

Lysimeters in Vadose Zone Research

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For a long time lysimeters have been used to study water and transport processes in soils with a specific emphasis on determining the terms of the soil water balance in soils and the fate of chemicals, fertilizers, and plant nutrition (e.g., pesticides, nitrogen, nanoparticles). The use of radioactive isotopes and stable isotopes has extended once again the benefit of lysimeter experiments. In the last decade lysimeter technology has developed significantly. The filling technology, weighing technology, measurement devices, and the control of the lower boundary condition in particular were improved. Many lysimeters are now equipped with various sensors (e.g., tensiometer, TDR-probe, matric potential sensor, temperature sensor, suction cup, etc.) for a better understanding of vadose zone processes. Especially weighable lysimeters have shown a large potential to resolve all terms of the water balance and to analyze the impact of climate and land use change on the water balance components. In this respect, lysimeters may be considered as the gold standard for accurately determining local-scale actual evapotranspiration. Several studies have also combined lysimeter technology with hydrogeophysical measurement techniques to analyze controls on water flow and solute transport as well as root water uptake. In this special issue, we welcome reviews and recent research on the use of lysimeters in quantifying and predicting vadose zone end ecological processes.

Deadline for submission of papers: 13 Jan. 2017