Modeling the spatial dependence of floods using the Fisher copula Floods often affect not only a single location, but also a whole region. Flood frequency analysis should therefore be undertaken at a regional scale which requires the considerations of the dependence of events at different locations. This dependence is often neglected even though its consideration is essential to derive reliable flood estimates. A model used in regional multivariate frequency analysis should ideally consider the dependence of events at multiple sites which might show dependence in the lower and/or upper tail of the distribution. We here seek to propose a simple model that on the one hand considers this dependence with respect to the network structure of the region and on the other hand allows for the simulation of stochastic event sets at both gauged and ungauged locations. The new Fisher copula model is used for representing the spatial dependence of flood events in the nested Thur catchment in Switzerland. Flood event samples generated for the gauged stations using the Fisher copula are compared to samples generated by other dependence models allowing for modeling of multivariate data including elliptical copulas, R-vine copulas, and max-stable models. The comparison of the dependence structures of the generated samples shows that the Fisher copula is a suitable model for capturing the spatial dependence in the data. We therefore use the copula in a way such that it can be used in an interpolation context to simulate event sets comprising gauged and ungauged locations. The spatial event sets generated using the Fisher copula well capture the general dependence structure in the data and the upper tail dependence, which is of particular interest when looking at extreme flood events and when extrapolating to higher return periods. The Fisher copula was for a medium-sized catchment found to be a suitable model for the stochastic simulation of flood event sets at multiple gauged and ungauged locations.