# Impacts of tides on ocean-ice interactions in East Antarctica

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The current generation of global climate models exhibits large biases in the Southern Ocean. While key processes governing heat and freshwater exchanges – such as polynyas or ocean ice shelf interactions – take place in coastal Antarctica, the resolution of global models is too coarse to adequately represent them. Parameterizations are used to simulate their effect, but they rely on sparse observations and might be too crude to catch the complexity of air-sea-ice interactions. Knowing whether or not small-scale processes are relevant for the study of the Antarctic climate and if current parameterizations are adequate to represent them is yet unclear. Here, we propose to evaluate the sensitivity of air-sea-ice interactions to the representation of small-scale processes, at hourly to seasonal time scales. To do so, we developed a very high-resolution model of the ocean and sea ice off Adélie Land, East Antarctica. We focus on the particular role of tides and ocean-ice shelf interactions. A series of sensitivity experiments is performed in which tidal forcing and under ice shelf cavities are removed. In the presence of tides, the seasonal sea ice growth is lowered. This is particularly the case for shallow regions of the coastal seas, where tidal velocities amplitude and associated mixing are large. While ice shelfves also experience stronger basal melt in the presence of tides, the response is highly variable from one glacier to the other. This spatial variability is due to the fact that tides also deeply modify ocean circulation on the continental shelf, resulting in changes in pathways connecting warm water and ice shelf cavities. While our results are specific to the particular case of Adélie Land, we argue that both tides and ice shelf cavities influence ocean-ice interactions in coastal Antarctica, and that high resolution is recquired to represent the broad spectrum of their effects.

Oral preference