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Thermal and Fluid Dynamics of Snow vs. Rain at the Air-Water Interface MEHDI VAHAB, KOUROSH SHOELE, Florida State University, DAVID MURPHY, University of South Florida — The effects of precipitation in the forms of rain, snow, and hail are studied using computational methods for multi-material/multiphase systems. The comparison of single droplet impacts shows the phase-dependency (a liquid or solid droplet) of the momentum and energy transfer to the surface and body of water. The depth of penetration and the resultant vertical flow are found highly dependent on the phase-change rate of the droplet. Multiple models of snow particles with systematic geometrical complexities are tested for the role of shape in air pocket entrapment at the impact. The sensitivity of the single droplet impact dynamics is also studied by varying droplets size and temperature, and are used for investigation of the precipitation events with the average ensemble effects of multiple droplet impacts. The size and velocity of the droplets are set based on the observed size/velocity distribution of frequent rain, hail, or snow events. A predictive model is developed to predict the changes in the water surface and body energy content following each precipitation event.

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