

The data assimilation framework TerrSysMP-PDAF: data assimilation for integrated terrestrial system models

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The integrated terrestrial system model TerrSysMP calculates the two-way coupling between the atmospheric, land surface, surface water and subsurface domains. It is expected that this fully coupled representation of the terrestrial system is an improvement compared to one way coupled simulations as the mutual interactions between the compartments are taking into account. Nevertheless, predictions with TerrSysMP are affected by uncertainty given the many unknown input parameters. Data assimilation can potentially improve the model predictions and reduce the uncertainty by updating model simulations with real-time measurement data. Measurement data also allow improving the characterization of the model parameters and therefore long-term climate simulations. We developed therefore a data assimilation system in combination with TerrSysMP. The parallel data assimilation framework (PDAF) was coupled to TerrSysMP and showed excellent scaling behavior and seems suitable for large scale high resolution data assimilation studies with TerrSysMP. This overview shows current developments of TerrSysMP including the assimilation of data from cosmic ray probes to improve the catchment-wide characterization of hydrological fluxes.