

Title: High order accurate methods for the shallow-water equations with dry area

Abstract: Shallow-water equations with a non-flat bottom topography have been widely used to model flows in rivers and coastal areas. An important difficulty arising in these simulations is the appearance of dry areas, and standard numerical methods may fail in the presence of these areas. These equations also have steady-state solutions in which the flux gradients are non-zero but exactly balanced by the source term.

In this presentation, we propose some recently developed high-order discontinuous Galerkin and weighted essentially non-oscillatory methods, which can preserve the steady-state exactly, and at the same time are positivity preserving without loss of mass conservation. Some numerical tests are performed to verify the positivity, well-balanced property, high-order accuracy, and good resolution for smooth and discontinuous solutions.