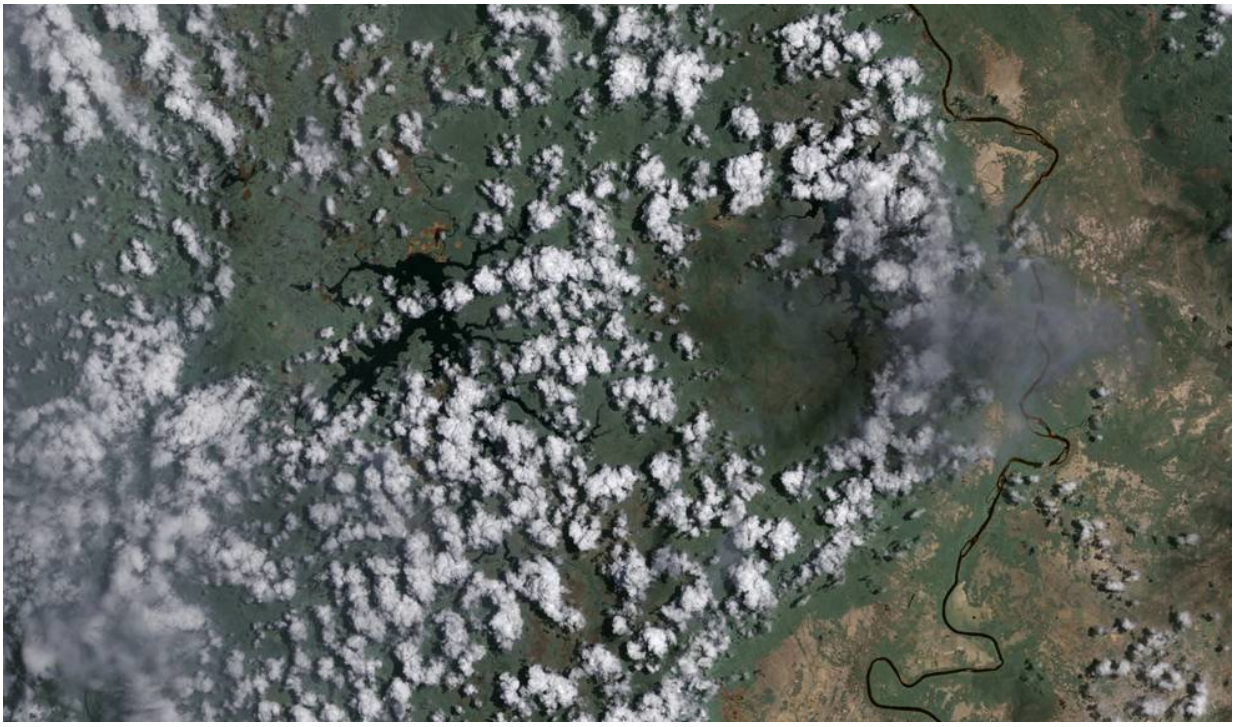
Scientists deploy damage assessment tool in Laos relief efforts

August 17 2018, by Jessica Merzdorf



Banner Photo: A view of a reservoir on the Xe-Namnoy river in southern Laos on May 8, 2018, 11 weeks before the July 23 failure of a hydropower dam unleashed 130 billion gallons of water on rural villages in Southeast Asia. Credit: NASA's Goddard Space Flight Center/Landsat/Matt Radcliff

The July 23 failure of the Xepian-Xe Nam Noy hydropower dam unleashed more than 130 billion gallons of water on rural villages in

southern Laos, in Southeast Asia, devastating thousands of houses and businesses and displacing more than 6,000 people. As authorities scrambled to gather information in the wake of the disaster, scientists at NASA's Goddard Space Flight Center in Greenbelt, Maryland, activated a new tool to help them assess the damage and get help to people in need.

NASA researchers John Bolten and Perry Oddo and Stanford University researcher Aakash Ahamed recently developed a system that predicts flood damage based on satellite and ground data. The model estimates floodwater depth, adds information about land use and building infrastructure, and generates a dollar-value calculation of the damage in the target area.

