



Dendrochronological dating of kauri timbers from Browne's spar station (1832–1836), Mahurangi, Auckland, New Zealand



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ABSTRACT

In New Zealand, timbers and other wooden objects have been found preserved in waterlogged prehistoric and historic-era archaeological sites, but dendrochronological analysis of such material is rare. In 2010 an archaeological investigation was carried out at the site of Browne's spar station, Mahurangi, Auckland (CE 1832–1836), documented as the earliest European settlement in the Auckland region. The station supplied spars to the British Admiralty and sawn timber to the Australian colonies. Timber features, made of kauri (*Agathis australis*), were present on the foreshore and included relics from a possible sawpit structure and a catwalk made from offcuts. Tree-ring samples were obtained from these to determine if they were associated with the spar station or from a later phase of activity. A four-timber tree-ring chronology was calendar dated to CE 1756–1831 and felling dates were obtained from three timbers. These indicated that: (a) the possible sawpit structure was built from trees felled between May and October 1832; (b) two offcuts used in the catwalk were from trees felled in late 1832 or early 1833; and (c) the catwalk was built in or after 1833. The tree-ring dates provide independent evidence that the timbers were contemporaneous with, and complement documentary information related to, the spar station. Analysis of wood samples also provides some insight into human behaviour regarding tree selection and the use of waste material. The spar station material is only the second waterlogged assemblage of kauri timbers to be analysed using dendrochronology in New Zealand and the first to be recovered from an inter-tidal context. The results demonstrate the potential for tree-ring analysis of waterlogged wood to provide accurate and precise dates for archaeological sites in New Zealand.

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1. Introduction

Establishing an accurate and precise chronology is a critical part of investigating, interpreting and understanding past human activity. This has been a particular challenge in New Zealand due to its short (ca 750 years) human history, the dating methods that have been available, and the paucity of written records in the early post-contact period (after 1769) prior to formal annexation of New Zealand as a British colony in 1840. Where wood is preserved in above- and in-ground archaeological contexts, dendrochronology can sometimes be applied to obtain calendar dates for features. Tree-ring dating of archaeological wood is common in the Northern Hemisphere, providing precise dates for events and, for historic periods, allowing comparison between the dates of archaeological material and written documentation (Baillie, 1982: 22). Dendroarchaeology also provides information about tree age and size, and past human behaviour and human-environment interactions (Cufar, 2007; Dean, 2009).

In New Zealand, timbers and other wooden objects have been found preserved in waterlogged prehistoric (pre-1769) and historic-era archaeological sites (e.g. Irwin, 2004; Adamson and Bader, 2013; Johns et al., 2014) but tree-ring analysis of such material is rare. In part, this is a legacy of a strong climate focus influencing the development of dendrochronology in New Zealand. It is also because timbers and wooden objects may be made from species unsuitable for dendrochronology, and the development of modern reference chronologies from archaeologically useful species such as totara (*Podocarpus totara*) or matai (*Prumnopitys taxifolia*) has been slow to progress. Despite a restricted geographical range in the upper North Island (north of 38°S), New Zealand kauri (*Agathis australis*) has received the greatest attention in recent years primarily because of its utility as a climate proxy (Fowler et al., 2004; Fowler et al., 2012; Boswijk et al., 2014). Dendroarchaeological research since the early 2000s has concentrated on analysis of kauri from historic-era buildings and structures to aid interpretation of construction and/or modification histories (Boswijk and Jones, 2012). More recently, the analysis of waterlogged wood from an urban site in Auckland city produced a tree-ring date that helped refine a chronology for the site (Boswijk, 2011). However, further work is

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required to explore how tree-ring analysis of waterlogged wood can contribute to archaeology, providing not just calendar dates but also insight into human behaviour, and human-environment interactions in prehistoric and historic-era New Zealand. Current uncertainties to be addressed include methodological issues such as identifying appropriate methods for sampling and preparing wet (kauri) wood, and establishing the suitability of material for tree-ring analysis, which can be affected by species and wood quality. In-built age effects due to the age and size of parent trees, and the utilisation of imported timber during the nineteenth- and early twentieth-century, can also impact on the usefulness of tree-ring analysis for establishing a chronology and interpretation of events.

