Page 1, line 25: Do not forget the dimensioning of such a system, note that the storage volume of a reservoir is an explicit design decision

Page 2, lines 7-18: Very clear example of the misleading classification into “continually adjusted” and “emergency response”. You address flood control as “continually adjusted”, but drought management as “emergency response”. You could turn it around with the argument that relevant floods occur only “every 20 years by design”. This is misleading, because the typical reservoir operating policy will reserve both a free

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volume due to flood control, a minimum volume for water supply, both seasonal dependent.

Page 4, lines 10-16: Revise this paragraph. Spill should be included in Equation 2. Either use inflow or release volume consistently if you like to refer to a volume, or alternatively use inflow and release if this is in flow units, but then introduce a time step in the equations.

Page 5, lines 22-32: You refer to advantages of the SDP. But against what kind of other technique? Furthermore, this description is biased and it appears that SDP has no disadvantages at all.

Page 5, line 34 -: This seems to be a deterministic technique only, please clarify.

Page 7, lines 1-3: Results do not belong in here.

Page 8, line 20: Do you refer to Multi-stage Stochastic Optimization rather than Dynamic Programming? In the following, this paragraph reads more like a methodology section, not a results one.

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