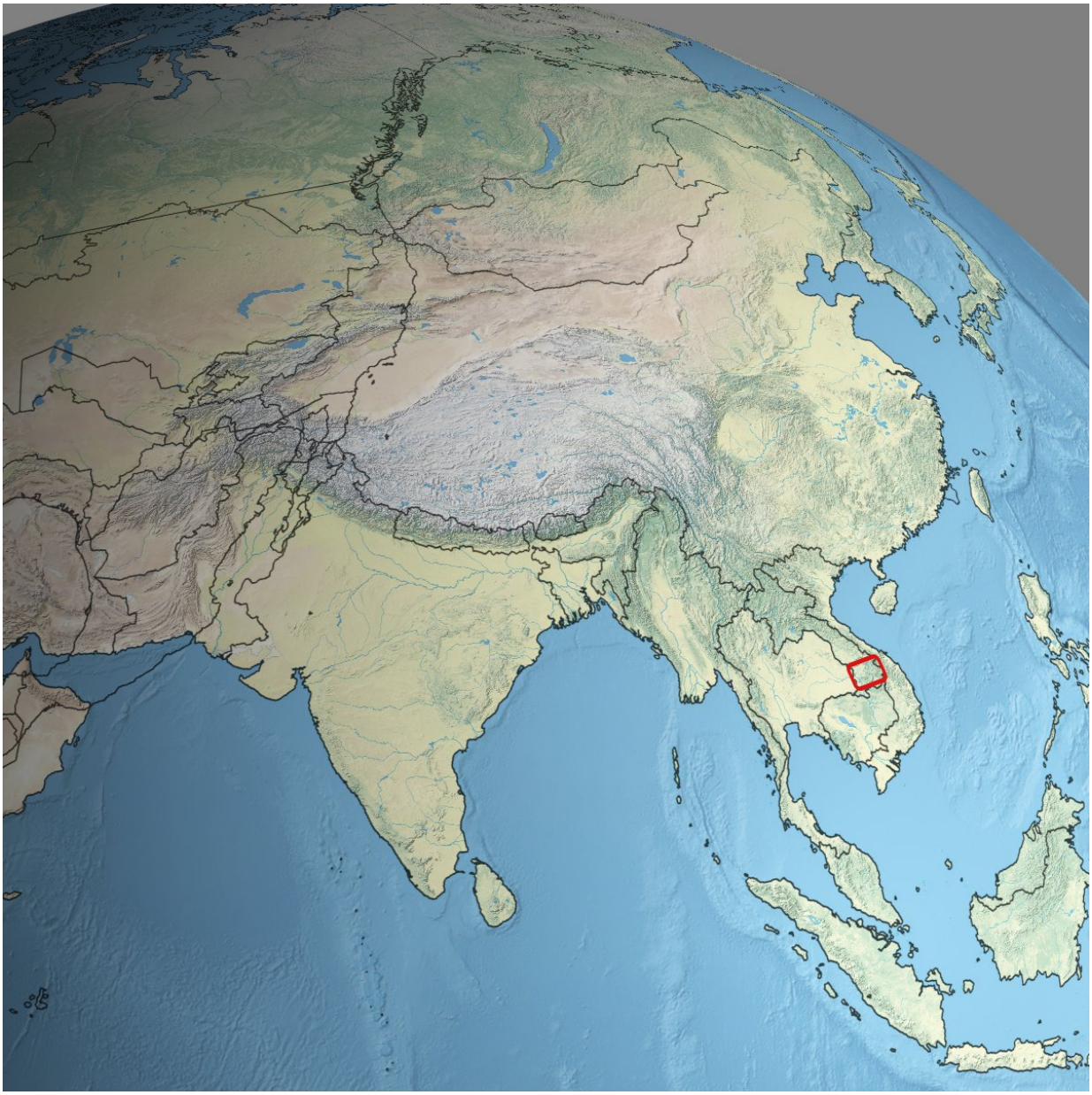
The model was designed to use data from NASA's Moderate Resolution Imaging Spectroradiometer (MODIS), a satellite-borne instrument that takes high-resolution photos using electromagnetic energy from plants and water to study Earth's surface and atmosphere. MODIS data is available to researchers just three hours after it is collected, making it useful for near-real-time applications where speed is important.

However, MODIS cannot collect data through cloud cover, so to contribute to the Laos relief effort, the researchers adapted the model to use radar data from Japanese satellite ALOS-2 and ESA's (European Space Agency) Sentinel-1.

"Our partners needed to know areas of flooding and inundation rather quickly," said Bolten, associate program manager of water resources for the NASA Applied Sciences Program. "Just a couple of days after the event, we were able to come up with the information that they needed."

In addition to the estimated cost of damages the researchers created maps of the flooded areas from satellite images, making them available

for other agencies to use.



The Xepian-Xe Nam Noy hydropower dam was located in southern Laos, in Southeast Asia. Approximate location highlighted here in red. Credit: NASA's Goddard Space Flight Center/Matt Radcliff

The researchers provided the data to several NASA partners working on recovery in Laos and other regions in a coordinated effort through SERVIR, a joint initiative between NASA and the U.S. Agency for International Development (USAID), and the NASA Disasters Program. SERVIR has a hub in the Mekong River basin, which stretches from Tibet through Laos and to Vietnam and Cambodia. SERVIR collaborates with the Asian Disaster Preparedness Center, a nonprofit organization that works to build disaster and climate change resilience in Southeast Asia.

"Local authorities and decision-makers are scrambling to get information as quickly as they can, and NASA was able to step up to the plate and deliver information in near real-time," Bolten said. He described the model as a "value-added" product: "Rather than simply saying 'this area is flooded,' we've added value to the flood map by including the floodwater depth, population, hectares of agriculture affected, locations of building footprints and so on with our damage assessment system."

The model uses near real-time data from NASA and other satellites to produce these estimates quickly, which is beneficial for rapid response efforts. It also provides decision-makers access to clear, understandable data.

"After a flood, especially in this region, there will be an extensive damage evaluation, which can take many weeks or months," said Perry Oddo, a support scientist at Goddard and lead author on the paper detailing the model's development. "Oftentimes, without information on how these damage assessments were conducted, the results we get can be somewhat vague. We hope that with this kind of very transparent, standardized approach we will be able to look at flood events across time and compare them."

The researchers' next step is to use economic evaluation tools to determine how beneficial the system is from a financial perspective. For example, first responders who have access to these early damage estimates might direct crews and resources more efficiently than those who do not.

"In a decision-making context, if a disaster strikes and you have resources to allocate and emergency response crews to manage, how does that change if you have access to these observations instead of operating blind?" Oddo said. "Hopefully, the inclusion of NASA Earth observations will lead to a reduction in expenses, shorter time to rescue, and increase in the number of people whose needs are cared for."

More information: To read the paper on the model's development, visit http://www.mdpi.com/2306-5338/5/2/23.

To learn more about SERVIR, visit https://www.servirglobal.net/.

To learn more about the NASA Earth Science Disasters Program, visit https://disasters.nasa.gov/home and the NASA Disasters Mapping Portal: https://maps.disasters.nasa.gov/

Provided by NASA's Goddard Space Flight Center

Citation: Scientists deploy damage assessment tool in Laos relief efforts (2018, August 17) retrieved 27 April 2024 from https://phys.org/news/2018-08-scientists-deploy-tool-laos-relief.html