

Geoarchaeology of a drowning island: Prehistoric human settlement and geomorphologic formation of Funafuti Atoll, Tuvalu

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More than 170 coral atolls are scattered in the trade wind zone from the westernmost Caroline Islands to the easternmost Tuamotu Islands. Their islets of foraminiferal sand and coral shingle lie on mid-Holocene emergent reef flats, and a chain of these islets, which are covered with coconut trees, separate a turquoise lagoon from the surrounding navy blue ocean. On the surface, the scene appears to be a typical Oceanic paradise. Most of the subaerial landforms, however, are no more than 2 m in elevation and a few hundred meters to less than a few kilometers at most width. As such they are highly susceptible to inundation by storm surges. One of such atolls is Funafuti in Tuvalu, which is well-known as a 'drowning island' by global warming.

The diversity of initial human colonization periods, however, was indicated by archaeological studies in the past few decades, including our investigations of atolls in the Western Pacific, in particular Majuro and Funafuti. Both atolls are located within the chain of island groups consisting of Marshalls, Kiribati and Tuvalu. The most reliable charcoal ages for earliest human settlement on Oceanic atolls, have been obtained from Majuro in Marshalls. These date back to 1800-2000 BP. But radiocarbon ages of charcoal sample retrieved from Funafuti suggest that Tuvalu were inhabited around 500 BP.

Most atolls and reef islands range northwest to southeast in the waters less than 200 sea miles distant from the nearest island. According to ethnographic accounts this should not be a barrier for skilled Oceanic navigators, but peoples of 2000 years ago did not find atolls in Tuvalu. While this remains a moot point in oceanic archaeology, it should be useful to take account of the Holocene sea level change and to examine geomorphic formation of each atoll islet.

Here we present results of archaeological excavations of Fongafale Islet in Funafuti Atoll and grain size analysis of sediments. Synthesizing them with the late 18th century's topographic information reported by the Royal Society of London, we then discuss a tentative scenario of geomorphic formation and prehistoric human settlement of Fongafale.