The flash before the flood

November 20 2008

Flash floods are the most common natural disaster in the United States, and because of their unpredictability they're the leading weather-related cause of death for Americans. They usually arrive with little or no warning, but a Tel Aviv University researcher is trying to predict where and when they will occur — using lightning.

Prof. Colin Price, coordinator of the international "Flash Project" and head of the Geophysics and Planetary Physics Department at Tel Aviv University, is studying the link between lightning and subsequent flash floods. The three-year study includes scientists from five European countries, and its results are expected to be adopted by weather forecasting agencies around the world.

The goal is to develop an early warning system for people in the path of a flood. "Flash floods are different from normal floods, which are often the product of melting snow. Flash floods are short-lived and dump a lot of rain," says Prof. Price, a climate change specialist. "Using the radiation emitted from lightning flashes, we've developed a system that can give adequate warning to the public — and save lives."

Eventually, the Flash system may be used to send messages to cell phones, RSS feeds, GPS units and other devices to warn people in the path of a flash flood and avert disaster.

"Nowcasting" for Flood Warnings

Unlike normal floods which arrive slowly and with more warning, flash

floods are particularly dangerous because they happen so quickly, developing from thunderstorms that form in a matter of hours. By measuring the radiation emitted by lightning, researchers can pinpoint the most intense thunderstorms, and the resulting rainfall can be located and tracked.

This data has been used to predict both the path of a storm and where heavy rainfall will appear — crucial predictions, since the impact of flash floods depends on ground topography, slope and vegetation cover. "Nowcasting," which predicts what conditions will be in the next few hours, versus "forecasting" a day or two in advance of expected weather conditions, is critical.

Looking at real-time lightning data, Tel Aviv University researchers can see where storms will travel over a period of a few hours, and can warn people in the path of the flood of impending danger. Such a tool will become even more relevant as erratic weather patterns, predicted by climate-change scientists today, become a reality tomorrow.

A Flood of Warnings Delivered in a Flash

The research from the Flash program can be extrapolated for use anywhere in the world, including the flash flood-prone regions of the U.S. For example, the U.S. National Lightning Detection Network could easily apply the results of the Flash research.

"This is a tool for the future," says Prof. Price. "And it will be even more exciting in the next decade, when we'll have continuous real-time detection of lightning activity from satellites. That data will be used to predict floods anywhere." The U.S. will also have geostationary satellites with lightning trackers that will take a picture every 15 minutes from 36,000 kilometers above the earth.

In the meantime, end users and educational institutions can connect and learn about floods on the "Flash" website (http://www.flash-eu.tau.ac.il/). By mid 2009, Prof. Price says, real-time maps will be available to predict floods in a flash.

Source: American Friends of Tel Aviv University

Citation: The flash before the flood (2008, November 20) retrieved 10 April 2024 from https://phys.org/news/2008-11-the-flash-before-flood.html

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