



Undergraduate Modeling Workshop

May 20-25, 2018

PROJECT ABSTRACTS

Group Leader:

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Project I: Arctic Sea-Ice

“Low order models of Arctic sea ice and the effect of process parameterizations for predictions”

Abstract: Covering 7-10% of the Earth’s surface, Sea ice is a critical component of the climate system and is sensitive to changes in global temperature. In the paper “Nonlinear threshold behavior during the loss of Arctic sea ice” (Eisenmann & Wetlaufer 2009) a low order model for sea ice thickness is presented which exhibits hysteresis in sea ice loss as the climate warms. This model considers the most impactful processes affecting sea ice volume and parameterizes them, good representations of these processes is thusly paramount. One such important process is the ice albedo feedback. In the Arctic summer months, snow melt turns into dark ponds which sit atop the sea ice. Dubbed melt ponds, these ponds lower the over albedo (reflectance) of the ice causing the absorption of more incoming solar radiation, promoting more melting and further lowering the ice albedo and continuing. In this project we will investigate how different parameterizations of this process affect model output and hysteresis. We can also examine how changing seasonal temperature variations, such as early warming and melting, will affect the fate of the Arctic sea ice pack.

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