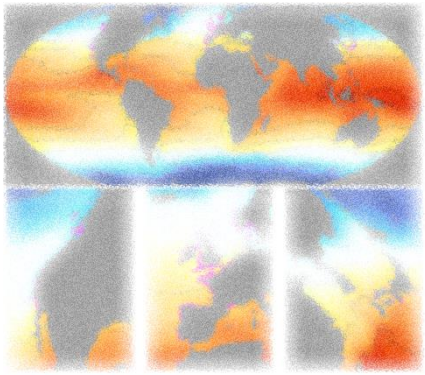
AQUATIC SPECIES DISTRIBUTION MODELLING



CIIMAR, 13-17 December 2021

Aquatic Species Distribution Modelling training workshop introduces the trainee to aspects of marine and freshwater biogeography, ecology and the theoretical and technical aspects pertinent to ecological niche modelling in aquatic environments. The course will cover the basics of statistical modelling, and the steps to undertake ecological niche modelling, from data compilation to model evaluation and interpretation. The course includes theoretical lectures and hands-on exercises using case studies on marine and freshwater species. Students are encouraged to bring their own datasets. Basic knowledge of R environment is required.

Course program:

Day 1

Morning

1.1 Overview of the course

1.2 Introduction to Marine and Freshwater :

1.2.1 - Ecology

1.2.1 - Biogeography

1.3 Introduction to basis of species distribution model:

1.3.1 - Niche concept

1.3.2 - BAM diagram

1.3.3 - Niche conservatism

1.3.4 - ENM vs SDM concepts

1.3.4 - Correlative vs Mechanistic

Afternoon

2.1 Basis of GIS

2.1.1 - Point, vector, raster data.

2.1.2 - Basic operations

2.1.3 - Geographic projections

3.1 . Baseline data – occurrence data and environmental variables

3.1.1 - Data sources (e.g.: GIF, OBIS)

3.1.2 -Dealing with dataset issues

3.1.3 - Environmental data: collinearity

3.1.4 - Study area definition

Day 2

Morning

4.1 - Algorithms

4.1.1 - Families of algorithms (models)

4.1.2 - Algorithms vs research question

4.1.3 - Algorithms vs data type

4.2 - Some light on the statistic behind:

4.2.1 - Maxent

4.3 Model evaluation and comparison

4.3.1 - Model Performance metrics (ROC, TSS)

Afternoon

4.3.2 Model comparison, null hypothesis testing

5.1 - Modelling projections

5.1.1 - Geographic space

5.1.2 - Temporal space

5.1.3 - Some light on GCMs and RCPs

Day 3

Morning

6. SDMs: approaching the different realms

6.1 - Marine SDM hands-on

Afternoon

6.1.1 Marine SDM hands-on: continue

6.2. Freshwater SDM hands-on

Day 4

Morning

6.2.1 Freshwater SDM hands-on: continue

7 Advanced applications

7.1 Ecological niche models using genetic data

7.2 Community modelling

7.3 Mechanistic models

Afternoon

8. Advanced marine SDMs applications

9. Knowledge application: practical classes

Day 5

10 Student presentations.

11 General discussion

Instructors: Cândida Gomes Vale, Rosa Chefaoui, Duarte Vasconcelos Gonçalves, Francisco Arenas.

Price: 150 € CIIMAR/URJC members; 200€ external people.

Venue: CIIMAR –Terminal de Cruzeiros, Matosinhos, PT

Registration: 20 available positions. Please explain briefly why you want to enrol in the workshop. Expressions of interest should be directed to farenas@ciimar.up.pt and cvale@ciimar.up.pt. Instructions for payment will be sent after confirmation of selection.

Important information:
- The course will be taught in English.
- At least a beginner's background in R and basic statistics is recommended.
- Information and materials necessary for the course (list of R packages, slides, scripts, example data) will be made available in advance.