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## Evaluation of the new irrigation implementation in CTSM

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Many observational and modelling studies have highlighted the important role that irrigation plays in the terrestrial hydrological and energy cycle. Land surface models are a key tool to study these interactions, underlining the importance of an accurate representation of irrigation in these models. However, most land surface models either ignore irrigation or represent it in a crude way. Here we improve and evaluate the implementation of irrigation in the Community Terrestrial Systems Model (CTSM), the land component of the Community Earth System Model (CESM). In this improvement, we consider three irrigation techniques (flood, sprinkler and drip), which differ in the amount and way of water applied. By combining global maps of the area equipped for irrigation with the distribution of different irrigation techniques, we represent the transient spatial distribution of irrigation techniques. Subsequently, we evaluate the performance of CTSM with the improved irrigation module. Three experiments are conducted: one with irrigation switched off, the second with the original irrigation module and the third with the improved irrigation module implemented. All three outputs are evaluated against observed or remotely sensed land surface energy fluxes and near-surface climate datasets. We anticipate that the results will reveal how our new irrigation schemes improve or reduce the performance of the land surface model.