

Media Relations

October 2, 2012

UNH to Study Great Lakes Archaeological Sites via Satellite

DURHAM, N.H. – Researchers from the University of New Hampshire have been awarded funds from NASA’s Space Archaeology program to investigate the transition of indigenous hunter-gatherer cultures in the U.S. Great Lakes region to agricultural-based communities prior to European contact between AD 1200-1600.

The three-year, \$365,698 project will be conducted by principal investigator Michael Palace of the Institute for the Study of Earth, Oceans, and Space (EOS) Earth Systems Research Center (ESRC), co-investigator Meghan Howey of the department of anthropology, and post-doctoral researcher Crystal McMichael of ESRC.

The focus of the study will be to determine if “micrometeorological lake effects” around major inland lakes contributed to settlement and development of prehistoric agriculture by creating favorable conditions for an extended growing season.

To verify the lake effects, the researchers will use ten years of satellite “remotely sensed” imagery from two identical instruments onboard NASA’s Terra and Aqua spacecraft. The Moderate Resolution Imaging Spectroradiometer, or MODIS for short, provides a time series of daily images of the Earth, including a region in Michigan’s Lower Peninsula containing earthen mounds built by indigenous cultures, which are a key feature to the archaeological thrust of the study.

The MODIS imagery will document the decade-long freeze/thaw cycle of the lakes, which will thus reveal the microclimate conditions of individual lakes. This, in conjunction with a tally of the earthen mounds constructed around lakes with a favorable microclimate, will point to human habitation and potentially increased agricultural practices such as growing maize prior to European contact. Core samples taken from lake bottoms will also be used to uncover evidence of early settlement and landscape changes.

“Our hypothesis is that the larger lakes with mounds and favorable microclimates will also have evidence of charcoal from manmade fires, pollen from maize, and other microscopic plant evidence of agricultural practices,” says Palace. A research assistant professor, Palace is expert in remote sensing and geospatial techniques and will lead the analysis of the MODIS imagery as well as remotely sensed radar-based digital elevation map data gathered during previous flights of NASA’s space shuttles.

Howey, an assistant professor of archaeology, has been investigating the Michigan mound-building culture and its relation to the transition from hunter-gatherer societies to an agricultural-based culture for years. Results of her work have just been published in her book “Mound Builders and Monument Makers of the Northern Great Lakes, 1200-1600” from the University of Oklahoma Press. Howey will head up the archaeological focus on mounds in the NASA study.

“The change from a foraging to farming way of life is one of the most significant transitions in human societies, and it has become clear from years of debate that no single ‘cause’ can fully explain the shift because it intertwines social, economic, ideological, and environmental factors,” Howey says. She adds, “The multifaceted nature of this transition demands creative and multiple research approaches, and remote sensing allows for comparison and analysis of vegetation and climate across vast areas.”

Post-doctoral researcher McMichael’s focus will be on the lake cores and identifying periods of past agricultural practices and associated vegetation changes through pollen and charcoal analyses. The lake core analysis will allow historical reconstruction of the timing and type of human settlements and agricultural practices. The combined efforts of the project, the scientists say, will produce solid lines of evidence for the assessment of connections between microclimates, mounds, and agriculture.

Also working on the project will be former ESRC scientists Rob Braswell and Steve Hagen of the independent consulting firm Applied GeoSolutions in Newmarket, N.H.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

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