



Colloids in the River Inn

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In the light of an increasing number of technical applications using nanoparticles and reports of adverse effects of engineered nanoparticles, research on the occurrence and stability of particles in all compartments has to be intensified. Colloids in river water represent the geologic setting, environmental conditions, and the anthropogenic use in its catchment. The river not only acts as a sink for nanoparticles but also as the source term due to exchange in the hyporheic zone and in bank filtration setups. The concentration, size distribution and elemental composition of particles in the River Inn were studied from the source in the Swiss Alps to the river mouth at Passau from 2008 to 2014. Samples were collected after each tributary from a sub-catchment and filtered on site using a new filtration device for gentle filtration. The elemental composition was determined after acid digestion with ICP/MS. SEM/EDX analysis provided morphological and elemental information for single particles. A complementary chemical analysis of the river water was performed to assess the geochemical stability of individual particles.

As presented at EGU 2014, particles in the upper, rural parts mainly reveal changes in the geological setting of the tributary catchments. Not unexpectedly, particles originating from crystalline rocks, were more stable than particles originating from calcareous rocks. Anthropogenic and industrial influences increase in the lower parts. This went together with a change of the size distribution, an increase of the number of organic particles, and a decrease of the microfauna. Interestingly, specific leisure activities in a sub-catchment, like extensive downhill skiing, manifest itself in the particle composition. This general setting was validated in last year's sampling campaigns.

An interesting change in on site parameters and hydrochemical composition was seen during all sampling campaigns at an inflow from the valley Kaunertal, Austria. Therefore, additional samples of the River Inn before and after the influx of the Faggenbach stream, Faggenbach stream itself and at an aqueous pressure gallery that discharges to the River Inn were taken and analyzed. Here the effect of construction activities at the power plant were clearly visible.