

Role of climate in the classic maya collapse history essay



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In this paper, the impacts of climate change on the Maya will be examined. It is likely that a number of factors combined to produce the 'collapse' for which the civilisation is well known. With this in mind, the extent to which climate itself played a role will be particularly looked into.

Defining the 'Collapse'

Before the role of climate can be looked into, it first needs to be established what the 'Maya collapse' actually was. Popular media has often portrayed the collapse as something that happened simultaneously across the Mayan region, resulting in the abrupt and complete destruction of the entire Mayan civilisation. However this was not the case. The 'collapse' mainly refers to the drastic decline of the cities of the southern Maya Lowlands. Many of these cities had been extremely powerful in the Classic period (AD 250-900), the so called 'pinnacle' of Mayan civilisation, and had dominated the entire Maya region (Sharer and Traxler 2006: 287). It is the fall of these city states that defines the Terminal Classic (AD 790-900), but this period also saw many sites, particularly in the north and east, continue to flourish and in some cases even grow, supporting large populations into the Postclassic (AD 900- c. 1542) long after the 'collapse'. Sharer and Traxler therefore define the collapse as 'a process of transformation that saw the end of Classic states and the rise of new states that dominated the Postclassic period' (2006: 503).

Identifying the Collapse

It has been seen that the collapse of Classic Maya sites was focussed within the southern Maya Lowlands, but what were the changes in the

archaeological record that signal collapse in this region? A major factor

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suggesting collapse was the decrease in the number of carved stone stelae and altars dedicated over the course of the 9th century, with the last known dated stela having been erected at Tonina in AD 909. The cessation of erecting monuments varied between sites, with inscribed stelae ceasing at Dos Pilas as early as AD 760 and Tikal at AD 889, suggesting that the collapse was not a sudden, simultaneous event, but was an ongoing process that affected different cities at different times; although ultimately the outcome was the same (Chase and Chase 2006: 169).

Drastic depopulation of the region is also identifiable. This can be seen in a decline of domestic activity in palaces and common houses alike. The cities of Tikal, Calakmul, Copan and Palenque, among others, had reached peak population in the Late Classic and so their subsequent decline is particularly noticeable (Sharer and Traxler 2006: 500). There have been various estimates as to the maximum population of the southern and central Lowlands during the Classic period, ranging from 3 to 14 million people, but it is seemingly agreed that this had dropped to around only 1 million by the start of the Postclassic. This suggests a depopulation rate in the range of 53-90%, a level unprecedented prior to European arrival in the New World (Gill 2000: 351). So although limited to the Maya Lowlands, the collapse was a significant event, leaving once powerful cities deserted within the space of 150 years.

What made the Mayan civilisation different from others that suffered a drastic collapse was that it was not a single, unified society, but was instead a collection of individual city states and their hinterlands, each controlled by a king. This would seem to suggest that there must have been external

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pressures that, at the very least, triggered and compounded existing problems within these city states, rather than internal problems that somehow all resulted in collapse. So what had caused these once great cities to be abandoned?

Causes of the Collapse

Many different arguments have been put forward to explain the Maya collapse. In the past a single cause had been sought, and natural disasters such as earthquakes or hurricanes were considered. It is now generally agreed however, that there was likely no single cause, but an interplay of factors (McNeil et al. 2010: 1017). For the purpose of this paper however I shall focus on drought and warfare, which are two of the most commonly debated theories.

Drought

Fluctuation in rainfall was common to the Maya area and there was precedent for drought, although evidence suggests that the Classic droughts lasted longer and were more intense than any previously experienced by the Maya (Gill et al. 2007). Lake sediment cores from Lake Chichancanab in the Eastern Yucatan Peninsula show that there was a period of drought lasting around 150-200 years, with three peak phases of severe drought within this. This is supported by evidence from marine sediments of the Cariaco Basin off the coast of Venezuela, which show that, in this particular region, the drought lasted from AD 760-930. Four periods of intense drought are identifiable from these samples, centring on the years AD760, 810, 860 and 910 (Gill et al. 2007). The correlation between the periods of severe drought and the collapse of Classic Maya civilisation in the Lowlands, surely suggests <https://assignbuster.com/role-of-climate-in-the-classic-maya-collapse-history-essay/>

it had a critical impact on those polities, such as Tikal, Calakmul, Naranjo and Palenque, that were not well served by rivers.

