

## ECOLOGY AND STATISTICS

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Today's society is faced by grand challenges associated with climate warming, land degradation and anthropogenic factors threatening urban, rural, and natural ecosystems. These challenges ask for interdisciplinary solution approaches, involving expert knowledge from bio- and geosciences, among others. It is also quite clear that these challenges demand joint efforts by international teams of scientists, bringing in perspectives from different schools of thought, as well as the different disciplines. At the same time, we currently live in a „century of data“ where scientific progress indispensably relies on smart use of data resources and sophisticated analyses in order to make sense of the quantitative information that is available, and in order to make the best possible predictions and decisions.

In the proposed project, we aim to bring together Austrian and Chinese experts from ecology (biological and geographical), as well as statistics. The main goal is a deeper understanding of ecological processes through smart use of data. While each of the involved research groups already works on related topics, there will be synergies in jointly discussing the grand challenges and the different approaches to tackle them, to exchange strategies, data, methodology, and other resources.

There will be a dedicated workshop in March 2019, where researchers from ecology, geology, and statistics will present their up-to-date research findings and interest. Based on this initial face-to-face meeting of all involved parties, more specific research goals and agendas will be identified. During a Summer School in July 2019, statistical methodologies related to missing information in data will be discussed. This is a frequently occurring problem in the analysis of real data sets, and the Summer School will introduce some of the current solution approaches.

Within the overall project, we will discuss, modify and develop different statistical approaches to analyze data on successions and multidiversity in natural and anthropogenic altered environments leading to the emergence of innovative insights in ecological and geographical processes, namely likelihood methods for capture-recapture experiments, novel nonparametric statistical methods tailored to ecology, methodology for missing values.

Current developments of the approaches will be presented at the kick-off workshop in March 2019. The discussions during, before and after this workshop will determine how they will be pursued in combination or parallel during the months to come. Ideally, synergies and commonalities will be identified and exploited in order to make significant scientific progress on more than one theme during the project period. Theme will be added at the July workshop.