The Xin'anjiang Hydrological Model: Theory, Evolution and Application

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Hydrological models are essential tools for investigating hydrological processes at both hillslope and watershed scale. These models have been recognized as the efficient non-engineering measures for flood control and water resources management. The Xin'anjiang (XAJ) hydrological model is a conceptually-based model which was developed on the basis of conception of hillslope hydrology and has been widely applied in humid and semi-humid regions of China for the purpose of real-time flood forecasting and water resource management. In the first part of this presentation, the detailed theory of the XAJ model will be introduced, including the theoretical basis, calculations processes, assumptions, and generalizations, etc. Then for the second part, the evolutions and improvements of the XAJ model will be presented, e.g. estimating parameters based on the catchment underlying surface characteristics, coupling the energy balance scheme to the original mass balance scheme, etc. These evolutions and improvements help to overcome the defects of the XAJ model and extend its application fields. In the last part of this presentation, some case studies of the XAJ model applied in China regarding real-time flood forecasting and water resource management will be demonstrated and discussed, implying the significance of the XAJ model to flood control in China.