

A SATELLITE-BASED PERSPECTIVE ON ANCIENT MAYA SETTLEMENT, DEFORESTATION AND CLIMATE.

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The Peten region of northern Guatemala contains some of the most significant Maya archeological sites in Latin America. This civilization reached a spectacular peak but then almost completely collapsed in the space of a few decades. Remote sensing technology is helping locate and map ancient Maya sites, canals, roadways and agricultural areas in the dense tropical forest. Through a combination of image analysis techniques we have been able to extract these features from the data. We have also been able to demonstrate a strong relationship between tropical forest vegetation and the location of archeological sites using a combination of visible and infrared wavelengths. We believe that the use of limestone and lime plaster in ancient Maya construction affects the moisture, nutrition, and plant species of surface vegetation. The detection and verification of cultural features upon the landscape indicate that the ancient Maya had adapted well to wetland environments from the earliest times and utilized them until the time of the Maya collapse around AD 800. While numerous explanations have been proposed to explain this collapse in recent years, drought has gained favor. Natural drought is a known recurring feature of this region and atmospheric modeling simulations (MM5 and CCSM3) demonstrate that deforestation by the ancient Maya also likely induced warmer, drier, drought-like conditions. Neither natural drought nor the human-induced effects alone were sufficient to cause the collapse but the combination created a situation from which the Maya could not recover. The results have implications for the present and future state of climate and water availability in tropical regions which are currently experiencing massive deforestation.