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# Disarticulation of Temperate Glaciers - The Dynamics of Passive Calving

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Syntheses of aerial photography, satellite imagery, topographic maps, and modern and historic field observations document that more than 50 large Alaskan glaciers, nearly all non-surging, are rapidly retreating through disarticulation. Disarticulation is defined as the passive separation of large icebergs from the floating terminus or floating lateral margin of a glacier following the transition of the glacier terminus or margin from grounded to floating. Disarticulation is a unique type of passive calving. Disarticulating glaciers typically terminate in deep ice-marginal lakes. Until recently, many of the Alaskan glaciers that are now rapidly retreating through disarticulation had terrestrial termini. Disarticulation begins after the melting, low-gradient, distal end of a retreating glacier thins, reaches a state of buoyancy, and separates from its bed. Once flotation of the terminus occurs, one or more tabular icebergs begin to disarticulate from the terminus or lateral margin. The largest disarticulated iceberg observed by the author was $>$1.5 km in length. Disarticulation usually occurs along old crevasse scars and fractures and may begin at distances of 2-4 km from the glacier's terminus. In some disarticulation events, hundreds of large icebergs have been observed simultaneously separating from a glacier terminus. Several glaciers have been observed retreating through disarticulation for periods exceeding three decades. Current calving theory suggests that active calving is initiated as a glacier terminus thins to some critical thickness, such as the thickness of neutral buoyancy plus 50 m (Tnb + 50 m), postulated by van der Veen. This presentation investigates the dynamics of disarticulation, a condition initiated when a temperate glacier thins below a second critical limit, presented here as the thickness of neutral buoyancy or the floatation thickness (Tnb). Observations from Bering Glacier are presented to illustrate this relationship.