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Holocene precipitation in the subtropical Pacific inferred from the carbon isotope composition of Melaleuca quinquenervia (The Broad-leaved Paper Bark tree) leaves

John Tibby (1), Cameron Barr (1), Andrew Henderson (2), Melanie Leng (3), Jon Marshall (4), and Glenn McGregor (4)

(1) Geography, Environment and Population, University of Adelaide, Australia (john.tibby@adelaide.edu.au & cameron.barr), (2) School of Geography, Politics & Sociology, Newcastle University, Newcastle upon Tyne, UK (andrew.henderson@newcastle.ac.uk), (3) Department of Geology, University of Leicester, University Road, Leicester, UK and NERC Isotope Geosciences Laboratory, British Geological Survey, Keyworth, Nottingham, UK (mjl@nigl.nerc.ac.uk), (4) Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane, Australia (jonathan.marshall@science.dsitia.qld.gov.au & glenn.mcgregor@science.dsitia.qld.gov.au)

Holocene records of the amounts of subtropical precipitation are rare, particularly in the Southern Hemisphere. Yet such information is vital for a comprehensive understanding of global climate system dynamics. We present a precipitation record inferred from the δ13C composition of Melaleuca quinquenervia leaves retrieved from the Holocene sediments of Swallow Lagoon, North Stradbroke Island, in the subtropics of Australia. The modern relationship between rainfall and δ13C was quantified using a collection of monthly leaf falls between 1992 and 2003 and climate data. We then used the calibration to reconstruct precipitation variability from 7500 to 600 cal. yr BP. Dry phases at Swallow Lagoon in the early to mid Holocene are correlated with cooling in the North Atlantic Ocean (i.e. "Bond" events). This relationship breaks down after $\sim$3500 cal. yr BP. From 3500 cal. yr BP there is increased aridity (and variability) associated with the mid- to late Holocene establishment of modern El Niño Southern Oscillation conditions. Overall, these data show linkages between precipitation in the low latitudes of the Southern Hemisphere and Northern Hemisphere cooling events, with a shift to internal forcing of subtropical climate via the Pacific Ocean in the late Holocene.