

## Postglacial environmental change and prehistoric hunter-fisher-gatherer habitations in the Hokkaido region (northern Japan) inferred from pollen data and archaeological site distribution

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Substantial progress has been made on understanding the evolution of Late Pleistocene/Holocene hunter-fisher-gatherers. A growing body of evidence suggests that most of these groups did not, as was long assumed, remain relatively static and marginal over long periods. One area that has a rich, complex, and dynamic hunter-fisher-gatherer prehistory, which persisted until the middle of the 19th century AD, is the Hokkaido region. While empirical information about the hunter-fisher-gatherer archaeology in this region is increasing, understanding of the specific mechanisms driving the cultural trajectories remains insufficient. What specific mechanisms generated the observed hunter-fisher-gatherer cultural patterns and which role climate change played in these processes are two main research questions of the ongoing Baikal-Hokkaido Archaeology Project (BHAP, <http://bhap.artsrn.ualberta.ca>). Within this scope, we have (1) examined the spatio-temporal distribution of archaeological excavation sites in the Hokkaido region and (2) have evaluated the findings in view of key palaeoclimate records from the greater study area and the preliminary results of the palaeobotanical analysis of the RK12 sediment core from Lake Kushu (45° 25'58"N, 141°02'05"E; Rebun Island). The continuous and well-dated RK12 core covering the last ca. 17,000 years has been identified as a key palaeoenvironmental record for the region of northern Japan. The spatio-temporal analysis of archaeological sites in the Hokkaido region exhibits hunter-fisher-gatherer population dynamics from the Upper Palaeolithic (>14,000 cal yr BP) to the Ainu period (ca. 700–100 cal yr BP). Most cultural transitions coincide with periods of climate and environmental change. The data support the hypothesis that Palaeolithic subsistence was, at least partly, based on terrestrial hunting. The subsistence strategy shifted towards marine resources and plant exploitation alongside the early phases of the Jomon cultural complex paralleled by lateglacial climate warming, rising sea levels, and a change in regional marine currents. With continuous Holocene climate warming, site numbers increased suggesting a rise in population, which culminated in the Middle Jomon period (5000–4000 cal yr BP). At the same time, Jomon subsistence experienced a process of diversification and intensification in exploitation of natural food resources. These changes in the food economy probably allowed the persistence of the Middle Jomon culture beyond the Holocene temperature optimum (around 5000 cal yr BP). After, the population decreased until the end of the Jomon culture accompanied by a trend towards cooler climate conditions. During the Satsumon/Okhotsk culture periods (1500–700 cal yr BP) population re-increased. While the spread of Satsumon people into Hokkaido appears to have been controlled by human agency, immigration of Okhotsk people may be linked to climate cooling in the regions north of Hokkaido. Sites representing the following cultural period (Ainu, ca. 700–100 cal yr BP) re-decrease and show a concentration in eastern Hokkaido. It remains unclear what brought about the Satsumon-Ainu cultural transition. Thus far, there is no indication for any social or climatic factors having influenced this cultural transformation. Although most parts of the Hokkaido forager trajectory appear to be linked with environmental changes, causal relations need to be verified by future high-resolution and well-dated regional palaeoenvironmental records (e.g. the RK12

core) and dedicated archaeological research including conventional methods and more recent techniques like the "life history approach".

Keywords: Human–environment interactions, Hunter-fisher-gatherer cultures, Postglacial climate change, Neolithic, Palaeolithic, Hokkaido