1143-65-244 **M. Aggul**, **J. Connors**, **D. Erkmen** and **A. Labovsky*** (aelabovs@mtu.edu). *A Defect-Deferred Correction Method for Fluid-Fluid Interaction.*

A method is proposed to improve two aspects of numerical simulations for a model of two fluids coupled across a flat interface. This problem is motivated by atmosphere-ocean interaction. A deferred correction approach lifts the numerical order of accuracy formally from first order (very common in applications) to second order, in terms of the time interval of communication between the fluid code components. This is accomplished in a two-step predictor-corrector type method. In the second step, a further defect correction is included as well. The "defect" represents artificial diffusion used in the fluid solvers, which is often included to control numerical noise or to model subscale mixing processes. The addition of the defect correction adds only marginally to the expense, but in exchange may provide a significant reduction of overdiffusive effects.

The method is stable, optimally convergent and also allows for the usage of legacy codes. A computational example using a known (manufactured) solution illustrates the theoretical predictions. We observe a computational benefit in this example even for coarse time steps and over a wide range of artificial viscosity values. (Received August 15, 2018)