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Louisiana sinking to Earth's core

Phenomenon wreaking havoc on planning

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You may not realize it, but here in Louisiana you are slowly getting a little closer to the center of the earth.

Most of south Louisiana sits upon a pile of mud tens of thousands of feet thick that is constantly compacting -- and as it does, the land sinks.

It might not sound like much of a problem. But as different parts of the state sink at different rates -- just a fraction of an inch here and an inch or so there -- measurements taken to make bridges meet in the middle or to map areas that flood become wrong, said LSU researcher Cliff Mugnier.

Such measurements are based on "benchmarks," actual markers where the government has set an official elevation. The trouble is the government can't keep those benchmarks updated.

The benchmarks are too high by about 1.4 feet in Venice, 0.4 feet in New Orleans and 0.8 feet in Baton Rouge, Mugnier said.

Advocate staff photo by Patrick Dennis
LSU researcher Clifford Mugnier, left, and Daniel Winester of the National Geodetic Survey are using a gravity meter to measure tiny changes in elevation.

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"New Orleans is sinking faster, but Baton Rouge is more (off the mark) because of the last time the benchmarks were updated," Mugnier.

To address the problem, LSU and the U.S. Geodetic Survey are working on a series of measuring stations that ultimately will lead to at least one constantly updated benchmark in each parish.

The stations use global positioning system, or GPS, devices to take measurements from satellites orbiting the earth. GPS equipment uses that data to provide exact coordinates and elevation.

To fine-tune the first sets of GPS devices, scientists will use a meter to measure the earth's gravity at each location. The first tests are being

conducted this spring, and a second set in 18 months or so.

Last week, Daniel Winester of the National Geodetic Survey from Longmont, Colo., took a 24-hour series of readings of the earth's gravity on the first floor of the Civil Engineering and Business Administration building on the LSU campus. One of the GPS stations is on the roof of CEBA.

The gravity meter doesn't look all that sophisticated. It's basically a big tube on a tripod support. Wires attached to it run to a computer console.

Every hour, the gravity meter turns itself on and drops a mirrored device in the tube, which has had all the air sucked from it to create a vacuum.

A laser and an atomic clock measure how fast the mirrored device falls. A small elevator brings the device back to the top of the chamber and repeats the process every 10 seconds for 1,000 drops. That takes about 17 minutes.

The data is fed into the computer. It is later corrected for the position of the moon and the Earth's tides, both of which can affect the readings.

"As Louisiana sinks, the force of gravity increases because we are getting closer to the center of the earth," Mugnier explained. "That means if this instrument returns here in a year and a half or so, it will be able to tell if LSU is getting closer to the center of the earth."

The network of permanent GPS stations includes sites at LSU, University of Louisiana-Lafayette, Southeastern Louisiana University and LUMCON, the Louisiana Universities Marine Consortium in Cocodrie. Stations are planned for Bootheville-Venice High School, Nicholls State University, McNeese State University and Loyola University.

All of the stations will feed into the LSU system, which will relay the information daily to the National Geodetic Survey. There, the data will be checked for quality and adjusted as needed so the information can be posted on the Internet for use by surveyors.

The information also will help researchers study how quickly Louisiana is subsiding, or sinking.

Aside from contributing to the massive loss of coastal areas in Louisiana, subsidence also causes problems of a far less serious, yet still weighty, kind.

"When you get on your bathroom scale, because of subsidence, you get heavier," Mugnier said.

The increased force of gravity that comes with being closer to the center of the earth makes people heavier.

The good news is it doesn't make people that much heavier.

"It would take couple of million years on that scale before you might see a pound difference," Mugnier said.

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