



## **Assimilating MODIS Snow Covers into Land Surface Model: Validation with in-situ Snow Measurements in Northern Xinjiang, China**

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Accurate monitoring of the spatiotemporal distribution and variation of snow cover is important for snowmelt runoff simulation and water resources management especially in mountainous areas. In this work, we develop a snow data assimilation scheme based on Ensemble Kalman Filter (EnKF) algorithm and Common Land Model (CoLM), which can assimilate snow cover fraction (SCF) products from the Moderate resolution imaging Spectroradiometer (MODIS) into CoLM for improving snow depth (SD) and snow cover area simulations. An empirical model between SD and SCF has been built based on MODIS SCF and snow depth observations at meteorological stations located in study area, which is used as observation operator in snow data assimilation scheme. The assimilation experiment is conducted during 2004–2007, in Xinjiang province, west China. The preliminary assimilation results are very promising and show that the assimilation of SCF could significantly improve the CoLM capability of simulating snow cover area and snow depth. The assimilation results are more closer to those of observations, which have more reasonable and reliable snow accumulation and melting trends throughout the snow season. After assimilating MODIS SCF observations, the Root Mean Square Error (RMSE) and Mean Bias error (MBE) of snow cover or snow depth are significantly reduced compared to the results without assimilation.