Lucero suggests that the Classic Maya elite based their power on the control of water. Many of the regional centres of the Maya Lowlands did not have access to natural water sources and relied on artificial reservoirs which were under the control of the rulers. As a result they were dependent on seasonal rainfall for water, and Maya royalty would have also used their special connections to the gods, specifically Chac the rain god, to guarantee enough water through rituals and ceremonies. It was upon this basis that Maya rulers exacted tribute and labour from their subjects (Lucero 2002). Decreasing rainfall and long term drought would have undermined the foundation on which the Mayan elite drew their power, resulting in political collapse. The diminishing power of the elite can be seen archaeologically through a reduction in the manufacture and distribution of prestige and ritual goods at many centres during the Terminal Classic (Sharer and Traxler 2006: 499-500). The production of polychrome pottery and ornately carved items of jade, wood, bone and shell, was controlled by the elite and used to reinforce status (Demarest 2004: 213). The increasing absence of such items in the archaeological record therefore suggests rulers no longer had the same level of support from their subjects. Their power was waning, as also reflected in fewer dynastic stelae, used to legitimise power, and the end of monumental construction projects such as ball courts, temples and causeways. The decline of the elite and, as a result, centralised political organisation was a major feature of the Mayan collapse. It is Lucero's argument that drought was the main reason behind this. It was only able to inflict such damaging

change because water control was inherent to the institution of Kingship within Mayan society. Drought would have also had the obvious consequences of a lack of drinking water and severe decrease in agricultural production.

Warfare

Conversely it has also been suggested that rather than drought, it was endemic warfare and competition amongst the various city states that led to the weaker polities being overpowered, causing the breakdown of dynastic power in these defeated polities. The cities of the Petexbatun region of present day Guatemala, in particular, are argued to have collapsed while trapped in a state of siege and fortification warfare (Demarest et al. 1997). This constant state of war is believed to have destabilised the political and economic structures, resulting in political devolution and eventual failure in the early 9th century.

Interestingly the Petexbatun region had good river access, making it unlikely that drought was a major factor in the collapse of this area (Sharer and Traxler 2006: 515-17). It is on this basis that Demarest disputes an ecological model, pointing out that political disintegration had already begun in the Petexbatun by the time drought occurred, the last inscription at the earliest known city to fall, Dos Pilas, dated to AD760 (Demarest cited in McKillop 2004: 99). Zooarchaeological evidence from this region also suggests there was no danger of famine, or nutritional stress through protein deficiency, in the Classic or Terminal Classic (Emery cited in Demarest 2006: 105). The violence prevalent in this region was seemingly independent of an environmental impetus.

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Common Ground?

There is a convincing amount of evidence in support of each of both drought and warfare, suggesting that they both likely played some role. The nature of Maya society however, being a collection of city states, means that evidence of warfare in one region, for instance, does not necessarily mean that it can be inferred elsewhere. As mentioned, it was in the cities of the Petexbatun where evidence shows endemic violence caused the abandonment of the region. It has often been the mistake to imply that this then must surely have been the cause for collapse across the entire Maya lowlands, or at least present in a wider area, but the evidence does not support this. The same goes for drought. Although this may have been noticeable over much of the Maya lowlands, the affects were surely most closely felt by those cities without access to natural water sources and dependent on rainfall for agriculture.

Instead the evidence appears to suggest that different regions likely had a different trigger cause or combination of causes (Sharer and Traxler 2006: 514). It seems hard to believe that such catastrophic events could have occurred within a similar timeframe, yet independently of each other, but have the same result. This does suggest however that Mayan civilisation had reached a point where it was extremely vulnerable to the slightest variation, with location playing a large part in deciding the factor that would tip a particular city over the edge, towards collapse.

Manmade or Natural Occurrence?

Drought appears to have played a relatively large, although joint, role in the collapse of the Classic Mayan civilisation. But was this environmental change <https://assignbuster.com/role-of-climate-in-the-classic-maya-collapse-history-essay/>

anthropogenic or a natural occurrence? The answer to this relates closely to the argument over the level of deforestation carried out by the Maya.

