

Compliance to reviewer (RC3) comments

Q1. Authors should clearly present a research question (why is the purpose of using copulas) and why do they believe that copulas are a suitable alternative to answer it.

Reply: In this work, we used ARMA model and Copula models to find out which model is best for capturing information between pre-monsoon and post-monsoon outflow at Farakka. Before arriving at the partitioning of discharge data into two series of six months, we also attempted partitioned series at different lags. Table below shows the performance of Copula when different series having varying lags are used.

Sr. No.	Arrangements	MSE	AIC	BIC
1.	Lag 1	0.0387	-57.724	-56.067
2.	Lag 2	0.121	-34.945	-38.944
3.	Lag 3	0.3815	-11.94	-10.29
4.	Lag 4	0.2465	-20.68	-24.72
5.	Lag 5	0.2942	-17.140	-15.48
6.	Pre-monsoon and Post-monsoon	0.00156	-121.98	-120.32

Needless to say, the scheme at Sr. no. 6 performs better than the rest. It is for this reason that we opted the partitioned series at serial number 6.

Finally, we conclude that performance of copula is better than ARMA for any set of series. Due to international disputes between India and Bangladesh, only 25 years discharge is available. For rainfall modeling similar type of study is done by several researchers, one of such kind is given below.

“Ghosh, S. (2010). Modelling bivariate rainfall distribution and generating bivariate correlated rainfall data in neighbouring meteorological subdivisions using copula. *Hydrological Processes*, 24(24), 3558-3567.”

Q2. Furthermore, there are some points in the research presented that need to be improved from my point of view. I do not understand why they use data between 1949 to 1968 to calibrate copulas and data between 1969 to 1973 to validate them. There are no data records after 1973?

Reply: The data on Ganga river is classified and therefore, there is a need to develop models which can help in generation of data. We also attempted to relate outflow data with the catchment precipitation but no well defined trend was conceived. To generate outflow from Farakka which is relevant to India as well Bangladesh, some mechanism has to be worked out. Reservoir routing is also not feasible as inflow data is classified. Thus, a classical hydrology based approach is not feasible. For this reason, recourse to statistical approaches was taken and two popular modeling strategies based on COPULA and ARMA are explored in this paper to

identify the suitable model for outflow generation. Obviously, the Copula model shows better predictive capabilities.

Q3. They present the types of copulas they use in lines 43-45, but the explanation on what a copula is appears in lines 86-88, after the presentation of the criteria used to choose among different types of copulas (lines 59- 65).

Reply: Suggestions and corrections will be implemented in the revised manuscript.

Authors would like to thank the reviewer for his useful comments.