

# New satellite may make flood prediction easier

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A satellite on schedule to launch in 2021 could offer a more comprehensive look at flooding in vulnerable, under-studied parts of the

world, including much of Africa, South America and Indonesia, a new study has found.

The study, published last month in the journal *Geophysical Research Letters*, found that the satellite also will likely improve flood modeling around the world, even in areas that are already studied extensively, especially in the United States and Canada. That could mean more accurate flood plain maps and better predictions about which areas are likely to flood after snowmelt, hurricanes, ice jam breakup and others.

"The flood maps—the 100-year, 500-year flood plains—they are only as good as our understanding of the terrain," said Renato Frasson, lead author of the study and senior research associate at the Byrd Polar and Climate Research Center at The Ohio State University. "And land use changes, rivers migrate, sometimes naturally, other times due to human activity. However, in some areas of the world, the best available maps are not updated often enough. With this mission, we will be able to go in and correct that old data."

The study found that the radar installed in the Surface Water and Ocean Topography (or SWOT) mission will collect more detailed looks at large-scale floods in parts of the world where flooding historically has not been studied as well.

To reach that conclusion, Frasson combined data from the Dartmouth Flood Observatory at the University of Colorado with the expected path of the SWOT mission. The database uses news reports and other publications to collect information on flood locations, severity and impact, and dates back to 1985.

What Frasson found is that the mission is likely to catch about 55 percent of floods worldwide, and that the mission is also more likely to capture more detailed images of severe, long-lasting floods than quicker,

less-severe floods.

"At first, it might not seem that exciting—just 55 percent of floods," Frasson said. "But what is really worth knowing is that, because we had this data from the Dartmouth Flood Observatory, we were able to see that the more intense the flood, the larger number of people who were displaced, and the more likely SWOT is to see those floods. And because SWOT is flying over areas of the world that have very little monitoring, it is likely to capture more floods than we would have otherwise known about."

Flooding is a crisis in many parts of the world, where climate change has led to more severe, more frequent storms. In the United States alone, including Puerto Rico, flooding has killed thousands of people over the last three years, and caused billions of dollars in damage.

"Some regions do not have time to recover before the next rains come," Frasson said.

The U.S. river-and-stream monitoring system is fairly robust, but still leaves major gaps, especially in rural areas. And in other parts of the world—including the Bahamas, where earlier this year Hurricane Dorian killed at least 43 people—satellites are some of the best options for scientists and aid workers to see damage.

"The first images of Dorian this year to really show how much of the island was under water came from scientists in Luxembourg, who analyzed and made visuals of data from existing satellites," Frasson said.

The SWOT mission, a combined effort by NASA and the French national space agency Centre National D'etudes Spatiales, along with support from the national space agencies in the United Kingdom and Canada, is important for geologists, hydrologists and others interested in

the state of Earth's water. The mission is the first-ever global survey of our planet's [surface water](#), and will allow scientists to measure how water bodies, including the world's oceans, change over time.

And while monitoring floods is not the mission's primary purpose, the data the mission will collect will likely be used by scientists for a number of things.

Frasson, who was born and raised in a flood-prone area of Brazil and who was a graduate and Ph.D. student at the University of Iowa during major floods in Iowa City, said the mission should make it easier to predict and react to floods, and to get help to people who need it after a severe [flood](#).

"Instead of making a guess about where the water will be, the SWOT [mission](#) could offer the data needed to predict when and where floods will happen, giving more time to locals and aid workers to start working on protections, on putting up sandbags, and on evacuation if necessary," he said.

**More information:** Renato Prata de Moraes Frasson et al. Will the Surface Water and Ocean Topography (SWOT) Satellite Mission Observe Floods?, *Geophysical Research Letters* (2019). [DOI: 10.1029/2019GL084686](#)

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