It has long been argued by many of those supporting the theory that drought was at least in part responsible for the Maya collapse, that the Maya themselves were to blame for the environmental degradation, due to deforestation. Shaw believes that the varying fate of the different city states during the Terminal Classic was a result of the level of deforestation in their particular region. She argues that, as deforestation raises temperatures and decreases evapotranspiration at a local or regional level only, the varying extent of tree removal explains the irregularity that the North and East of the Yucatan Peninsula continued to support a thriving population, while the heartland collapsed under severe drought (Shaw 2003). Studies into 20th century droughts in the United States and Mexico, however, show that over large areas they are hardly ever uniform, and so it is actually normal for certain areas to be affected more, or less at different times (Gill et al. 2007: 287). This provides another explanation for the asymmetrical effects of drought in the Maya area, disputing the idea that deforestation was responsible for the irregularities.

The Maya would have cleared sections of forest to make room for farming and agriculture. Wood was also used as domestic fuel, and was needed for the high temperature fires used to make lime mortar from limestone, a key component in Maya construction (Demarest 2004: 145). That the Maya made use of their forest environment is therefore known, but it is Shaw's argument that they exploited it through conscious overuse (Shaw 2003). Diamond is another advocate of the deforestation model as a cause of collapse, arguing <https://assignbuster.com/role-of-climate-in-the-classic-maya-collapse-history-essay/>

that deforestation would have made the soil much less fertile at a time when more agricultural land was needed, due to population pressure. He also agrees with Shaw that another of the consequences would have been manmade drought, and he uses the example of Copan, in present day Honduras, in particular (Diamond 2005: 168-70).

That deforestation was widespread, and a human induced cause of drought, is a plausible theory, and in Copan, is supported by a core sample from Petapilla Swamp, a peat bog 4.5 km north of the city itself (Rue 1987). Pollen retrieved from the core showed a much lower representation of tropical and deciduous forest trees than previously known, and less variation in the palynoflora. The cores showed no suggestion of significant climatic change from the palynological evidence, and led Rue to conclude that the vegetational changes were human induced through deforestation, with increased activity in the Late Classic (Rue 1987).

New evidence has recently been put forward however, that disputes deforestation as the cause of environmental degradation. This new research particularly focuses on the polity of Copan where, as touched on above, it had previously been asserted that by AD800, not a single tree remained from the deciduous, or pine forest on the slope above the city (Abrams and Rue 1988, Diamond 2005: 169). McNeill et al. argue that Rue's Petapilla Swamp core, upon which much of the deforestation theory has been based, only dates back to AD1010 with its oldest sediment, 100 years after Copan's collapse (2010). Therefore it could not possibly have bearing on the Classic period population and their affect on the environment. The new data comes from another core from the same swamp, of which the earliest sediments

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this time date to 900-790 cal BC, providing data over a much longer range. It provided an interesting pollen profile, with the most pronounced deforestation apparent at the earliest stage of 900-790BC, with another later surge in the 5th century AD. Very much in contrast to the earlier core, it also shows an increase in arboreal pollen in the Late Classic, particularly that of pine. This data allowed McNeill et al. to surmise that:

At the close of the city's Classic period, the hills above Copan were more densely forested than when the Maya first built their polity centre.

(2010: 1021)

This therefore suggests that rather than destroying their environment, the Maya were actually managing and cultivating it.

Even though Copan was situated on a river, it received much less rainfall than other river centres at around 130 centimetres a year; so was likely at the mercy of changing rainfall patterns and drought. But if drought in this region was not caused by deforestation as the latest evidence suggests, then climate change was likely behind it. Palaeoclimatic records from North America, Europe and the Arctic indicate that the 9th and 10th centuries AD were as cold as during the Little Ice Age. Tree rings from the White Mountains of California show a steep decline in temperatures from AD790-950 and glacial advances in Alaska have been dated to AD700-900. In Sweden also, a number of glacial advances are known from this period, dated to AD800-910 (Gill 2000: 287-88, 385). Severe cold in the Northern Hemisphere can indicate a south-westward displacement of the North

Atlantic High and a southward shift of the Inter-Tropical Convergence Zone
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(ITCZ) which would have caused summer rains to fail in the Maya Lowlands. The failure of the ITCZ to move north in the summer at this time, is evidenced by a drop in sea surface salinity in a marine sediment core from the north-eastern Caribbean, coinciding with the period of collapse (AD 760-930) (Gill et al. 2007). As a result, all this evidence points to the climatic conditions as having been conducive of drought at the time of the Maya collapse.

Avoidable Climate Change?

