Anonyms Referee # 1

We thank the referee (#1) for reviewing our manuscript entitled 'Modeling the Changes in Water Balance Components of Highly Irrigated Western Part of Bangladesh' and for his/ her valuable comments to improve our manuscript. We have responded to referee (#1) comments below**:**

Overall Comments:

This paper by A.T.M. Sakiur Rahman et al (the authors) describes the development of wavelet autoregressive moving average models to forecast changes in water balance components. The approach is applied to a highly-irrigated area in Western Bangladesh using data collected between 1982 and 2013. The authors show that the approach can be used to forecast short term changes in water balance components but suggest that models could be further improved using different combinations of wavelet analysis.

Reply to overall comments:

We are very much grateful to you for your valuable comments about our study ***'Modeling the Changes in Water Balance Components of Highly Irrigated Western Part of Bangladesh****'. We have gone through your comments and we will incorporate the necessary corrections in the relevant sections. We are also doing necessary corrections in language which is your main concern regarding the manuscript. Thank you very much for your suggestions that will help us to prepare a good paper. Yes, the paper is methodological in nature; we have tried to forecast water balance components (WBCs) more preciously after denoising the time series by discrete wavelet transformation. We also expect that there is a scope for further improvement of the methodology by different combinations of wavelet techniques. We will add a discussion section (3.4) where we discuss the advantages and limitations of our study. Please go through reply 11 of anonym's referee-2.*

Action: *We are doing necessary corrections in language. We have also written a discussion section. Please go through reply 11 of anonymous refree-2.*

The responses to the specific comments are also presented as follows:

Reply to the Specific comments

Comment 1: This is a technical paper with a strong methodological focus. While the approaches used are well described, I would recommend the authors more clearly define the importance of the work in a broader hydrological context; for example, the relevance to hydrology and water resource management regionally and globally as this is only mentioned briefly.

Reply 1: *We have rewritten the introduction section and discussed about the time series analysis in a broader hydrological context following your suggestions (please go through the reply 1 of referee #2). Thank you very much for your constructive comments.*

Action: *We have rewritten the introduction section following the reviewer's suggestions. Please go through reply 1 of anonyms refree#2.*

Comment 2: This study is applied to a region in Bangladesh, however, both the approach and the paper would benefit if the transferability of the methodology could be highlighted by the authors; i.e. in what environments and under what conditions would the methods described work well.

Reply 2: *We are very pleased after going through your comments. ARIMA models (Box and Jenkins, 1976) are very much useful for forecasting hydrological variables such as rainfall (e.g., rainfall of the USA by Burlando et al., 1993), temperature (e.g., temperature of Bangladesh, Nury et al., 2017), PET (e.g., PET of Iran, Valipour, 2012), groundwater level (e.g., groundwater level of Canada by Adamowski and Chan), runoff (e.g. runoff of Russia by Nigam et al. 2014), water quality (water quality of Turkey by Faruk 2010) etc. These are the few examples of the application of ARIMA models in hydrology. However, ARIMA models have a limitation; these models cannot appropriately handle non-stationary hydrological data. Wavelet analysis is a suitable technique to overcome this*

problem. Several studies have already demonstrated the advantages of wavelet analysis (Sang, 2013). Wavelet denoising has not attracted much attention in hydrologic science, though it has been used in the other science and engineering fields (Sang, 2013). We have discussed the advantages of denoising for forecasting the hydrological data in our article. Water balance components are related with a rage of hydro-meteorological variables. As we have given here few examples of worldwide applications of ARIMA models for forecasting the hydrological variables. Therefore, we may assume that our developed wavelet denoised ARIMA models can be applied for forecasting the hydrological variables worldwide. We will briefly discuss the matter in our new discussion section. Thank you very much for reminding us to write something about this important issue.

Action: *As mentioned earlier, we have added a discussion section following the reviewer's suggestions. Please go through reply 11 of anonyms refree#2.*

Comment 3: The paper would also benefit from a separate limitations section; for example, as an additional section 3.4. Limitations, in addition to those found within the methods, should also be highlighted. This may include, for example, scarcity of data. Also, data from 11 stations are used to represent over 61,000 km2. A comment on how representative this data is would be welcome.

Reply 3: *As mentioned earlier, we will incorporate a discussion section where we highlight the limitations of our present study. We are doing another research work, and we hope that we will mention the scarcity of data and representativeness of the data for a large area in our next study.*

Action: *As mentioned earlier, we have added a discussion section. Please go through reply 11 of anonyms refree#2.*

Comment 4: Some of the text in Figure 6 is difficult to read. Also, please be consistent with the font.

