

Environmental Analytics: Data-Modelling Techniques- June 2020

Module Guide



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Information for attendees:

This module is designed with the aim to provide an insight about concepts like linear regression, correlation a brief introduction to mixed-models, distribution modelling, mapping and Ecosim.

It is assumed that the attendees have a basic understanding in statistics and R/ R Studio programming. In the module all the above concepts will be discussed firstly on a conceptual level and then will be explained using “real-data” case-studies. The entire course will be interactive and will be conducted as a lecture-demonstration workshop.

This course **IS** for you if you are a

1. Student/ researcher/ professional who has a basic understanding of statistics but wants to learn applied R / R Studio programming especially for above mentioned concepts.
2. Have a basic understanding of R programming language but needs help with translating statistical tests on real-time data.
3. Wish to understand and interpret graphical representation of statistical inferences in articles, journals and reports.
4. Wish to gain a basic understanding of Species Distribution Modelling (SDM), QGIS, MaxEnt, ENMTools.

This course is **NOT** for you if:

1. You are already an advanced R programmer or QGIS user with thorough knowledge of statistics and data representation.
2. Have a sound stats background and don't need to use programming for analysis.
3. If you don't require data-science/ mapping in your discipline of work.

Basics of Linear Regression / Correlation using RStudio analytical framework

Basic concepts of correlation, what is a statistical relationship and it's applicable in an ecosystem context. Example and case-study using RStudio.

Basics of linear models and brief introduction to non-linear and mixed-models.

Species Distribution Modeling (SDM): What, Why and How?

Understanding the principles of geographical distribution, habitat and niche

Understanding applications of SDMs / ENMs

Using online tools to create SDMs and calculate Area of Occupancy and Extent of Occurrence

QGIS

Basic operations in QGIS open source software

Data processing and visualization for SDMs

Link to QGIS Tutorial: <https://www.ggistutorials.com/en/>

MaxEnt

Maximum Entropy approach to SDMs

Hands-on with environmental data

Tutorial: https://biodiversityinformatics.amnh.org/open_source/maxent/Maxent_tutorial2017.pdf

ENMTools

Rank MaxEnt models using Ecosim

Calculation of niche breadth and overlap

Tutorial: http://www.danwarren.net/enmtools/ENMTools_User_Manual%201.0.pdf

Course Registration Link

<https://forms.gle/aGZX6w34UxsBcpYZ6>