NANO-Transfer Workshop and Winter School (19th and 20th October 2017)

Executive summary - Winter school:

The winter school took place on both days of the NANO-Transfer Workshop and can be divided in three parts:

- Toxicity experiments with fish embryos of the zebrafish (*Danio rerio*)
- Experiments with radiolabelled nanomaterials (^{14}C-MWCNT) in aqueous media
- Demonstration of aquatic and terrestrial field mesocosms

In the first part of the summer school the participants get a theoretical presentation as an introduction into the fish embryo toxicity (FET) test. The participants learned how to obtain and handle fish eggs from *Danio rerio* and how to perform this kind of toxicity test. Especially, it was shown which lethal and sublethal endpoints can be observed to evaluate the toxicity of a chemical or nanomaterial. After that, the participants worked experimentally by selecting zebrafish eggs of a certain development stage. The selected eggs were transferred to 96 well and 6 well plates. Furthermore, the behaviour of older and more developed embryos was observed in order to connect the theoretical part with the practical part.

In the second part of the summer school, the participants learned to work with radioactively labelled multiwalled carbon nanotubes (^{14}C-MWCNT). A defined amount of carbon nanotubes was weighed by the supervisors. The participants added these carbon nanotubes to an aqueous medium and dispersed them by using an ultra-sonication microtip for about 20 min. During this time, the participants learned about the method for separating algae cells (*Desmodesmus subspicatus*) from a MWCNT-dispersion, i.e., the density gradient centrifugation. After finishing the dispersion process, its homogeneity and recovery of radioactivity were determined by measuring aliquots in liquid scintillation counters.

In the last part, one of the two field mesocosm facilities (terrestrial and aquatic) of the gaiac research institute, also a partner of the Nano-Transfer consortium, was visited. There are about 50 large-volume basins (m^3-size) on the research site, each of which contains an aquatic ecosystem containing natural sediment and water from a local source. Various insect traps are installed in the aquatic mesocosms to facilitate counting. The aquatic mesocosms offer the possibility to carry out fate and effect studies of chemicals under almost realistic field conditions, which provide basic information for an environmental risk assessment. The aquatic mesocosms described were used in the Nano-Transfer project to evaluate community level effects of carbon-based nanomaterials (fullerenes) and a biocide (triclocarban). On the other hand, terrestrial mesocosms can be used to estimate effects of such materials on soil organisms. Several enclosures serve as replicas, e.g. for studies in which the fate of herbicides in soil is to be investigated. The test systems are exposed to realistic field climate conditions.