Recently an opportunity arose to analyse waterlogged wood located at Brownes Bay, Mahurangi, Auckland (Fig. 1). From 1832 until 1836 a spar station, a small settlement focused on the extraction and processing of trees for masts, spars and sawn timber, operated at the bay. Timber processing may also have occurred in the 1850s, as a contemporary

cadastral plan shows a sawpit at the southeast end of the bay. In 2010 an archaeological investigation was carried out at the site of the station (NZAA R09/43&48), prompted by on-going erosion of the shoreline escarpment from wave action and deterioration of timber structural remains in the inter-tidal zone that were potentially associated with the site. Although the spar station is one of a number of such settlements established in the upper North Island during the early nineteenth century, it has historical significance as the first documented European settlement established in the Auckland region (Bader and Adamson, 2010). However, few timber stations have been investigated archaeologically. The site of a timber camp connected to the HMS Tortoise (1842–43) has been recently recorded (Wilton and Ritchie, 2015) and investigation of an 1820s shipbuilding and timber station at Horeke, Hokianga Harbour, is in progress (Carter, 2015). The investigation of Brownes Bay spar station (named after the enterprise's supervisor, Gordon Davies Brownes) at Mahurangi, mainly through geomagnetic survey and excavation, focused on the probable location of the settlement and activity

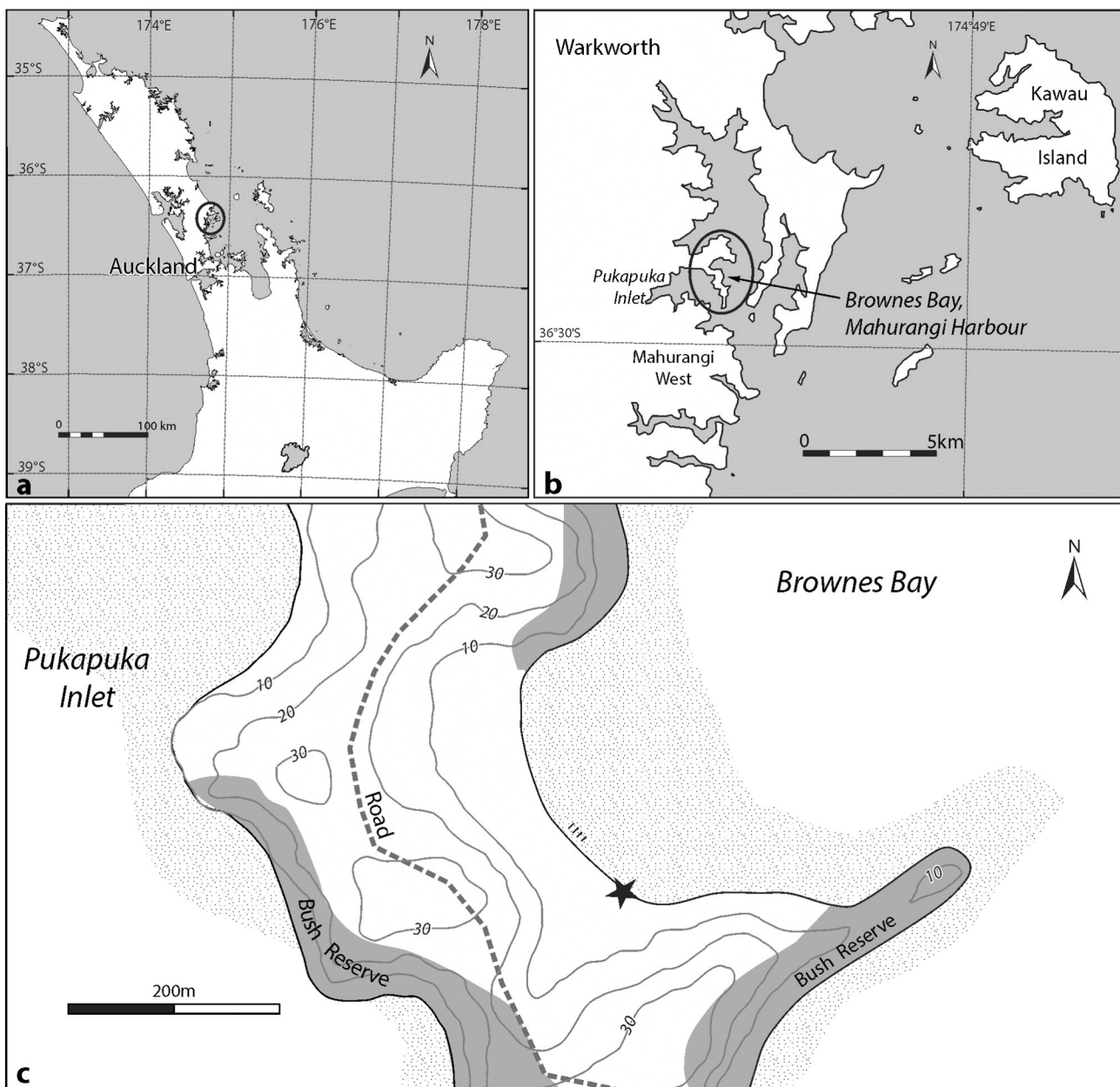


Fig. 1. (a, b) Brownes Bay, Mahurangi Harbour, upper North Island, NZ. The bay is situated north of Auckland city. (c) The star indicates the location of the excavation site and position of the catwalk on the foreshore immediately in front of the site. The horizontal timbers are on the foreshore to the northwest of the catwalk.

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