

## MARUM / GLOMAR Expert Course:

### Statistics I: Introduction to Statistical Methods in Geosciences

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#### Objectives

Although statistical methods are very useful, especially on the scientific data analysis, there are still seen as a complicated field. Actually, several software packages to perform statistical analysis exist but one of the most important points is the knowledge of the theory/basis behind statistic methods.

The objective of this **introductory course** is to get a general overview of statistical methods and how to apply these methods in our scientific daily work. The course is intended for students who have a basic or no knowledge on statistic methods and want to learn the basis and then apply it with different software packages. The course will be basically divided in two parts; one part with discussion of the theory and then a part in which the students will be able to work on several prepared examples in order to understand the methods discussed previously.

#### Course Structure

The course is divided into 4 sessions (2 morning sessions and 2 afternoon sessions respectively) of 3 hours each.

#### Topics

##### Session 1

The first session will be focused on basic concepts about data organization. Also in this day the typical distribution functions will be discussed. The main part of this session will be dealing with the statistical tests for the evaluation of hypothesis, like test-t, F-test, Chi-test, etc... and the use of the Analysis tool pack of Excel as a tool for statistical analysis.

##### Session 2

The second session will deal with the analysis of outliers. Moreover, analysis of variance will be explained, especially taking into account the basis for the calculations and which strategies can be used for the ANOVA analysis. Also in this day we will talk about regression analysis.

### Session 3

During this day we will use Solver, a tool also from Microsoft Excel used to solve some specific equations and we also shortly will practise with the Macros of Excel that although it is not a specific tool for statistics can be used for the help on data organization. The main part of this session will be though focused on MATLAB software, with a general introduction and how to use MATLAB on hypothesis testing and ANOVA. The idea is to show that statistics can be performed with different software packages being the most important part the knowledge of the theory behind.

### Session 4

The last day will be focused on the use of MATLAB to work in multivariate analysis, and will include multilinear regression or cluster analysis, among others. At the end of the course a file will be supplied with the solutions of all the problems showed during the course.

### **Location**

MARUM, University of Bremen, 28359 Bremen, Germany, Room 2070

### **Time**

09.00 – 17.00

### **To subscribe**

Please send a mail to Christina Klose ([glomar-courses@marum.de](mailto:glomar-courses@marum.de)). Please give your name, status (PhD student, Postdoc or Master Student), institute / university and research area / working group as well as your field of study.