The Abdus Salam International Centre for Theoretical Physics
www.ictp.it

United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

School on Recent Advances in Analysis of Multivariate Ecological Data: Theory and Practice

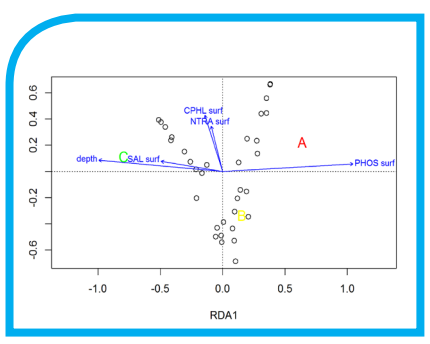
24th – 28th October 2016
(Miramare – Trieste, Italy)

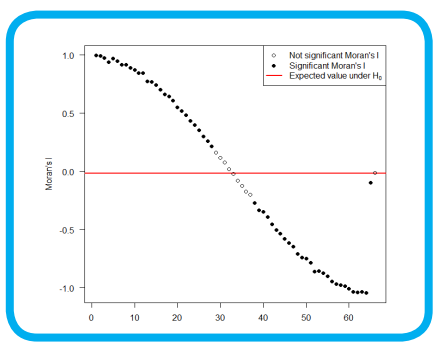
The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, together with the OGS (National Institute for Oceanography and Experimental Geophysics), Trieste, Italy, will organize a School on Recent Advances in Analysis of Multivariate Ecological Data: Theory and Practice from **24th to 28th October 2016.** The School will be co-sponsored by the International Union of Geodesy & Geophysics (IUGG), and the International Society for Ecological Modelling.

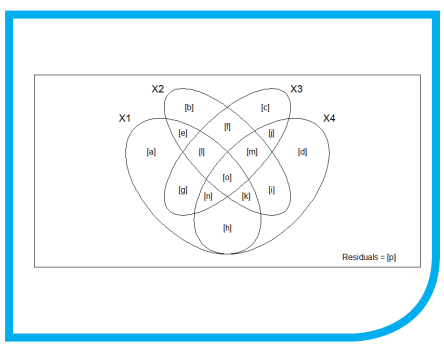
The school aims to provide both, the theoretical and practical knowledge needed to perform advanced analysis of physical, environmental and ecological data, and to provide a bridge between theory and practice. Ecosystems are facing cumulative impacts of a variety of stressors (e.g. pollution, climate change, exploitation of natural resources, invasive species) that can potentially alter their state and functionality and possibly adversely impact both, human health and nature's own capability to provide goods and services. To tackle with these challenges, a large number of institutional monitoring programs and of research projects have been launched, so that the amount of available experimental information is steadily increasing. However, there is still a substantial lack in the capabilities to use advanced quantitative methods to analyze these data and to plan more efficient data collection for the future. A proper analysis of the data requires a full understanding of the theoretical assumptions used in the analysis, so to guide the choice of the proper methodologies. Moreover, practical skills are needed to fully exploit the possibilities of appropriate data analysis software.

The school will be organized in morning lecture sessions and afternoon sessions devoted to practical training. Practical sessions will be the backbone of the school, with hands-on training, using R, an open-source, free, integrated suite of software facilities for data manipulation, calculation and graphical displays. The participants are encouraged to bring their own data set and will be able to work on specific problems of their choice. Furthermore, additional lectures will be given by specialists on selected methods and applications related to the school main arguments (e.g. artificial neural networks, machine learning, data mining tools). The course focus on the application of the methods in ecology, but the methodologies can be used for any set of multivariate data (geophysics, earth science, climatology, etc.).

The main arguments to be covered during the school will be: Ordination in reduced space (PCA, CA, PCoA); Measures of similarity and dissimilarity; Multiple linear regression; Polynomial regression; Partial regression and variation partitioning; Regression diagnostics and significance tests; Statistical testing by permutation; Multivariate analysis of variance by canonical analysis (RDA, CCA); Methods for selections of environmental variables; Spatial modelling and origin of spatial structures; Beta diversity partitioning and LCBD indices; Multi-scale modelling of the spatial structure of ecological communities (dbMEM, generalized MEM, AEM); Community surveys through space and time: testing the space-time interaction in repeated surveys.







GRANTS

A limited number of grants are available to support the travel and living expenses of selected participants, with priority given to participants working in a developing country and who are at the early stages of their career.

HOW TO APPLY FOR PARTICIPATION

The application form can be accessed at the activity website: **http://indico.ictp.it/event/7617/**

ACTIVITY SECRETARIAT:
Telephone: +39-040-2240-355 Telefax: +39-040-2240-585
E-mail: smr2835@ictp.it ICTP Home Page: http://www.ictp.it

May 2016

DIRECTORS

V. Bandelj
OGS, (Trieste)

D. Borcard
University of Montreal (Canada)

P. Legendre
University of Montreal (Canada)

C. Solidoro
ICTP/OGS, (Trieste)

LIST OF SPEAKERS

Pierre Legendre
Daniel Borcard
Michele Scardi
François Gillet
Sašo Džeroski

DEADLINE
For requesting participation:

30th June 2016