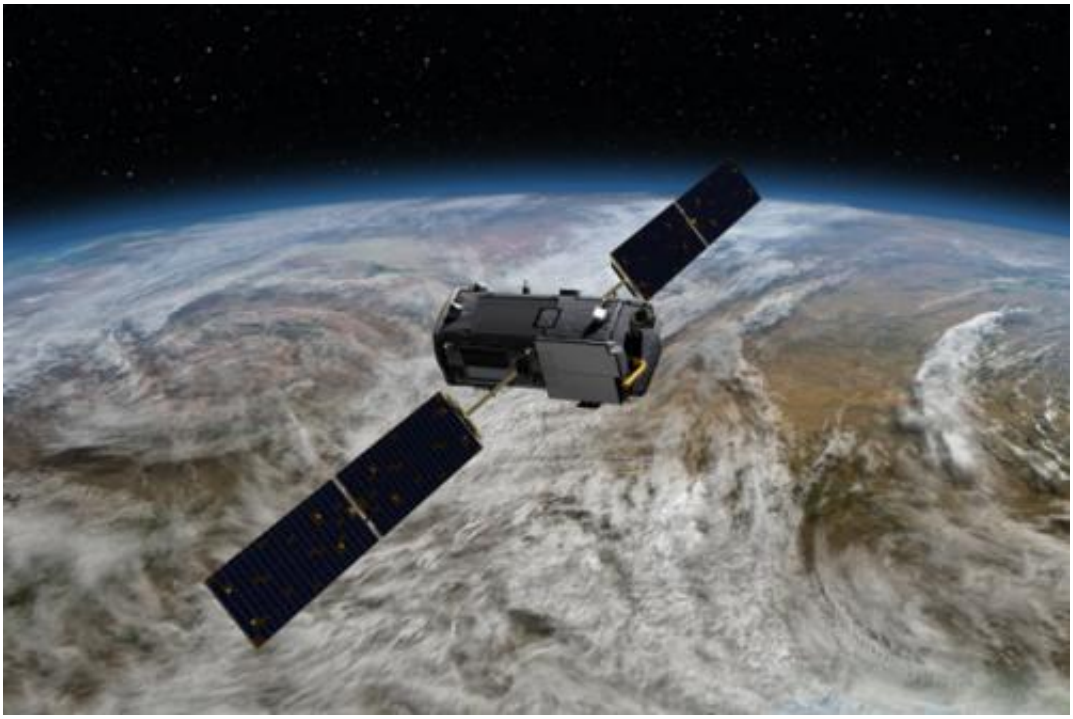
Satellite will help predict climate changes, say Stanford researchers

July 4 2014, by Shara Tonn



The Orbiting Carbon Observatory satellite will help scientists make precise measurements of atmospheric carbon dioxide. Credit: NASA

The Orbiting Carbon Observatory satellite will monitor carbon dioxide concentrations in the atmosphere and help scientists understand the lifecycle of carbon on Earth.

Wednesday at 2:56 a.m., a satellite that could help predict the future of

our climate was launched into orbit from Vandenberg Air Force Base in California after a long history of false starts.

Anna Michalak has been involved in the project for a decade. She is an associate professor, by courtesy, in Stanford's Department of Environmental Earth System Science, and also a faculty member in the Department of Global Ecology of the Carnegie Institution for Science, on the Stanford campus.

Following a rocket launch error in 2009 that destroyed the original satellite, Michalak and her colleagues started from scratch with the aptly named Orbiting Carbon Observatory 2, known as OCO 2.

"The primary overall goal of the satellite is to make the most precise and accurate measurements of atmospheric CO2 concentrations from space that we've ever had," said Michalak.

To do this, the satellite measures reflected sunlight. After the sunlight hits Earth's surface, it bounces back up toward space and the wavelengths within that light change depending on what's in the atmosphere. "By very carefully measuring certain points in the spectrum of the light bouncing off the surface of the Earth, the satellite can infer how much CO2 is in the air," Michalak explained.

With that information, Michalak and her colleagues want to better understand what happens to carbon dioxide on Earth. Only about half of the carbon dioxide we emit through burning fossil fuels or driving cars stays in the atmosphere – the other half is sucked up through oceans or plants. But right now scientists can't pinpoint exactly where that carbon dioxide is being absorbed.

"If you look at future predictions of climate," said Michalak, "our lack of understanding of what the natural land processes are doing is actually

one of the biggest uncertainties in our ability to predict how climate will change between now and 2100."

Even though Earth is providing a free service – sucking up half of the carbon dioxide emissions – that may change as the climate evolves. So with the OCO 2 data, Michalak and her colleagues will be able to map those areas, monitor the changes and better predict what could happen in the future.

In a month, the satellite should be beaming back volumes of data. But Michalak is still holding her breath. "Going through a launch is a pretty rough process and the very first thing that we really want to know is that the instrument is intact," she said. "Once the data starts coming in, I think it's going to be a very exciting time."

Provided by Stanford University

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