Stochastic rainfall is especially beneficial as input for hydrological models used for flood frequency analysis. It is important to improve rainfall models in order to be more flexible to a changing climate.

One step towards this aim is to consider circulation patterns (CP). CPs describe the atmospheric conditions over a large area. It has been found that CPs significantly influence precipitation conditions. Therefore it is only natural to try using CPs for conditioning the parameters of a rainfall-model. First results of the procedure are presented here.

The analyses were performed with an alternating renewal model (ARM) for stochastic synthesis of short time step rainfall (see Haberlandt et al., 2008).

In an ARM precipitation is described as an event series. The events are defined by their wet-spell durations and intensities and dry-spell durations (see Fig. 1).

These event-characteristics are generated with probability distributions while a 2-D Copula is used to relate wet-spell intensity and duration.

Daily CPs were obtained with an automatic classification method based on fuzzy-rules (see Bárdossy, 2010). The CPs are defined by pressure anomalies (see Fig. 4).

Each rainfall event was allocated to the most frequently occurring CP in the event duration.

The first results indicate that atmospheric circulation patterns are a useful tool in stochastic rainfall modeling as they allow an objective discrimination of the data. This advantage could only partially be translated into improved model performance yet. Reasons could be either a non optimal model or the short observation length.

Required further work include an extension of the time series, a clustering of the CPs and, presumably, further changes in the model-structure.