
Professional Development Programme

Methods Course

Introduction to Statistical Methods to Assess Geological Data

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5-6 December 2023

09.00 – 13.00 hrs.

Objectives

Statistical methods are indispensable to analyse geological data in a systematic and quantitative manner. However, the analysis of those data is obstructed by the often-unknown effect of limited sample sizes, instrumental effects and/or lack of process understanding. Therefore, a strategy must be developed to separate the different contributions to the final results of a measuring campaign. To apply statistical methods effectively, some basic principles must be understood, allowing tests of scientific hypotheses quantitatively. Choosing an approach that combines the imparting of fundamental statistical principles by employing practical examples appears to be the right way to help practitioners in geoscience research address their specific scientific needs. Thanks to existing powerful and user-friendly software packages, the most complex statistical techniques are easily accessible.

This course will introduce you to the application of statistical methods by focusing on the core topics mentioned above, i.e., accounting for limited sampling sizes, measurement uncertainties, and the identification of the influence of individual processes.

Topics

- Elementary Statistics
- Time Series Analysis (Statistical tests, confidence intervals)
- Autocorrelation and Autocovariances
- Multivariate analysis (Principal Component and Cluster Analysis)
- Practical exercise with example data
- Using available tools like MATLAB and R
- Outlook on Machine Learning

Target Group

Marine Scientists with an interest in the topic. Preference is given to members of MARUM and researchers working on a MARUM-related project. No previous knowledge is required.

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Course Preparation

To make the most of the course, participants are offered to submit a **sample data set** of the data they work with prior to the course. The lecturer will use these to prepare for the course.

Please send your data set (e.g. a reference to PANGAEA) to early-career@marum.de **before 27 November 2023**.

For the course, you will need to bring your **laptop with MATLAB** (ideally) **or R** (alternatively) installed on it. If you don't have access to a laptop, you can borrow one from the ECR support. Please indicate this need in the registration form. You will not need any previous knowledge in either MATLAB or R but you will be asked about your level of knowledge in the registration form so the lecturer knows whether he needs to give a short introduction to the software as well.

Venue

MARUM, University of Bremen, Leobener Str. 8, 28359 Bremen, Germany

MARUM I (main) building

Day 1, 5 December: Room 2070

Day 2, 6 December: Room 2060

Registration

To register for this course, please visit the course web page:

<https://www.marum.de/en/education-career/professional-development/2023/2023-12-05.html>

Please note that your registration will be binding.

The registration deadline for this course is **27 November 2023**.

Any enquiries regarding this event can be addressed to early-career@marum.de.