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Modelling the contribution of land use change and climate change to streamflow in a subbasin with the largest sand generation in the Yangtze River

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Land use change and climate change are the main drivers affecting hydrological regime in Anning river basin, a tributary with the largest sand generation in the upper Yangtze River. However, their contribution to the variation of flow in the subbasin keeps unclear. Firstly, the gauged precipitation, streamflow and sand data were used to analyze their trends of variation since 1980s and land use and land cover change in four representative years were studied. Then semi-distributed hydrological model MIKESHE was used to simulate the ecological and hydrological status of several scenarios reflecting the different changes of climate and land use. The results showed that the runoff of Anning River increased and the its variation decreased, which was consistent to the loss of forest cover. The comparison among scenarios showed that both climate change and land cover change contributed to the variation of flow. The land cover change exerted more influence on the variation during 1990s, which might be the main reason why the Anning River became the one that had the largest sand generation in that time. As hydrological impacts of land use change and climate change may be temporally varied, it is requisite to manage water resources adaptively to address future climate change and water resources shortage.