GPS helping provide more precise precipitation predictions

October 10 2019

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Scientists are using GPS signals to measure air moisture for better weather forecasting. The method is now being incorporated into the Bureau of Meteorology's weather forecast models following successful

tests over Australia, off the back of World Space Week 2019.

The RMIT University, Geoscience Australia and Bureau of Meteorology collaboration has harnessed the growing network of GPS receivers to provide more accurate, real time weather forecasts.

The system works by measuring the time it takes GPS signals from overhead satellites to reach ground receivers. Signals can be slightly delayed by moisture in the troposphere, causing what's known as a zenith total delay, so scientists measure this delay to assess air moisture.

RMIT Adjunct Professor and Bureau Senior Principal Research Scientist, John Le Marshall, said it was an exciting new capability for real-time weather measurements and forecasting.

"Atmospheric water vapour is highly variable yet vital to accurate analysis and weather forecasting," Le Marshall said.

"The development of a GPS-based system to improve moisture analysis and forecasting over Australia is therefore an exciting step towards improved humidity and rainfall forecasting."

GPS is proving increasingly useful to meteorologists, with another completed project using the bending of GPS signals through the atmosphere to determine temperature at various altitudes, whereas this system measures the delay in the arrival of those signals to determine water vapour levels.

While the technology could be applied almost anywhere, it's particularly valuable in a sparsely populated country like Australia where there's a lack of ground-based meteorological observation stations.

"Weather forecasting is dependent on accurate atmospheric

observations, but the limited stations we can draw measurements from across our vast continent has always been an issue," he said.

"With this technology we were able to tap into an Australia-wide network of 256 GPS receiving stations, and that number of stations is set to continue increasing over coming years."

A study of the system has just been published in the *Journal of Southern Hemisphere Earth Systems Science*.

More information: *Journal of Southern Hemisphere Earth Systems Science*, DOI: 10.22499/3.6901.009

Provided by RMIT University