It seems apparent that climate change was responsible for the drought that affected much of the Maya Lowlands. In some places this may have been exacerbated by deforestation, but on the whole it seems more likely that it was not anthropogenic. As discussed previously, drought was one of the main factors to influence and perhaps even trigger the Maya collapse in some regions. If the drought was not induced by human action or inaction, is it possible to learn from the mistakes of the Maya as Diamond asserts in his book? Diamond bases much, if not all, of his argument on the belief that the Maya had a choice, but their refusal to change led to their downfall. He more or less suggests that the Maya of Copan, which he uses as an example, stood back and watched as the last tree fell. But his argument is based on flawed evidence. This is easy to say with hindsight, in the light of recent publications, but he also ignored existing evidence, seemingly because it did not support his position. He comments:

...Maya kings sought to outdo each other with more and more impressive temples, covered with thicker and thicker plaster- reminiscent in turn of the extravagant conspicuous consumption by modern American CEOs.
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(Diamond 2005: 177)

As previously mentioned, lime plaster required extreme heat to create and for this reason much wood was required in its production. If deforestation was causing problems for their society, which is now believed to be false in any case, then to continue to create vast quantities of plaster for nothing but aesthetic reasons would have been ignorant and stupid. This is seemingly what Diamond is suggesting, despite research published in 1996 that showed that sculptures dating to the Late Classic at Copan used much thinner layers of plaster than those of an earlier date. Implying the Maya were taking measures to prevent unnecessary tree loss (Fash and Fash 1996). Diamond focuses on the implications for our present society, which is a good reason for studying past collapse, but he seems to oversimplify the problems of the Maya. Under the heading 'The Maya Message' he identifies the various strands that he believes led to the collapse, but in a way that makes it seem like they are a checklist to avoid if we do not want our present society to fail. He does not give the Maya any credit for having attempted to change their society in any way. But he would likely not have wished to do so; acknowledging that the Maya understood the precarious ecological situation they found themselves in and made attempts to counter this, but still failed, does not bode well for our current society, where short term benefit, at seemingly any cost, is most often preferred over long term solutions.

Conclusion

To come to the conclusion that the Maya did not shape their own downfall, in as much they did not create drought through deforestation, apparently <https://assignbuster.com/role-of-climate-in-the-classic-maya-collapse-history-essay/>

leaves the almost equally unwelcoming alternative that borders on environmental determinism. This argument implies that the Lowlands were not conducive to complex and advanced civilisation; the Mayan cities were destined to collapse, it was an inevitable event that could only be put off not overcome. I feel there is, however, a middle ground between the two. I would agree that the drought was likely not the result of the Maya being irresponsible and overusing their natural resources. On the contrary it seems more likely that the Maya, at least at Copan, had become well adapted to their environment and were using it sustainably. They were at their peak florescence in the Classic period, when both environmental and climatic conditions were relatively constant. As a result of this stability though, they were increasingly becoming part of a rigidity trap, mastering their environment of relatively low level, but predictable rainfall by growing water-efficient maize, and utilising reservoirs in order to build cities on fertile land far from a permanent water source. They had made themselves highly vulnerable to drought and in the terminal classic were faced with the worst droughts the region had seen for 7000 years.

It was not the carrying capacity of the region however, but the nature of Mayan society that reduced their ability to change, as it must also be remembered that warfare was as important a cause of the collapse as drought in some regions. Although the Maya showed some adaptability at Copan in maintaining the forest, factors other than land use were much harder to change. Another society without a ruling system based on the control of water for example, would perhaps have fared better in the same circumstances, as drought would likely not have brought down their political

system as easily. But this method of control was inherent to Mayan society, allowing for such things as monumental construction and the exacting of tribute. The Maya way of life had evolved to meet their circumstances and their environment, but in the end they had become fixed in these ways and were unable to modify their society enough when their situation changed. Even if the elite had foreseen drought and wished to change the basis of their power, it is unlikely they could have even done so without collapse remaining the end result; it was such a fundamental component of their society.

It can therefore be seen that the Maya collapse was an extremely complex event that was the result of multiple factors, of which warfare and drought were dominant. In an attempt to focus more on the role of climate, I have neglected some of the other factors such as weakening economy through loss of trade and overpopulation among others, but have attempted to emphasize the multi faceted nature of the collapse in the hope of avoiding oversimplification.

Climate change and the resulting drought played a large, albeit joint role in the collapse of the Lowland Classic Maya. A long period of relative stability had made the Maya culture fragile and inflexible, so that when faced by changes to this constancy, a precarious balance between the various elements of their society was revealed; ultimately they proved unsuccessful in maintaining this in a time of stress.