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**Kaitlin Hill\*** (k-hill@u.northwestern.edu), Northwestern University, 2145 Sheridan Rd M426, Evanston, IL 60208, and **Dorian S Abbot** and **Mary Silber**. *Analysis of an Arctic sea ice loss model in the limit of a discontinuous albedo*. Preliminary report.

As Arctic sea ice extent decreases with increasing greenhouse gases, there is a growing interest in whether there could be a bifurcation associated with its loss, and whether there is significant hysteresis associated with that bifurcation. A challenge in answering this question is that the bifurcation behavior of certain Arctic energy balance models have been shown to be sensitive to how ice-albedo feedback is parameterized. We analyze an Arctic energy balance model in the limit as a smoothing parameter associated with ice-albedo feedback tends to zero, which makes the system piecewise-smooth. Our analysis provides a case study where we use the piecewise-smooth system to explore bifurcation behavior of the smooth system. In this case study, we demonstrate that certain qualitative bifurcation behaviors of the smooth system can have nonsmooth counterparts, and we use this link to provide an alternative perspective on how parameters of the model affect bifurcation behavior. We expect our approach, which exploits the width of repelling sliding intervals for understanding the hysteresis loops, would carry over to other positive feedback systems with a similar natural piecewise-smooth limit, and when the feedback strength is likewise modulated with seasons or other periodic forcing. (Received September 21, 2015)