Science Societies

A Simple Water Sampler for Runoff Measurement Systems

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Left: Runoff quantification devices known as UBeTubes are ready to deploy. Inset shows a top-down view. Right: Lab test of the water collected by sampler. Photos by Jacob Maris.

Overland flow—storm- or meltwater moving across the land—is a common runoff process that can impair water quality. Researchers have developed different devices to quantify the volume of surface runoff. But collecting water samples from these systems is challenging and often requires expensive equipment and infrastructure.

In a recently published article in Vadose Zone Journal, researchers at Virginia Tech developed a low-cost water quality sampler that can be integrated with surface runoff measurement systems. Called

the Holey Sampler, it doesn't need power and has no moving parts. It consists of a vertical standpipe with small holes at specific elevations to ensure the rate of water entering the sample is proportional to the surface runoff rate. The team designed two variations of the sampler and integrated them into a runoff quantification device called the UBeTube. Laboratory tests confirmed that the samplers collected water at a constant proportion of 1 mL of water for every 250 mL of runoff. Measured sample collection rates closely matched theoretical predictions under both constant and variable-flow conditions. The sampler design offers considerable flexibility and can be modified to accommodate different surface runoff rates and runoff measurement systems. Adapted from Maris, J.O., & Stewart, R.D. (2022). A device to collect passive, flow-weighted water samples from surface runoff. Vadose Zone Journal, e20226. https://doi.org/10.1002/vzj2.20226

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