Hydrology and Earth System Sciences Discussions

Interactive comment on "Stochastic modeling of Lake Van water level time series with jumps and multiple trends" *by* H. Aksoy et al.

Anonymous Referee #2

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General comments The manuscript illustrates a stochastic model for monthly water level data of the lake Van (Turkey), characterized by trends and jumps. An AR(2) model is applied to water level data once that trends and periodicities are first removed from the time series. The main novelty in this study lies in the fact that trends observed in the lake water level time series are fitted by two models: a mono-trend model (time series treated as a whole) and a multiple-trend model (time series divided into four homogeneous segments).

The paper presents an interesting topic. Overall it is well written and organized, besides the applied methodology seems appropriate. Nonetheless, I believe that further details should be added to the paper in order to support the interpretations and conclusions

drawn from the analyses carried out by the authors.

A first point to be clarified is the water budget computation. According to the authors, the comparison between lake water level calculated through the water budget and that measured at the gauging station illustrated in Figure 3, shows a very good agreement. As a matter of fact, although calculated values follow a similar pattern with respect to the measured ones, they are rather different in several years. For instance in the year 2000, such difference is about 50 cm. The authors should provide an explanation for that. Is it possible that one or more components have been disregarded in the water balance? For instance, only surface runoff is taken into consideration, . . . what about the base runoff?

A second point concerns validation of the proposed AR(2) model both in the case of mono-trend and multiple-trends. In particular, the only comparison is between observed and simulated maximum water levels of different fixed probabilities (or return periods), which is reported in Table I. Results of the comparison between the two models in terms of observed and model correlograms, as well as in terms of AIC or BIC, would be required to better support the conclusions of this study.

All things considered, I think the manuscript could be published after it has been revised following previous suggestions.

Specific comments follow.

Abstract Line 5 p. 2354: "a stochastic model is generated using the measured monthly water level data of ..." to be replaced by "a stochastic model is proposed for simulating monthly water level data of ..."

3 Water budget The observation period and time scale of precipitation and evaporation historical data sets should be indicated. In addition, details on how direct precipitation falling on the lake surface is calculated, based on the available meteorological stations, should be added for the sake of clarity.