

Antarctic glacier tongue recession: causes, rates and implications

WEIHAUPT, JOHN, G. and RICE, ALAN. University of Colorado, Denver, Colorado, U.S.A.; Rhodes University, Grahamstown, South Africa.

Glacier tongue and ice shelf changes constitute one of the major Antarctic indicators of possible local, regional and global environmental change. Changes in glacier tongues, particularly since the early 1900s, are variously documented around the Antarctic continent, but perhaps best documented for the Mertz and Ninnis Glacier Tongues on the George V Coast, at $146^{\circ}00'W-67^{\circ}00'S$. The earliest reliable record of these glacial features is that of the Australasian Expedition of 1911-1914, which determined the dimensions and seaward extension of each of these glacier tongues. Subsequent determinations of their sizes and locations in 1962, 1987 and 1999 reveal a progressive decline in ice volumes, dynamical flow, and seaward extension. The close proximity of two such major glacier tongues, and their apparent parallel histories suggests a common origin for each, and common causes for their decline. Conspicuous because of their sizes and marked degradation since 1912, they therefore constitute one of the most dramatic changes related to the continental ice sheet in that period. Analysis of the ice volumes, flow rates, tectonic influences, subglacial and coastal geomorphic control, glacial histories and possible gradual and/or catastrophic processes involved, are examined as causes of the unusual original extent and subsequent rapid changes in these continental ice sheet margin features.