

Big data analysis of monitoring data: what questions can be addressed?

Martina Vijver, Gert Everaert, Jörg Roembke

May 10, 14:20 - 16:00, Meeting Studio 313 & 315

Many chemical and ecological data are collected under different monitoring programs, which are often designed to establish the current status of an environment or to establish trends in environmental parameters. Well known examples on the European level are the Marine Strategy Framework Directive (MSFD) or the European Water Framework Directive (EU-WFD). Additional programs are run on the national level, most profoundly for soils where a European program is lacking. Unfortunately the use of monitoring data is often limited to the purpose of which they are collected. In addition, there are often difficulties in causally linking stressors with observed differences in ecosystem structure and functioning in natural environments because both natural processes as well as the influence of stressors are highly variable in both space and time. Despite these disadvantages, field data provide the only means to capture actual environmental conditions and ecological complexity. To tear down these pre-assumptions and try to get "hands on ideas" on how to make use of these data we would engage researchers to presents their ideas and projects. We think that the large amount of monitoring data does give huge opportunities to tackle a variety of challenges. Moreover, to date, due to improved technologies the computational time for transferring environmental data into scientific knowledge has drastically decreased. As a lot of physical-chemical and biological data have been collected, merging different sets of data has significantly increased our ability to investigate and quantify how stressors potentially alter biodiversity and ecosystem functioning (including interactions between anthropogenic and natural stress). As such, big data analysis will become increasingly relevant for risk assessment procedures and are already required in some European regulations (e.g. Post-Registration-Monitoring of pesticides). Last but not least the outcome of such monitoring programs is a strong communication tool, linking scientific results with public experience. In this session, we invite contributions that perform meta-analyses of existing sets of monitoring data aiming to improve our knowledge about the impact of stressors on biodiversity and ecosystem functioning and to expand our ideas on how to effectively use the large quantity of valuable data. This session targets a broad audience, including ecotoxicologists, ecologists, conservationists and environmental scientists, but also those involved in the authorization/registration of chemicals as well as those involved in the design and implementation of nature policy and management. In particular we invite people directly working with data bases containing ecological and ecotoxicological information to illustrate the power of existing data for answering long-lasting environmental questions.