

R for Macroecological and Global Change Studies

Organizer: Brody Sandel, Ecoinformatics and Biodiversity Group, Department of Bioscience, Aarhus University

Venue: The beautiful Sandbjerg Estate in southern Denmark (<http://www.sandbjerg.dk/en/>) Sandbjergvej 102, 6400 Sønderborg.

Dates: June 22-27, 2014

Format: An intense, week-long (Sunday-Friday) course with a mix of lectures and practical exercises.

Study credits: 4

Supported by: International Research School in Applied Ecology. **Board and lodging** are covered for all participants by IRSAE. IRSAE registered students will also receive an IRSAE mobility grant to cover **travel costs** and may download the application form at: <http://irsae.no/grants/>.

Scientific content: As the amount of data available to ecologists grows, more sophisticated tools are needed to extract knowledge from data. The statistical programming language R is well-suited for addressing this challenge, with the capabilities of handling massive datasets, performing the functions of traditional GIS software, and executing spatial analyses.

This course will introduce R, with a focus on aspects of the language that are relevant in the analysis of large spatial datasets. The course assumes no or little prior knowledge of R but will move quickly through introductory topics such as defining functions, plotting and basic statistical tests. With this foundation, we will then introduce more advanced topics related directly to macroecological and biogeographical studies beginning with handling and manipulating vector- and raster-type data. We will then introduce two widely-used methods in spatial macroecology and global change studies – species distribution modeling and spatial regression methods. We will conclude with a small project that integrates the topics covered in the course. Students may bring their own data to analyze in the project if it fits the course themes.

The course will last for one week, with a morning and afternoon class each day. Each class will begin with a lecture, after which students will work on problems in R with guidance from the lecturer. Each student will need to bring a laptop capable of running the latest version of R to each class.

Course schedule

Sunday afternoon (June 22):	Arrival at Sandbjerg in the late afternoon, welcome dinner
Monday morning:	Introduction to the R programming language
Monday afternoon:	Functions and plotting
Tuesday morning:	Model specification, statistical tests and model selection
Tuesday afternoon:	Spatial data in R
Wednesday morning:	Species distribution modeling I: data handling and preparation
Wednesday afternoon:	Species distribution modeling II: model fitting and evaluation
Thursday morning:	Spatial regression I: spatial filters
Thursday afternoon:	Spatial regression I: simultaneous autoregressive models
Friday (June 27):	Work on projects, departure

Participation: This course is open to all PhD students. There will be room for a maximum of 18 students in the course, so strong competition for attendance is expected.

Registration: Email a brief description of your PhD project and description of the relevance of the course to your research, along with a CV to Brody Sandel (brody.sandel@biology.au.dk). Deadline April 21, 2014.