Marine Scientist Finds 'Little Ice Age' Had Dramatic Effect on Gulf

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USF College of Marine Science doctoral fellow Julie Richey with one of the sediment cores which document how the Gulf of Mexico was affected by the Little Ice Age.

(PhysOrg.com) -- More than 350 years ago, the temperatures in northern Europe dropped dramatically in an event known as the “Little Ice Age.” Now - deep below the waters of the Gulf of Mexico and buried in the sand, silt and mud - a USF marine geologist has discovered new evidence showing just how this long-ago climate change also affected the low

latitude of subtropical areas.

Using deep-sea sediment samples pulled from below the gulf floor, climate change researcher Julie Richey has been able to reconstruct what happened to temperatures on the gulf's surface. Her discovery: the Gulf of Mexico cooled 2 to 3-degrees during the Little Ice Age, a much more dramatic effect that suggests the region may be more sensitive to climate change than scientists expected.

"The more we learn about past climate change, the more we understand about what is occurring now," said Richey, a presidential doctoral fellow at the College of Marine Science.

Richey's research was able to examine 1,500 to 2,000 years of climate change by examining the chemical composition of microscopic fossils in the sediment cores, was published in a recent edition of Geophysical Research Letters.

Richey's research has focused on the Atlantic Warm Pool, which develops west of Central America in the spring and expands east through the fall. She has also conducted similar studies using sediment cores from Lake Tulane near Sebring in an effort to examine 2,000 years of climate change in Florida.

The core samples in her most recent study were pulled in 2006 from a section of the Gulf of Mexico floor (samples were gathered from basins due south and southwest of Louisiana) where sediments from the Mississippi River have collected for eons. Because the majority of climate records covering the past millennium are derived from higher latitude land environments, Richey said very little is known about how past episodes of climate change affected the tropics and sub-tropics. The Gulf of Mexico is unique because of its high volume of sediment carrying telltale minerals and organic matter from the U.S. Midwest and

northern regions that now give scientists clues about how climate has changed.

Richey's study was able to generate three 600-year long records of sea surface temperature from three locations in the northern Gulf of Mexico. Sea surface temperature was calculated by examining the calcium carbonate in the fossilized remains of a tiny creature that normally lives at the ocean surface, but whose shells sink to the gulf floor as they die. The magnesium/calcium ratios in calcium carbonate change in proportion to the water temperature in which the calcium carbonate forms, giving scientist a picture of what temperatures were like through the ages.

Richey's research project found that in all three Gulf of Mexico basins recorded a ~2ºC cooling during the Little Ice Age, which is much larger than the 0.6ºC global average estimated from broad-scale climate reconstructions. The findings imply that natural climate variability in the Atlantic Warm Pool is quite dynamic, and may be especially vulnerable to future climate change, Richey said.

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