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The Marco Gonzalez Maya site, Ambergris Caye, Belize: Assessing the impact of human activities by examining diachronic processes at the local scale

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ABSTRACT

Research at the Maya archaeological site of Marco Gonzalez on Ambergris Caye in Belize is socio-ecological because human activities have been a factor in the formation and fluctuation of the local marine and terrestrial environments over time. The site is one of many on Belize's coast and cayes that exhibit anomalous vegetation and dark-coloured soils. These soils, although sought for cultivation, are not typical 'Amazonian Dark Earths' but instead are distinctive to the weathering of carbonate-rich anthropogenic deposits. We tentatively term these location-specific soils as Maya Dark Earths. Our research seeks to quantify the role of human activities in long-term environmental change and to develop strategies, specifically Life Cycle Assessment (LCA), that can be applied to environmental impact modelling today.

1. Introduction

1.1. Scale, context, and aims of the research

Understanding socio-ecological processes at a scale at which individuals can make a difference is problematic when environmental and social questions are articulated at macro-scale levels of analysis, such as 'climate change'. How, then, can we envision what we have recognised at a macro-scale—in our case, long-term environmental change—at a level at which we can not only ask the right questions but also articulate them so that our answers will have some impact on human decision-making today? At the Maya site of Marco Gonzalez on Ambergris Caye, Belize (Fig. 1), long-term environmental change is evidenced in dark surface soils that could not have formed naturally from local soil parent materials. If we keep the frame of analysis at the macro scale, we would ask what the Maya did to *cause* (produce) dark-coloured soils. To mitigate the danger of conflating hundreds of years of social and ecological factors into a macro-question, however, we instead view the dark soils as an *association* (Graham, 2006: 58–62). We are attempting to reconstruct the long and complex history of soil formation processes at the site by studying the details of sequent human occupation and the effects over time. In this way we hope to 'capture' the management of human actions at a level of analysis that, because it is not structured causally by what we know to have been the long-term result, should help in addressing decisions that have to be made concerning human behaviour today. Beyond recycling, which is a short-term concern, long-term environmental impact is not something that people generally feel empowered to change. Rather than battling to change human behaviour, it may be possible to exploit it.

The activities associated with occupation at Marco Gonzalez—which reflect a social group, and at times a true community (Hegmon, 2002)—comprise house construction, house destruction, land modification, resource procurement, rubbish deposition, shoreline fill, burying of the dead, production and manufacturing,

