

Construction and field test of a programmable and self-cleaning auto-sampler controlled by a low-cost one-board computer

Philipp Stadler (1,2), Andreas H. Farnleitner (3,4), Matthias Zessner (1,2)

(1) TU Wien, Center for Water Resource Systems, Vienna, Austria (stadler@waterresources.at), (2) TU Wien, Institute for Water Quality, Resources and Waste Management, Vienna, Austria, (3) TU Wien, Institute of Chemical Engineering, Research Group Environmental Microbiology and Molecular Ecology, Vienna, Austria, (4) Interuniversity Cooperation Centre for Water and Health, Vienna, Austria

This presentation describes in-depth how a low cost micro-computer was used for substantial improvement of established measuring systems due to the construction and implementation of a purposeful complementary device for on-site sample pretreatment. A fully automated on-site device was developed and field-tested, that enables water sampling with simultaneous filtration as well as effective cleaning procedure of the device's components. The described auto-sampler is controlled by a low-cost one-board computer and designed for sample pre-treatment, with minimal sample alteration, to meet requirements of on-site measurement devices that cannot handle coarse suspended solids within the measurement procedure or -cycle.

The automated sample pretreatment was tested for over one year for rapid and on-site enzymatic activity (beta-D-glucuronidase, GLUC) determination in sediment laden stream water. The formerly used proprietary sampling set-up was assumed to lead to a significant damping of the measurement signal due to its susceptibility to clogging, debris- and bio film accumulation.

Results show that the installation of the developed apparatus considerably enhanced error-free running time of connected measurement devices and increased the measurement accuracy to an up-to-now unmatched quality.