

# Researchers using GPS and accelerometers in base stations to create early warning system in southern California

January 6 2014, by Bob Yirka

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Credit: AGU

(Phys.org) —Teams of researchers with the Scripps Institute, NASA's JPL laboratory and NOAA are working together, representatives from

each have reported at this year's meeting of the Geophysical Union, to upgrade monitoring stations in parts of southern California—the aim is to use existing monitoring stations as an early warning system for earthquakes and flashfloods.

Southern California, due to its unique geography, is subject to both earthquakes and fast moving storms that can cause flashfloods. Predicting when either or both may strike is critical to saving lives. To study earthquake behavior, various research organizations have installed monitors at locations throughout the southern part of the state. GPS is used because it allows for noting ground movement. Now, in this new effort, the researchers from the three groups have been using the GPS data for a different purpose and have also been installing accelerometers to more precisely measure ground movement in near [real-time](#).

GPS, the researchers told the audience, in addition to location information, also contains an additional data element—humidity level. The degree of water in the air impacts the time it takes for a GPS signal to travel to and from a satellite—higher levels, or a sudden increase in moisture may indicate that a storm is developing. Monitoring levels in real time can help predict such storms and thus flashfloods. That information, the team hopes, could then be relayed to media outlets, emergency workers, and even regular people via their cell phones, offering local citizenry an opportunity to take proactive measures to ensure their safety. Currently, weather balloons serve in this capacity, but they can't provide data in real time. The addition of GPS data has already proven its worth—it's predicted several flashfloods in the San Diego area.

Meanwhile, adding accelerometers allows for monitoring very slight ground movement (and P-waves) which under the right circumstances can mean an earthquake is likely to happen—when combined with existing GPS data more information is available, making for a more

reliable system—information that could be disseminated giving people some small amount of warning before a quake strikes, potentially saving many lives. If the system proves to be as accurate as the researchers believe it could be, it could become part of the western United States' tsunami [early warning](#) system as well.

To date, seventeen stations in southern California have been upgraded—more will be modified as money comes available, and presumably, as the upgraded monitors prove their worth.

**More information:** [fallmeeting.agu.org/2013/press ... blic-safety-threats/](https://fallmeeting.agu.org/2013/press-releases/public-safety-threats/)

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Citation: Researchers using GPS and accelerometers in base stations to create early warning system in southern California (2014, January 6) retrieved 27 June 2024 from <https://phys.org/news/2014-01-gps-accelerometers-base-stations-early.html>

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