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*Workshop on*

# Recent Advances in Spatial Analysis of Multivariate Ecological Data: Theory and Practice

May 23–27, 2013

**Day 1**

0. Introduction to data analysis.
1. Ordination in reduced space: principal component analysis (PCA), correspondence analysis (CA), principal coordinate analysis (PCoA).
2. Transformation of species abundance data tables prior to linear analyses.

**Day 2**

3. Measures of similarity and distance, especially for community composition data.
4. Multiple linear regression. R-square, adjusted R-square, AIC, tests of significance.
5. Polynomial regression.
6. Partial regression and variation partitioning.

**Day 3**

7. Statistical testing by permutation.
8. Canonical redundancy analysis (RDA) and canonical correspondence analysis (CCA). Multivariate analysis of variance by canonical analysis.

**Day 4**

9. Forward selection of environmental variables in RDA.
10. Spatial modelling: Origin of spatial structures.
11. Multi-scale modelling of the spatial structure of ecological communities: dbMEM, generalized MEM, and AEM methods.

**Day 5**

12. Spatial structure functions: univariate correlograms and variogram.
13. Multivariate correlogram and variogram.
14. Cartographic interpolation, kriging.
15. Control for spatial autocorrelation in tests of species-environment relationships.
16. Searching for discontinuities [*if time permits*]: clustering with spatial or temporal contiguity constraint.

Topic given as a research seminar: *Community surveys through space and time: testing* the *space-time interaction in repeated surveys*.

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**⇒ Lectures in the morning.**

**⇒ Afternoons: Practicals about these topics using the R language**

The day-by-day practicals are described in the file Short_Course_Practicals.pdf

The following files are distributed in the folder Practicals_in_R.zip –

- Introduction to the R statistical language (file: Introduction_to_R.pdf)
- Practicals in the R language: Basic matrix operations (file: Basic_matrix_operations.pdf)
- Practicals using the R statistical language (file: Practicals_in_R.pdf)

The following files are distributed in the folder Spatial_eigenfunction_practicals.zip –

- NEwR Script Chapter 7
- Gault_forest_reserve
- Legendre-Gauthier practicals