



# The environmental context of the Neolithic monuments on the Brodgar Isthmus, Mainland, Orkney



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## ABSTRACT

The World Heritage Sites of Orkney, Scotland contain iconic examples of Neolithic monumentality that have provided significant information about this period of British prehistory. However, currently, a complete understanding of the sites remains to be achieved. This is, in part, because the monuments lack an adequate context within the broader palaeolandscape. Recent investigations (seismic geophysical survey, microfossil analysis and <sup>14</sup>C dating) in and around the Brodgar Isthmus, both onshore and offshore, are used to reconstruct the landscapes at a time when sea-level, climate and vegetation were different to that experienced today. Results show that in the early Neolithic the isthmus between the Ring of Brodgar and Stones of Stenness was broader with a smaller loch to the west. Furthermore this landscape contained sandstone outcrops that would have provided a potential source of stone for monument construction. Microfossil analysis and radiocarbon dates demonstrate that the Loch of Stenness was transformed from freshwater to brackish during the early Neolithic, perhaps immediately preceding construction of the major monuments. Finally, the analysis of our data suggests that sediment influx to the loch shows a tenfold increase coincident with widespread vegetation change that straddles the Mesolithic/Neolithic transition at c. 8 ka cal. B.P. These results provide, for the first time, a landscape context for the Neolithic sites on the isthmus.

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## 1. Introduction

The contextualisation of archaeological sites in the landscape requires an understanding of the relationship between landscape, site structure and site function/use. In practice, generating the ground truth control to provide this context can be difficult, timing consuming and costly. This is particularly the case where sites sit in a landscape that straddles the transition zone from terrestrial to wetland/marine and where landscape flooding by the sea may have had a considerable impact on the changing relationship between site and environment through time.

Ironically, it is these precise landscapes that have recently been identified as of particular interest with regard to the intensification of human settlement and societal development in the early millennia of the Holocene. Bailey and Milner (2002), examine the role of coastal environments in the social evolution of hunter-gatherers from 6000 B.P.

onwards, across the Mesolithic/Neolithic transition, while Wickham-Jones (2013) highlights the potential of the fluid marine-skerry landscapes of southern Scandinavia as a driver in the development of coastal technologies where the role of woodland as an isolating element between coast and land is also noted. The dynamic coastal environment and its influence on technological and cultural developments from as early as 11,000 B.P. has been discussed in detail with regards to the Hensbecka sites of southern Sweden (Schmitt, 1994; Schmitt and Svedhage, 2016) while Evans et al. (2014) emphasize the significance of continental shelf locations for early society.

Increased awareness of the value of these vulnerable landscapes presents specific challenges to archaeology. Not only are they often difficult to access (e.g. Tizzard et al., 2015), but any archaeological remains are subject to complex taphonomic processes that are still poorly understood (Ransley and Sturt, 2013), while the zones themselves are particularly vulnerable to environmental change (Bailey, 2014). Currently, understanding of submerged landscapes, and potential associated archaeology, relies heavily on broadscale models (Sturt et al., 2013) with their inherent limitations for the interpretation of human behavior (Wickham-Jones et al., forthcoming-a, forthcoming-b).

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Nowhere, perhaps, are these issues more pertinent than in Orkney (Fig. 1) where the mechanics of relative sea-level rise, coupled with climatic change (Farrell, 2009), resulted in a dynamic environment that persisted into more recent millennia. It is thus necessary to understand the changing environment of Holocene Orkney in order to understand fully more recent periods such as the Neolithic. While specific remains have yet to be verified underwater, the great monuments of Neolithic

Orkney (Ring of Brodgar, Stones of Stenness and Maeshowe), lie along the Brodgar Isthmus which today separates the brackish waters of the Loch of Stenness to the west from the fresh waters of the Loch of Harray to the east (Fig. 2). This paper presents the results of multidisciplinary research into the palaeoenvironmental setting and landscape context of the Neolithic sites that make up the suite of monuments along the Brodgar Isthmus. It provides a more detailed understanding of these

