

Scientists have a new theory on timing for human settlement of some parts of tropical Pacific

December 19 2022



A mangrove forest on the island of Kosrae, Federated States of Micronesia. These mangrove forests have been growing on the coastline of Kosrae for at least 5,000 years, keeping pace with rising sea level. Credit: Juliet Sefton

Spread across vast distances, the islands of the tropical Pacific Ocean have been believed to have been populated by humans in two distinct migrations beginning approximately 3,330 years ago.

The first followed a northern route out of what is today the Philippines and the second followed a southern route from Taiwan and New Guinea. People arrived on the islands between these routes—now making up the Federated States of Micronesia—about 1,000 years later.

But a new finding by a Tufts [sea-level](#) researcher and his colleagues suggests that the islands in Micronesia were possibly settled much earlier than supposed, and that voyagers on the two routes may have interacted with one another. The researchers have reported their research in the journal *PNAS*.

Andrew Kemp, an associate professor in the Department of Earth and Climate Sciences, was drawn to Micronesia to improve understanding of how climate change impacts global sea level change by collecting new data from the tropical Pacific Ocean, which is not nearly as well documented as the north Atlantic Ocean.

The research team collected cores of mangrove sediment on the islands of Kosrae and Pohnpei in the Federated States of Micronesia.

Although relative sea level—the height of the land relative to the height of the ocean next to it—has fallen during the past 5,000 years across much of the tropical Pacific, in Micronesia radiocarbon dating showed that relative sea level has risen significantly, by about 4.3 meters (14 feet) because the islands are sinking.

Although the researchers can't yet fully explain why the two islands are subsiding so much faster than others in the Pacific, they could clearly see the results and their meaning for understanding how people came to

populate remote Oceania.

The team—including Juliet Sefton, then a postdoctoral researcher at Tufts and now an assistant lecturer at Monash University in Australia, and Mark McCoy, an associate professor of anthropology at Southern Methodist University—was struck by the implications of relative sea level for interpreting the monumental ruins of Nan Madol, a large series of stone buildings constructed on islets separated by canals filled with ocean water just offshore from the island of Pohnpei.

The ruins, now a U.N. World Heritage site, are long presumed to have been administrative or religious buildings constructed about 1,000 years ago for the island's elite to live apart from the main population in the island.

But Kemp and his colleagues realized that long-term relative sea-level rise meant that this presumption was incorrect. When the structures were built, they were on the island itself, not separated by water. According to McCoy, the prevailing description of Nan Madol as the "Venice of the Pacific" may not have been accurate when it was constructed.

It got the researchers thinking about when these islands were in fact first settled. Kemp notes that the seafaring people who first came to the islands would probably have lived at the coastline. That's why researchers look for [archaeological evidence](#) there, but haven't seen it for older inhabitation.

"We propose that Pohnpei and Kosrae perhaps weren't settled anomalously late, but rather they were settled around the same time as the other islands in the Pacific," Sefton says. "People arrived and lived at the coast, but subsidence of the islands caused relative [sea level rise](#), which submerged the oldest archeological evidence. It's probably underwater, yet to be found—if it will ever be found."

If that is the case, people on the northern and southern migrations may have interacted with one another around the volcanic islands of Micronesia—Kosrae, Pohnpei, Chuuk, and Yap.

There's been no evidence of this before, because researchers were building on the wrong assumptions about when the islands were first inhabited based on sea levels. McCoy points out that archaeologists "have been looking in the wrong place for years, because we assumed that relative sea level was falling."

"Although we can't prove that there was interaction between these two pathways, we can present an argument that says the data that exists now about migration in the Pacific is probably a lot more incomplete than it is thought to be," says Kemp.

More information: Sefton, Juliet P., Implications of anomalous relative sea-level rise for the peopling of Remote Oceania, *Proceedings of the National Academy of Sciences* (2022). [DOI: 10.1073/pnas.2210863119](https://doi.org/10.1073/pnas.2210863119).
www.pnas.org/doi/10.1073/pnas.2210863119

Provided by Tufts University

Citation: Scientists have a new theory on timing for human settlement of some parts of tropical Pacific (2022, December 19) retrieved 6 May 2024 from <https://phys.org/news/2022-12-scientists-theory-human-settlement-tropical.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.