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A study of the effect of surface conditions on free-surface evaporative convection S.M. BOWER, J.R. SAYLOR, Clemson University, Dept. Mechanical Engineering — An experimental study is presented of free-surface evaporative convection in both the presence and absence of a surfactant monolayer. The transfer of heat and the evaporation rate are quantified by parameterizing the Nusselt and Sherwood numbers in terms of the Rayleigh number. The goal of this study is to determine how these $Nu - Ra$ and $Sh - Ra$ relationships change when the hydrodynamic boundary condition is changed at the free surface. Specifically, two cases are presented: 1) a surface covered with a surfactant monolayer having a finite elasticity, and 2) a clean surface having zero elasticity. The resulting $Nu - Ra$ parameterization is also compared to investigations of the classical Rayleigh-Bénard experiment where the hydrodynamic boundary condition is of the no-slip type.

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