

# Wind-Blown Snow Infilling of a Rift in the Ross Ice Shelf

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Iceberg-calving rifts in Antarctic ice shelves are often filled with a mixture of snow, marine ice, and ice talus referred to as ice melange. Ice melange may play various roles in the rates of propagation of rifts in the Ross and Amery Ice Shelves. This study examines the role of windblown snow in the formation and maintenance of ice melange within the idealized geometry of the "nascent rift" in the Ross Ice Shelf (78°08'S, 178°29'W). The rift axis is perpendicular to the regional wind direction, allowing us to employ a two-dimensional blowing snow model. The Piekduk-Tuvaq blowing snow model (Dery and Tremblay, 2004) adapted the Piekduk blowing snow model for use in sea ice environments by including parameterization for open-water leads within the sea ice. This is useful for modeling the initial conditions of a freshly-opened rift, as the input of blowing snow into the seawater within the rift promotes marine ice formation by cooling and freshening the surface water. Once the water surface is sealed with a layer of marine ice, snow and talus derived from the ice shelf can pile up on this surface, leading to the typically lumpy morphology of ice melange. While the rift initially acts as a trap for blowing snow, the topography within the rift eventually reaches steady-state. The presence or absence of such a topographic profile within a rift can potentially be used to determine whether or not the rift is actively propagating or deforming.