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# Low-cost water depth, temperature and electrical conductivity (CTD) sensor for spatially distributed groundwater table and surface water measurement

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Traditional instrumentation suites utilized for spatially distributed, catchment scale hydrological characterization effectively sample aboveground environmental variables and water storage in the vadose zone. However, spatially distributed measurements of shallow groundwater characteristics, critical to understand both vadose zone and groundwater hydrology, have often been under-sampled due mostly to prohibitive expense. An inexpensive CTD sensor designed specifically for catchment scale distributed sensing networks was developed to specifically fill this need. The depth measurement is optimized for shallow water measurements, with the high resolution and accuracy necessary for shallow ground and surface water measurements. Temperature and conductivity measurements are also optimized for these scenarios and the sensor consumes very little power and is therefore ideal for wireless data acquisition networks that are common in distributed sensing applications. This new measurement tool provides an opportunity to better understand shallow groundwater and surface water hydrologic processes.