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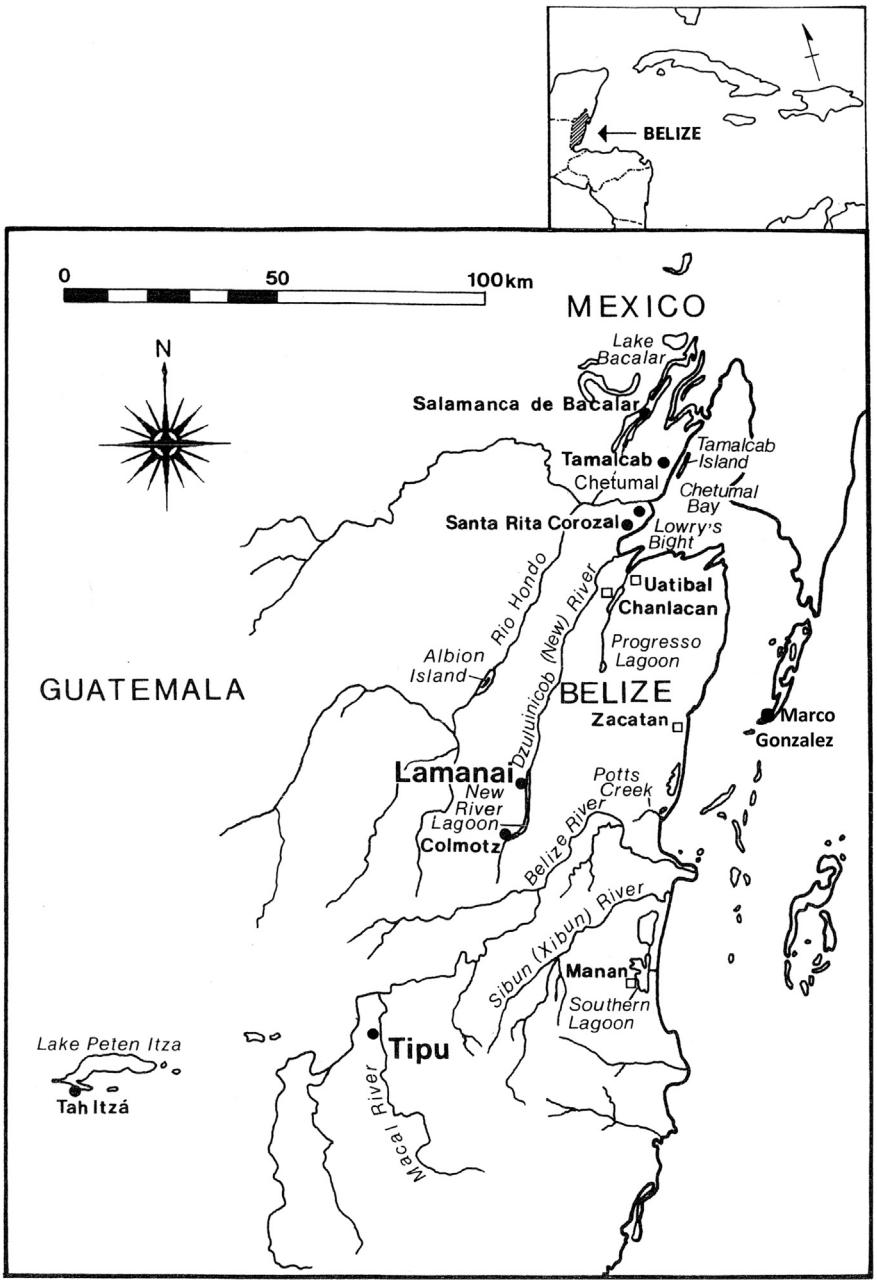

Fig. 1. Map of northern Belize showing the location of Marco Gonzalez.

and the deposition of excreta. Although we sometimes refer to the 'Marco Gonzalez community', there is no doubt that the people and the nature of the social group changed through time, a period of over 2000 years. The aim of the preliminary research we describe here is not to elucidate the rationale, in an emic sense, behind the human behaviour involved in depositional activity—except insofar as details help us to gauge intensity and timing. In fact, the evidence from Marco Gonzalez so far suggests that the soil enrichment represented by the modern dark earths was inadvertent. Our aim is to determine the successive *effects* of past behaviour. The idea that soils on the planet have been enriched by activities for which humans have been the catalyst is widely acknowledged in Amazonian Dark Earth (ADE) research (Arroyo-Kalin, 2009, 2014a). In the Maya area, dark earths have not received much attention, mainly owing to the rarity of evidence of ADE-level enrichment (Beach et al., 2015: 18). The degree of enrichment at Marco Gonzalez is, however, significant enough (Beach et al., 2009) to warrant extending studies of the distribution of anthropogenic dark soils of Precolumbian origin to this region of the Neotropics (Graham, 2006; Arroyo-Kalin, 2014a: 174).

A key methodological issue in the study of anthropogenic soils and sediments is the 'need to establish adequate baselines to assess anthropogenic modification' (Arroyo-Kalin, 2014b: 282). In the caye environment, it is simpler than it would be on the mainland to: 1) identify the natural soil parent materials and distinguish what would be expected to be natural soil formation processes; and 2) identify an area that was not occupied or altered or utilised by the ancient Maya. The dark-coloured soils and vegetation at Marco Gonzalez are not what one would expect to find on an island where the soil parent materials are derived from coral and Pleistocene limestone of the Belize Barrier Reef (Gischler and Hudson, 2004).

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