NASA Jet Propulsion Laboratory, Pasadena, California

U.S. Disasters Team II

VPS Title: “Blazing Models: Creating a Predictive Tool for Wildfires”

By: Nick Rousseau, Brittany Zajic, and Daniel Jensen

[Open scenes to disaster fire footage from Santa Clarita, 2015]

[Music]

[Titles]

>> JOHN T. REAGER: Probably one of the biggest skills a scientist needs to have, and that people are learning through this DEVELOP program is critical thinking and being able to look at a problem , and in the traditional sense of science, formulate a hypothesis, and design an experiment, and do a test on whether something is true or not

>> NICK ROUSSEAU: My name is Nick Rousseau.

>> DANIEL JENSEN: I am Daniel Jensen.

>> BRITTANY ZAJIC: I am Brittany Zajic and we are the U.S. Disasters Team here at NASA JPL.

[Open scene in field of dry brush]

>>NICK ROUSSEAU: In the contiguous United States, wildfires have been on the rise due to recent drought conditions, and emergency response agencies have used a variety of methods to counter wildfires on a national level. But what feeds a wildfire? While there are many causes, either by lightning or human-induced, we know that water stored on land can have an impact on fuels that are created in vegetation.

[GRACE satellite animations]

>> NICK ROSUSEAU: GRACE, the Gravity Recovery and Climate Experiment, are two satellites that orbit the Earth in tandem, and they sense changes in spatial and temporal variability in Earth’s gravity field.

>>Brittany Zajic: Grace satellites are unique in that they measure closer to the ground than any other Earth satellite. They can capture both water above an d underneath the Earth’s surface.

>> DANIEL JENSEN: So in the broadest sense, our hypothesis is exploring if we can use the GRACE satellite data to determine a quantitative relationship between water conditions in the U.S. and wildfire.

>> JOHN T. REAGER: People who work with fires, fighting fires and forecasting fires have always know that moisture, especially soil moisture, can be a precursor for fires. If it is getting really dry like a drought, vegetation and trees can be stressed out and they can become incendiary, so they can ignite, and so what GRACE gives us is a little bit of a feeling for how dry conditions are relative to how they’ve been in the past, and in these projects, we engage project partners like the U.S. Forest Service so it really does hit the ground running with applications.

>>DANIEL JENSEN: So then to measure wildfire activity, we obtained data from the USDA Forest Service’s Fire Program Analysis, Fire Occurrence Database. We can then import everything into a geographic information system and process those points into a raster dataset with a matching spatial resolution to our GRACE dataset. This allowed us to spatially and temporally compare our fire occurrence record against our GRACE-derived soil moisture record.

>> BRITTANY ZAJIC: Final Results quantified a relationship between GRACE and wildfire data by land cover type. Patterns and the correlations between GRACE and wildfire data can result in a fuel moisture content or FMC, product. In this way, GRACE is a promising tool for the U.S. Disasters Team as we create a predictive algorithm for wildfire activity on a national scale.

[Credits]