Multi-sphere hydrological modeling over the Third Pole

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In recent years, we have been committed to the development of a multi-sphere hydrological model for the Third Pole (TP) region, to improve the predictive ability of regional water resources and disasters. We have made significant progresses in modeling and observing the cryosphere processes, which can be summarized below. (1) Through incorporating the cryosphere processes (e.g., glacier, snow, frozen soil) into a distributed biosphere hydrological model (WEB-DHM), a multi-sphere hydrological model that is applicable to TP has been developed. (2) We have applied the multi-sphere hydrological model into various basins in the Pan-Third Pole Region, for addressing important issues of water science (e.g., short-term flood forecasting, cold-region drought monitoring, study of large lake changes). Based on these studies, much improved understanding of TP multi-sphere interactions (atmosphere- cryosphere- hydrosphere- biosphere) has been achieved. (3) We have built various field observations over the TP region to support the numerical modeling, including the observational networks at the Yarlung Zangbo River Basin as well as the upper Dang River Basin.