1070-34-15 **Dorian S Abbot*** (abbot@uchicago.edu), 5734 South Ellis Avenue, Chicago, IL 60637, **Mary Silber**, 2145 Sheridan Road, Evanston, IL 60208, and **Raymond T Pierrehumbert**, 5734 South Ellis Avenue, Chicago, IL 60637. *Using a Simple Mathematical Model to Understand Arctic Sea Ice Behavior in a Future Warmer Climate.*

Arctic sea ice is currently being lost at a rapid rate. This loss could continue linearly until there is no sea ice left or sea ice could exhibit nonlinear behavior, such as a collapse after crossing a nonlinear threshold or jumping between equilibria as a result of stochastic weather forcing. Eisenman and Wettlaufer (2009) developed a simple ODE model of seasonal variations in Arctic sea ice that allows us to get a handle on what sort of behavior we might expect. Their main conclusion was that summer sea ice loss shouldn't exhibit nonlinear threshold behavior but winter sea ice loss could. We extend their model to include changes in clouds and heat transport into the Arctic as sea ice is lost. We find nonlinear behavior is possible for summer sea ice loss, but that winter sea ice loss should be "more" nonlinear. These results appear to be consistent with those from highly complex global climate models. (Received November 21, 2010)