Reply 4: *Thank you very much again for your valuable suggestions. We have already prepared new figures following your suggestions. We will add this figure in our final manuscript.*

Action: *We have prepared a new figure.*

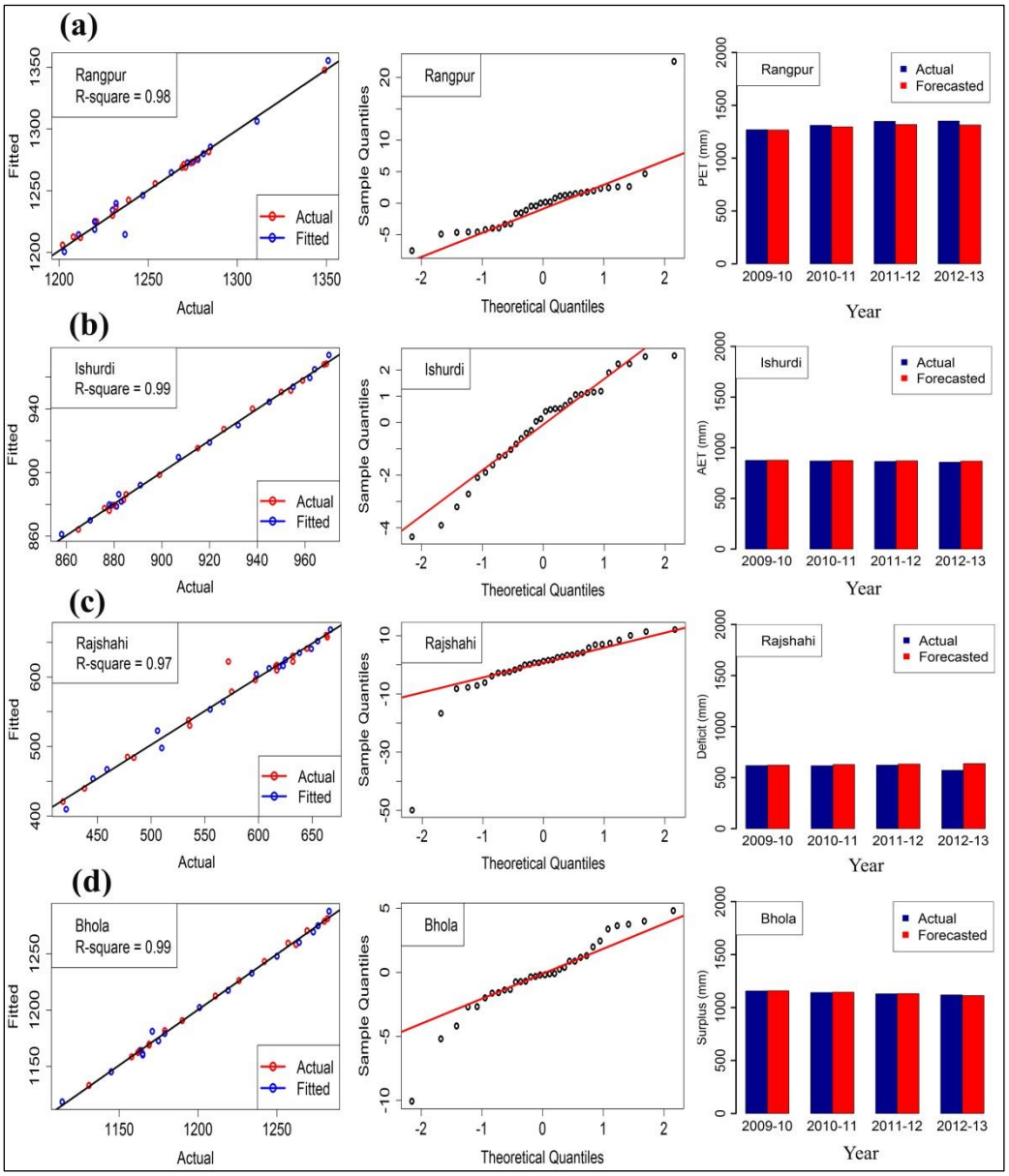

Figure 6: Plot of best wavelet ARIMA model first panel represents actual versus fitted values for the period of 1981-82 to 2012-2013, the second panel is normal Q-Q plot of residuals of the model, and the third panel shows actual, fitted and forecasted values for 2009-2010 to 2012-13 (a) P_{ET} of Rangpur station located in north; (b) A_{ET} of Ishurdi station located in the central part, (c) deficit of Rajshahi station located in NW Bangladesh and (d) surplus of Bhola station located in south of the study area.

Comment 5: Some examples of typos and where sentence rephrasing would be beneficial:……

Reply 5: *We are going through the manuscript carefully and doing necessary corrections to improve the language. Thank you very much for your time and comments that help us a lot to improve the article.*

Action: *As mentioned earlier, we are doing necessary language corrections with the help of two professors of English department.*

References

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