Inferring the flood frequency distribution for an ungauged basin using a spatially distributed rainfall-runoff model

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The estimation of the peak river flow for ungauged river sections is a topical issue in
applied hydrology. Spatially distributed rainfall-runoff models can be a useful tool to
this end, since they are potentially able to simulate the river flow at any location of
the watershed drainage network. However, it is not fully clear to what extent these
models can provide reliable simulations over a wide range of spatial scales. This issue
is investigated here by applying a spatially distributed, continuous simulation rainfall-
runoff model to infer the flood frequency distribution of the Riarbero Torrent. This
is an ungauged mountain creek located in northern Italy, whose drainage area is 17
km^2. The results were checked by using estimates of the peak river flow obtained
by applying a classical procedure based on hydrological similarity principles. The
analysis highlights interesting perspectives for the application of spatially distributed
models to ungauged catchments.