DEVELOPMENT OF A COASTAL INUNDATION MODEL USING A TRIANGULAR DISCONTINUOUS GALERKIN METHOD

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The use of unstructured triangular meshes provides an opportunity to accurately model coastlines which will aid in the study of tsunamis and storm surges. Discon- tinuous Galerkin methods employing triangular elements applied to shallow water equations have been developed by Giraldo and co-workers [1,2]. The attractive features of the discontinuous Galerkin method over the finite element and finite volume methods are the higher order accuracies and the local conservation properties. The local nature of the discontinuous Galerkin method inherently lends itself to efficient parallelization on massively parallel processing computers. A coastal inundation model applied in the triangular discontinuous Galerkin framework will be discussed in this presentation. Standardized test cases existing in the litera- ture will be verified and possible higher order methods for wetting and drying will be discussed. Simulation of recent tsunami events will be presented. Discussion of idealized wind stress models along with strategies for combining wind stresses from a DG non-hydrostatic mesoscale atmospheric model to perform storm surge calculations will also be presented.

References

[1] F.X. Giraldo and T. Warburton, ”A high-order triangular discontinuous Galerkin oceanic shallow water model”,International Journal for Numerical Methods in Fluids,v. 56,p. 899-925, 2008 [2] F.X. Giraldo and M. Restelli, ”High-order semi-implicit time-integrators for a triangular discontinuous Galerkin oceanic shallow water model”,International Journal for Numerical Methods in Fluids,v. 63,p. 1077-1102, 2009