# Workshop: Modelling compositional turnover using generalised dissimilarity models (GDM).

## Tuesday 7 January 2013

Predictive models of beta diversity, or compositional turnover, are increasingly being applied to studies of conservation priorities, impacts of climate change (paleo and future) and habitat loss.  A commonly used approach is the generalised dissimilarity model (GDM).  GDM is particularly useful for spatial analyses of biodiversity where the patterns of interest involve hundreds or thousands of species.  GDM compares the community composition and environment at pairs of sites to predict compositional difference as a function of environmental difference, extrapolating the prediction beyond surveyed sites.  The resulting models give a spatially continuous prediction of turnover, and thus of the spatial structure of diversity.  GDM models have been used to study compositional turnover in space and time, as well as species, phylogenetic, genetic and functional turnover.

This hands-on workshop will introduce the concepts and practical steps involved fitting GDM models.  Participants will fit and interpret GDM models, and explore a number of ways of applying and visualising them.  Applications covered may include defining biological regions, land cover change and biological survey planning.  Participants will use the open source statistical package R, and various stand-alone tools.

Presenters: Dan Rosauer and Karel Mokany  (with a talk by Simon Ferrier)

# Schedule

**9.00 – 9.15 Welcome, practicalities, plan for the day.**

**9.15 – 9.45 GDM – why was it developed, why use it? *Ferrier***

**9.45 – 10.15 Review some studies which have used GDM *Mokany***

(to introduce a broad range of responses modelled, applications of the models)

**10.15 – 10.45 More background on fitting a GDM model *Rosauer***

Including:

* response data formats
* predictors – formats, types of data
* what happens in fitting a GDM model
  + distance decay curve
  + fitting the predictors to represent distance

**10.45 – 11.15 Break**

**11.15 – 12.30 Participants start fitting a model to supplied data using the R GDM library:**

* resolve software issues
* generate site pairs
* attach environment data
* fit GDM model
* select reduced set of variables for the model
  + permute environment data to test variable significance.
* compare predicted to observed turnover (using withheld test data)

**12.30 – 1.15 Lunch**

**1.15 – 2.00 Complete variable testing and model fitting in R (if needed)**

**2.00 – 3.30 Applying a GDM model – using GDM modeller**

* generate transformed grids
* do unsupervised classification (with pretty colours)
* calculate density (analogous to endemism)

**3.30 – 3.50 Coffee break**

**3.50 – 5.00 Applying a GDM model – *continued***

* **a**nalyse conservation gaps / species loss (Allnutt et al method)
* projecting under climate change to estimate temporal turnover

**5.00 – 5.15 Participants complete evaluation**