

Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05784, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05784
EGU General Assembly 2008
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Data archaeology: sea level change at Macquarie Island since Mawson's 1912 expedition

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Historic tide gauge data acquired during Sir Douglas Mawson's 1912 expedition to Macquarie Island in the Southern Ocean has been coupled for the first time with modern day estimates of sea level and land level change to determine a rare and intriguing snapshot of sea level change over a 90 year period in a region devoid of similar observations. Located in sub-Antarctic waters, Macquarie Island (54° 30' S, 158° 57' E) is an important geodetic and oceanographic observing station, providing one of very few sea level records south of 50 degrees latitude. This study applies novel GPS buoy techniques to calibrate the unique modern day tide gauge record which has been observed using an acoustic tide gauge installed in an inclined position. Initial results and error analysis of the historic and modern day sea level records are presented, highlighting the value of such historic records - particularly in data sparse regions such as the Southern hemisphere.