Some challenges and their current examples in large-scale modeling of hydrology and water resources under AsiaPEX

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I am going to introduce a few subjectively selected topics which would better be carried out in AsiaPEX from the viewpoint of large-scale surface hydrology, in particular from the perspective of modeling may be coupled with earth observations such as satellite remote sensing. Those topics are, the better estimation of precipitation in less-gauged areas of Asia and its application, hydrological modeling which incorporates human water withdrawal particularly in Asia, and the integration of satellite observations and model simulations for exploring land water budgets and dynamics. Some more details for a specific topic may be further introduced. That is hydrological modeling in high mountains including large-scale glacier melt modeling. Modeling of hydrology and water resources in high mountains in Asia should be a major topic in next stage of GEWEX RHP in Asia as mentioned above. Here, I am going to discuss its difficulties and state-of-the-art tools to overcome the difficulties such as the modeling of debris impact on melting in a high-resolution modeling and the effect of precipitation and temperature data on future projection of cryosphere in high mountains. A model study for a high mountain area is further applied to the estimation of hydropower under climate change.