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URANOS - modeling cosmic ray neutrons

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The understanding of neutron transport by Monte Carlo simulations led to major advancements towards precise interpretation of measurements. URANOS (Ultra Rapid Neutron-Only Simulation) is a free software package, which has been developed in the last years in a cooperation of Particle Physics and Environmental Sciences, specifically for the purposes of cosmic ray neutron sensing. Its very comfortable user interface and input/output scheme tailored for the CRNS method offers hydrologists straightforward first steps in setting up their model and directly performing advanced neutron transport calculations. A URANOS user models the geometry layerwise, whereas in each layer a voxel geometry is automatically extruded using a 2D map from a png image of predefined materials - allowing to construct objects on the basis of pixel graphics without a 3D editor. It furthermore features predefined cosmic ray spectra and detector configurations, which allow for example a replication of an instrument site - from a small pond to the catchment scale. The simulation thereby gives precise answers to questions like: From which location do neutrons originate? How do they propagate to the sensor? How does the neutron flux change for specific environmental parameters? URANOS has been successfully applied to calculate the cosmic ray neutron footprint, signals in complex geometries like mobile applications on roads, urban environments and snow patterns. In this contribution we present an overview about the features of this versatile tool for researchers.