Dear Authors,

The paper is comparing ability of an Artificial neural network (ANN) model – Convolutional Neural Network model (CNN), and a reservoir model – KarstMod in five European karst springs to simulate discharges.

The idea of comparing ANNs and reservoir models in the context of karst spring discharge simulation stands as an interesting point of interest for hydrology and earth system sciences, especially through consideration of the different basins with different characteristics. Therefore, the article is considered relevant to the scope of HESS since it can contribute the improvement of karst system modelling approaches with extensive comparisons between different models. However, following suggestions and comments can be considered to improve the context and methodology of the paper and provide better understanding to readers.

1- In Data and study sites section (2.1 to 2.5) (p3. From 85-165): it could be better to explain the reason behind using different potential evapotranspiration (PTE) calculation methods for different basins and the impact of different methods on PTE, if there is any.

2- In Artificial neural networks section (3.1) (p6. From 175 to 185):
Selected ANN model type should better be demonstrated with figures as it is done for reservoir models in the following section. Since CNNs are quite complex deep learning models, it can be difficult to be comprehended even for experienced ANN modelers. Demonstrations of CNN and a little more detailed explanation of the regularization methods to avoid traps such as exploding gradient could enrich the context of the article.

3- In Model evaluation section section (3.4) Model evaluation criteria should be better justified. Moreover, using more evaluation criteria can be more rigorous which are usually considered in hydrological modelling studies. For instance, relative volume bias, normalized peak error, root mean square error, nash score (the last two is suggested sice they are also used as cost function).

4- In Introduction section (p. 2) from line 48 to 51, authors said "Distributed models require a lot of data for defining physical parameters and thus can 50 be tough to use in a scarce data context. On the other hand, data-driven models permit studying complex and heterogeneous karst systems without requiring extensive meteorological and system-related data.". However, the difference between distributed and data-driven models (if the authors meant statistical models such as ANN) about the data requirement is not necessarily about the amount of data but rather about the diversity. This phrase can be modified to indicate that distributed models need more diverse data while ANNs need only input and output data.

5- In Introduction section (1) (p. 2) from line 57 to 62 references can be given in historical order.

In Introduction section (1) (p. 3) in line 74 references can be given in historical order.

In Reservoir model section (3.2) (p. 7) in line 74 references can be given in historical order.

[References can be homogenized as so...]

6- In Source of uncertainties section (4.2) (p.23) from line 518 to 540, authors can mention the expected (if not quantified) amount of uncertainty for each source in their case studies for different basins either by expertise or literature support. Since basins are of different characteristics, it can be interesting to have such information for readers.