



## Abstract View

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# A Time-Dependent Model of a Coastal Polynya

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### ABSTRACT

An idealized model is used here to examine the temporal behavior of a coastal polynya driven by an offshore wind. The model has incorporated the important effect of a finite surface drift by which the frazil ice formed in the open ocean is advected downwind and collected at the ice edge. It is found that a finite surface drift, on the one hand, reduces the “inertia” of the ice edge, thus prompting a greater response for a given flux imbalance, but on the other, delays and smooths out the forcing effect at the ice edge. The resulting polynya behavior is examined in response both to a finite step change and small perturbations in the atmospheric forcing. The model results suggest, among other things, that the ice edge is in approximate equilibrium with synoptic and longer-period atmospheric variations, but is not responsive to higher-frequency atmospheric fluctuations with periods short compared with the transit time of a water parcel through the polynya.

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