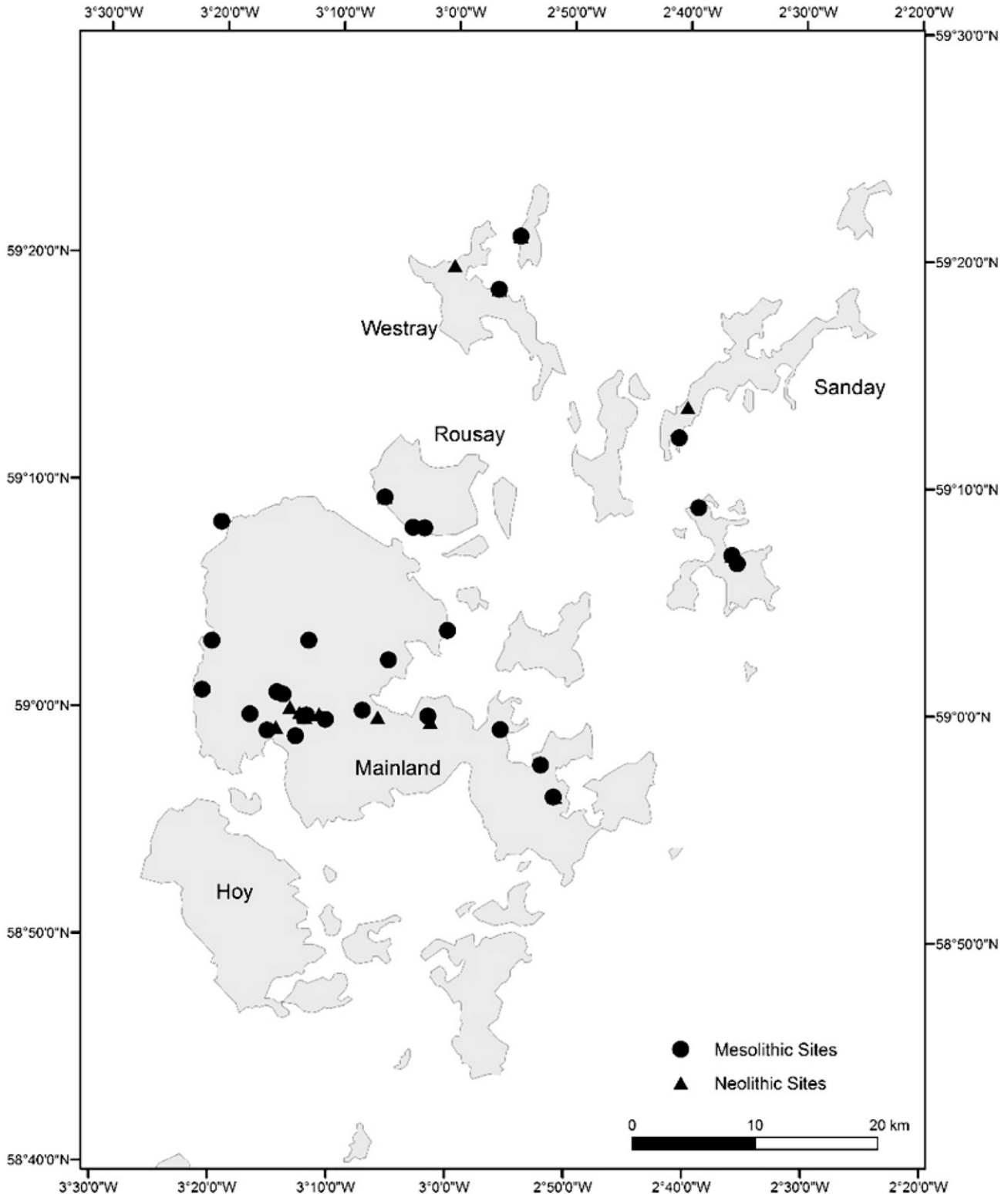


Fig. 1. A: Locations for Neolithic/Mesolithic Orkney sites discussed in the text. B: Locations for palaeoenvironmental sites discussed in the text. P1: Spretta Meadow, P2: Hobbister, P3: Glimms Moss, P4: Loch of Brokan, P5: Bay of Firth, P6: Mill Bay, P7: Scapa Bay, P8: Crudale Meadow.

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