RAINY DAY

A Modern, Open-Source Rainfall Information System for Understanding Long-term Hazards and Risks

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Problem

Rainfall-driven hazards such as floods and landslides are the most common natural disasters worldwide. Though much could be done to manage these risks through infrastructure or insurance, management plans depend on being able to accurately calculate the rainfall hazard at a particular location. This has traditionally been difficult for two reasons. First, such understanding requires long records of rainfall, which are nonexistent in much of the world, including parts of the United States. Second, usage of rainfall records in hazard and risk modeling is highly subjective and many standard practices are either misused or badly out-of-date.

Solution

Remote sensing datasets from satellites and weather radar offer high-resolution rainfall measurements at zero cost everywhere on the globe. With more than 15 years of continuous monitoring, these data can be used to improve estimates of the frequency and intensity of rainfall, floods, and other hazards. **RainyDay** is an open-source rainfall information system developed at NASA Goddard Space Flight Center for quickly generating large numbers of **probabilistic extreme rainfall scenarios** using remote sensing data. It is based on Stochastic Storm Transposition, a peer-reviewed statistical method for generating rare storms (such as 100-year or 1000-year events) from short datasets. **When used as inputs to hydrologic or hydraulic simulations, these scenarios can provide superior results to those derived from conventional IDF, design storm, or discharge analysis methods.**

Comparison of 24-hour IDF Curves for Iowa City

- RainyDay IDF with Stage IV radar dataset
- RainyDay IDF with NASA TMPA satellite dataset
- NOAA IDF with 90% confidence intervals