Human impacts on extreme hydrologic events: new features in E3SM V2

Tian Zhou and Ruby L. Leung

Extreme hydrologic events such as floods and droughts are often perceived as natural hazards, but human activities may alter their characteristics by perturbing the water and energy fluxes in the earth system. In the newly developed Energy Exascale Earth System Model (E3SM) version two (V2), we have developed several new features to represent the human dimensions, including a water management scheme in the river component, and a two-way coupled irrigation scheme between land and river components. In addition, to better capture the hydrologic responses of the flood events, we have also improved the river component with a new flood inundation scheme. In this presentation, we summarize these new features in E3SM V2 and showcase some on-going studies to demonstrate how these new features can help us understand the human impacts on hydrologic extremes and human perturbations on the interacting processes within a coupled earth system.