ICES Training programme

The International Council for the Exploration of the Sea (ICES) offers courses led by high-profile scientists and instructors. Visit the ICES web-page: www.ices.dk

Application of geostatistics to analyse spatially explicit survey data in an ecosystem approach

Context, objective and level

The application of geostatistics to fisheries survey data is now a well accepted method of estimating fish stock abundances and its precision. However, geostatistics are still not routinely used and there is a need for training in appropriate methods and software. In 2011, the ICES Working Group on Fisheries Acoustic Science and Technology (WGFAST) recommended that an ICES course was developed in cross cutting methodologies of geostatistics to support scientists in research and monitoring topics such as acoustic, icthyoplankton and bottom trawl surveys. To fulfil the EU Marine Strategy Framework Directive (MFSD) member states are obliged to monitor the state of their shelf sea ecosystems. Geostatistical methods to characterize spatial distributions of species and habitats and to produce maps from surveys series are keys to identify changes over time.

The objective of the course is to provide a thorough grounding in the use of geostatistical methods to analyse spatially geo-referenced survey data. Students will be guided through the different steps of geostatistical analyses based on case studies.

The course is mainly targeted at individuals who are new to geostatistical methods. However, examples of advanced methods are given to benefit researchers already familiar with geostatistical method who wish to further improving their skills and understanding.

Programme

The course will extend for five days. The morning sessions will consist of lectures on background and theory. The afternoons will be arranged as computer 'practicals' where survey data analysis will be demonstrated using freely available software. Participants will be able to work with their own data during these sessions. During these afternoon sessions interaction among the course participants will be encouraged.

Scottish herring survey data from Marine Laboratory, Aberdeen.
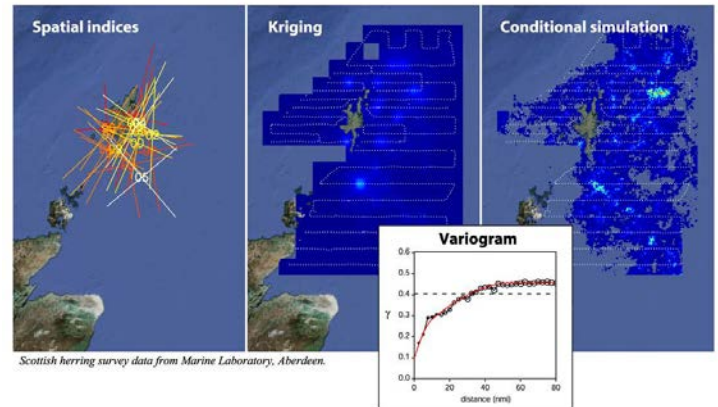
Course lectures:

- Geostatistical indices to characterize the many aspects of spatial distributions (location, dispersion, aggregation, correlation, overlap)
- Linear geostatistics theory: transitive vs. intrinsic case, variogram, variance, survey precision and planning, kriging, mapping, indicator variograms and their use.
- An overview of advanced geostatistical methods with emphasis on co-kriging, non-linear geostatistics, and conditional simulations

Course 'practicals':

- Data pre-processing, basic checks on quality and visualization of observed distribution and intensity of survey data
- Use of spatial indices to characterize series of maps
- Variogram analysis
- Abundance estimation and survey precision, the testing of different survey designs
- Kriging and production of spatial distribution maps
- Application of advanced methods for habitat mapping based on multiple information as well as mapping risk based on the probability of trespassing thresholds

Course dates

2-6 December 2013. The five-day course will run in morning and afternoon sessions.

Training course materials

- Data downloads of training data sets (available to participants on the ICES website prior to the course)
- Lecture notes (will be made available to participants prior to the course)
- Presentations (will be made available to participants prior to and during the course)
- Analysis routines using open source software such as R (will be made available to participants during the course)
- The course practicals will use the R library RGeoS.

Organization

The course is organized by IFREMER, Mines ParisTech, Geosciences Center/Geostatistics, IRD and the ICES Secretariat as part of the ICES Training programme.

Trainers (see below) with extensive experience of geostatistical methods will lead the course and provide course materials. The course includes applied examples, case studies, and hand-on exercises on the computer. Participants are required to bring their own laptops (Mac with virtualization is ok) to connect to the ICES network, and also to have R (freely downloadable from http://www.r-project.org/) installed prior to arrival.

Admission and registration

The course is designed for a maximum of 40 participants. The working language is English.

Please register online:
www.ices.dk/iceswork/training/registration/

The deadline for the submission of applications is 11 October 2013.

Fee

The fee for the course is €750[1]. This covers only tuition.

Venue

Mines ParisTech, Geosciences Center/Geostatistics
35 rue Saint Honoré
77305 Fontainebleau
France
Web-link to location here
Tel : +33 1 64 69 47 78
Fax : +33 1 64 69 47 05

Instructors

Pierre Petitgas (Ifremer)
www.ifremer.fr

Mathieu Woillez (Ifremer)
www.ifremer.fr

Jacques Rivoirard (Geosciences Center/Geostatistics)
www.geosciences.mines-paristech.fr

Nicolas Bez (IRD)
www.ird.fr

Spatial indices (1 day)
Linear geostatistics including co-kriging (2 days)
Non-linear geostatistics (1 day)
Simulations (1 day)

The 4 trainers will be present throughout the entire course. Each morning lecture will be covered by one or several trainers. The 4 trainers will help in the afternoon practicals.

Contact ICES Secretariat for more information

Coordinator for Training
Tel: (+45) 33 38 67 52
training@ices.dk

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[1]The course fee for participants from non-ICES member countries is 1250 €