Studying the Fall of the Classic Maya Kings through a Conflict Dynamic Model

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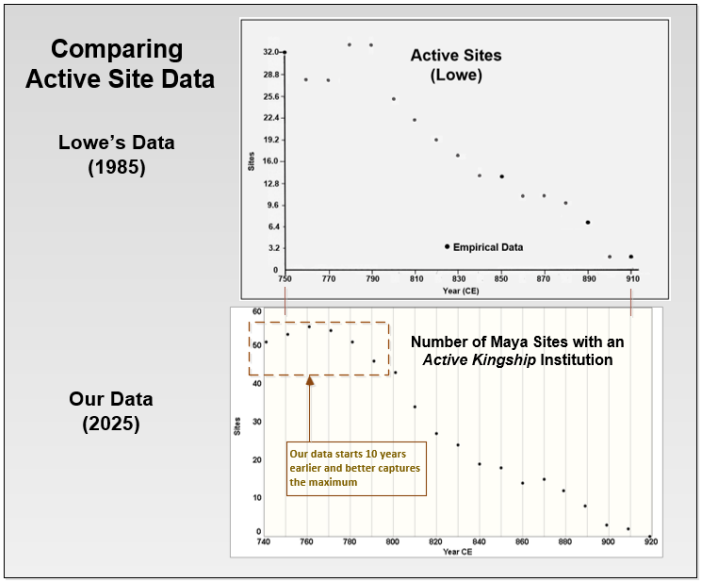
Maya city-states in the southern lowlands and highlands began collapsing during the eighth century CE. Our study focuses on the political, not the demographic, collapse of the city-states. To explore the dynamics of this collapse, we first conducted a comprehensive literature survey of Maya monument data. It included the date of monument construction and the last monument date. These dates provide an estimate of the duration of active kingship for a city-state. We used these dates to generate two plots: the number of active city-states over time, and the cumulative number of collapsed city-states. We then showed how a conflict dynamics model fits both plots well for the period 741 to 860 CE. This model allowed us to quantify the impact of conflict on the political collapse. And also infer the influence of contributing factors to collapse without having to identify them in the model. Many of these factors could cause conflict to arise, and others could cause collapse on their own. The best-fitting model solutions differ in their rates of recovery from conflict-induced crises. Historical events, such as periods of intensified warfare, support our study of the Maya political collapse. Our research yielded several key findings.

(1) The active and collapsed city-state plots mirror the collapse. Lowe, in his book, *The Dynamics of Apocalypse* (1985), pioneered these plots. He used data covering 54 sites. Our data starts 10 years earlier, ends on the same date, and includes 66 sites. New discoveries since Lowe published his results allowed us to update about a third of his dates. Lowe's plots start at 751 CE; our plots start at 741 CE. Our data values show a rise in the number of active sites until ~761 CE and then a gradual decline. Fluctuations in Lowe's data from 751 to 771 CE masked the maximum at 761 CE. His fit of model to data showed only a decline in the number of active sites beginning at 741 CE. Our model fits both the rise and decline.



(2) The conflict dynamics model fits these plots well for the 119-year period from 741 CE to 860 CE. Several reviewers criticized Lowe's model. It is important to discuss how our approach differs. Lowe defined collapse as demographic collapse. Yet, there were still people living in many city-states after the last monument date. Since Lowe relied on monument dates, his data only reflected a political

collapse. To avoid that criticism, we focused only on the political collapse. In 1985, Lowe did not have the benefit of the current translation of the Maya inscriptions. He had only monument dates. Translations of other information from Maya inscriptions came later. The inscriptions included life histories of rulers and records of warfare. Without this information, Lowe made assumptions to justify his use of a conflict dynamics model. Reviewers were critical of some of these assumptions.

We took a different perspective. After Lowe's work, researchers used epigraphic and archaeologist data to paint a picture of Maya warfare. Conflict intensified during the Maya collapse. Using epigraphic data and architectural evidence of Mayan conflict, we explored whether a conflict-dynamics model could fit our data. We used a simpler version of his model equations and gave a different meaning to many of its parameters.

(3) Unlike Lowe, we plotted the number of stable sites and crisis sites and not only their sum, the number of active sites. These later plots improved model comparison with historical events, such as the period of heightened warfare.

The following plots show our results. Our results show the value of using a dynamic model and macroscopic variables to understand the Maya dynastic collapse.