

## Earth & Space

# Lake mud reveals the fate of an ancient Maya city

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### ABSTRACT

*We have discovered not only what happened to the people of an abandoned ancient Maya city, but the exact day that much of the population disappeared. The study was a collaboration between earth scientists, who took a core from a lake that sits just below the ruins of an ancient Maya city, and archaeologists who excavated the monuments and structures of the site.*



*Ruins of a Maya city in Tikal, Guatemala  
Image credits: Beata Kuśmider*

The mud that accumulates at the bottom of lakes contains a rich archive of past environments, in part because it preserves much of what is buried with it. It preserves pollen grains that tell us what plants were growing in the watershed. It also preserves chemical residues that inform us about how much rain fell and whether or not people were living around the lake. The changing amounts of small pieces of charcoal can also tell the history of fires near a lake. Since the material is always falling to the bottom of lakes, the deeper into the mud one goes, the further back in time one gets.

In 2013 a research group working in modern-day Guatemala took a sediment core – a tubular sample containing many layers of the mud from the bottom – from Laguna Ek’Naab. This lake is situated right below the ruins of an ancient Maya city. The core contains 1700 years of data, going back to AD 300, which record the activity of Witzna’s inhabitants (Witzna is the name given by archaeologists who discovered the ruined city). Several datasets provide a timeline for nearby agriculture, increased or decreased erosion due to forest clearance, and when there were fires (as well as how large they were). The most striking find was a massive fire that happened

sometime around AD 700, after which the population of Witzna dramatically decreased, suggesting almost complete abandonment. At first, the researchers weren't sure what caused the fire and subsequent depopulation. Although massive droughts might have caused the abandonment of the region between AD 800 and 1000, the timing of the fire event was too early for a connection.

Then the archaeologists made a rare discovery. While excavating the main plaza at Witzna, they found two ancient stone monuments called stelae. The two stelae displayed ancient inscriptions, one of which contained a special type of inscription called an "emblem glyph." These glyphs tell us the ancient names of Maya cities, and, though most cities presumably had one, very few have been discovered. This discovery provided crucial evidence in understanding what happened at the end of the 7th century at Witzna.

Once the researchers knew the ancient name of Witzna (which, by the way, was Bahlam Jol), they were able to link it to writing on another stone monument that mentioned Bahlam Jol. A larger nearby city, Naranjo, had erected a large stela in the early 8th century boasting of its military conquests over a 5-year period. One inscription claimed they had attacked and burned Bahlam Jol on May 21, 697. With this information, the archaeologists intensified their excavations at Witzna and found that all the major structures had been burned and many

monuments intentionally destroyed. The researchers concluded that the catastrophic event recorded in the sediment core was caused by the attack described on Naranjo's stela.

This was the first time a written record had been directly linked to data from a lake sediment core in the western hemisphere. It was also the first evidence of what an attack described with the verb "burned" (puluuy in Maya script) meant in terms of societal impacts. The data suggests that when puluuy was used describing an attack, it meant total destruction of a city. While it is impossible to know whether the people of Witzna were killed, taken captive, or fled, it is clear from the data that attack had devastating impacts on the population.

Prior to our study, very little was known about Maya warfare during the Classic Period (AD 250-950). Many scholars believed that warfare was limited to elite classes and was largely ritualistic, with puluuy likely describing small scale burning of targeted monuments. What little evidence that did exist prior to our study suggested that such violent warfare was limited to the Terminal Classic period (AD 800-950) and was symptomatic of conditions that led to the collapse of the civilization. Contrary to this view, these findings show that violent warfare was likely common throughout the Classic period. This evidence challenges the theory that increasingly violent warfare was an important factor contributing to the collapse of Maya state institutions.