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RESEARCH & IDEAS

MONDAY, JUNE 1, 2015

UC Berkeley researchers conduct supercomputer-assisted 3-D cloud imaging

DAVID ROMPS/COURTESY

BY YUKA KOSHINO | STAFF

LAST UPDATED 20 HOURS AGO

David Romps, an assistant professor in UC Berkeley's earth and planetary science department and part of a team that created a system to observe cloud behavior, visited the site of his research in Miami on Thursday after first installing the system there in 2012.

Computerized stereophotogrammetry — a method of synchronizing photos taken from two distant points into three-dimensional data — enabled Romps' team to analyze the size, speed and height of clouds over oceans without the use of a landmark for reference. The data produced by this system, which uses two cameras about a half-mile apart from each other and facing Miami's Biscayne Bay, is expected to provide a better understanding of climate change and weather patterns, such as lightning.

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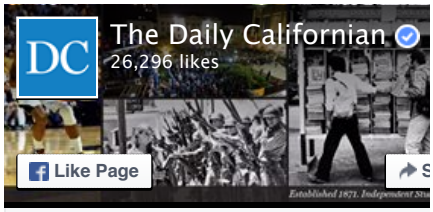

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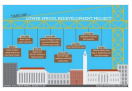

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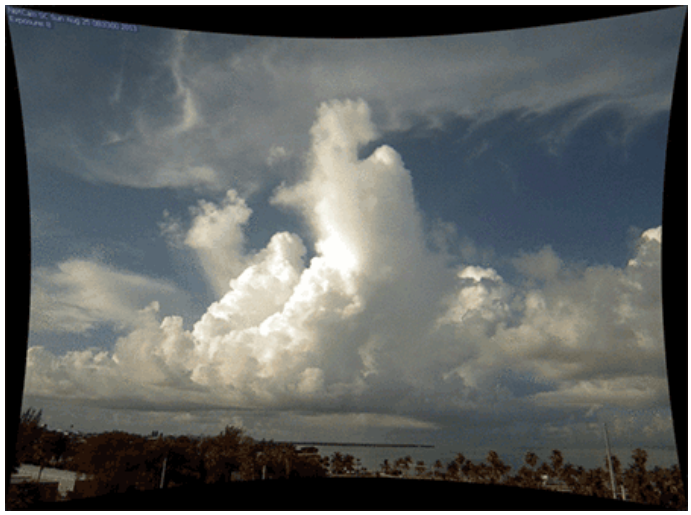
"A lot of people wanted to do this decades ago, but the computing was not there," Romps said.

Using a supercomputer, the team discovered that clouds rise at a speed of 20 meters per second — about 40 mph — which is twice as fast as what similar studies conducted manually had concluded. He said that the data could answer a longtime debate within the atmospheric research community over how quickly clouds rise above the ocean.

Paquita Zuidema, an associate professor at the Rosenstiel School of Marine and Atmospheric Science at the University of Miami and co-author of Romps' study, had been using a single camera to observe cloud formation. But in 2012, Romps set up another camera on the roof of the Maritime and Science Technology Academy, or MAST Academy — a nearby high school — allowing them to accumulate 3-D data for observation. Zuidema said she hopes to use the system's observations to determine how the shapes of clouds change when the air becomes polluted.

Rusen Oktem, a project scientist from the campus's earth and planetary science department, created a new algorithm for the calibration and automation of the cloud-data accumulation and 3-D reconstruction. Oktem said that before this project, she did 3-D face modeling in an indoor environment rather than modeling in an outdoor environment with clouds, which are completely out of her control.



The team can now identify more than 35 million cloud features, such as bumps, using images taken every 30 seconds over the course of three months, according to Romps.

"(The camera) makes the science more real to the student and the faculty," said Mark Tohulka, an environmental science teacher at MAST Academy.

Julie Hood, a physics teacher at MAST Academy and a UC Berkeley alumna, said she appreciated that Romps was "involving young people to develop research interest." She said she is hoping there will be research opportunities for her students to help analyze data collected by the cameras.

Romps said he will publish a paper on the camera systems' findings within a month.

Contact Yuka Koshino at ykoshino@dailycal.org and follow her on Twitter @YukaKoshino.

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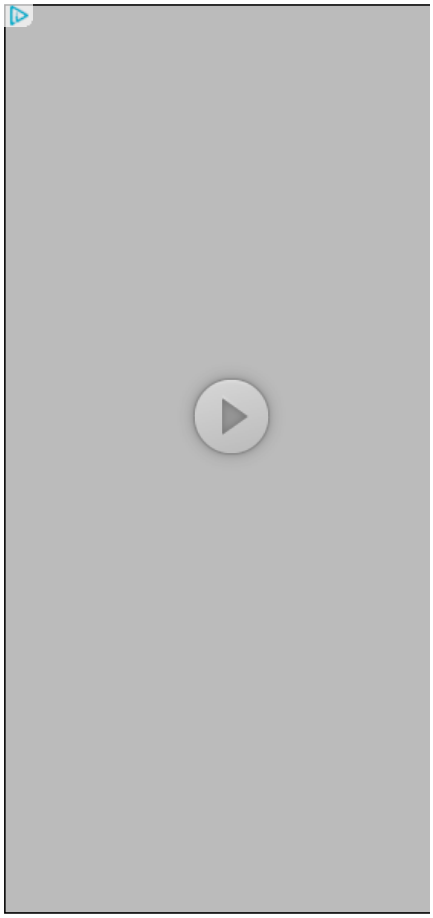
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