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Building an integrated modeling framework for assessing land-use change and its consequences for areal water balance in mountainous Southwest China

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Abstract. The opening up of China's industry towards market orientation has a distinct impact on natural resources as well as on social structures. The example of rubber introduction in Yunnan province (SW China) shows the mutual interdependencies between economy, natural resources, and social structures. We assess the impacts of rubber introduction and possible development paths in the study area. An integrated modeling framework (NabanFrame) is developed for the catchment of the Naban River (size 270 km^2), a tributary to the Mekong River. NabanFrame comprises an agro-economic, ecological, and social model. Altogether they interact with a land-use change model via defined interfaces. Effects on the water cycle are considered by additionally integrating the spatially distributed rainfall-runoff and water balance model AKWA-M® in the model framework. Therefore, a reasonable parameterization is needed to assess the land-use changes on areal water fluxes. The authors conclude that the chosen hydrological model is able to assess the impacts of land conversion (from forest to rubber plantations) on catchment hydrology and address further adaptations to be implemented in the hydrological model.

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