Symposium

ZOOLOGICAL SOCIETY OF LONDON
REGENTS PARK, LONDON, NW1 4RY

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29 April 2016

Space - the final frontier for biodiversity monitoring?

ABSTRACTS

SPEAKER BIOGRAPHIES

POSTER ABSTRACTS

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optimizes the direct use of high-dimensional remote sensing data for mapping the spatial patterns of beta diversity. The sparse generalized dissimilarity modelling (SGDM) approach is based on the transformation and reduction of the spectral data constrained to correlate with the community data in a canonical transformation fashion. The resulting components are subsequently fitted to the community data in a generalized dissimilarity model (GDM). We tested the approach on a study area in southern Portugal along a shrub encroachment gradient, to model the respective bird community transitions. We fitted our models with two high-dimensional datasets: a time stack of Landsat data and a hyperspectral EnMAP-simulated image. The SGDM approach was capable of delivering reasonable maps of the observed community transitions and it always outperformed a classical GDM. We conclude that SGDM is suitable for use with high-dimensional remote sensing data for mapping and monitoring patterns of beta diversity across large areas.

15. **Measuring Rao's quadratic entropy from remote sensing, an open source solution**
    Matteo Marcantonio, Fondazione Edmund Mach, Italy

Measuring the heterogeneity of natural systems is critical in ecology. Indeed, the degree of heterogeneity of natural systems is related to diversity. Remote sensing allows the collection of a considerable amount of spatially explicit ecological data that need to be summarised. As a result, a wide set of heterogeneity indices have been developed and applied. Classic heterogeneity indices mostly rely on classified remotely sensed imageries, allow a single informative layer and do not necessarily consider the distance between the measured units, but only the proportion of their category. Rao's quadratic entropy (Q) is a diversity index widely used in functional ecology applications. Rao's Q integrates both the relative abundance of the measured units and the pairwise distance between them, and allows for the integration of a potentially infinite number of information layers. In this study, we applied Rao's Q to remotely sensed images, showing the differences with other common diversity indexes in ecology (I.e., Shannon H'). Moreover, we propose a simple method, formalized as an R function, to apply Rao's Q index to hyperdimensional remotely sensed datasets. We observed that Rao's Q discriminates complex patterns of heterogeneity when others indices saturate. We suggest that the routine application of Rao's Q to remote sensing data would expand the information usually retrieved by other heterogeneity indices.

Co-authors: Carlo Ricotta, Duccio Rocchini

16. **Spatio-temporal land cover variability in the Kruger National Park, South Africa, with potential implications for conservation management**
    Christopher G Marston, Edge Hill University

Land cover change monitoring is used widely for informing environmental management and conservation practices. In Kruger National Park (KNP), South Africa, changes to vegetation distributions such as the removal of large trees by elephants, and the recently hypothesized ‘scrubbing-up’ of the Skukuza thickets are of particular interest, with implications for faunal distributions, park management and tourism. Here, we present accurate and detailed information of land cover change in southern KNP from 2002 to 2015, using a combination of medium (Landsat) and high (Quickbird, WorldView-2 and IKONOS) spatial resolution imagery, coupled with intensive field survey data. We use multi-scale observation of the landscape to examine differences in vegetation canopy cover during this time period with a particular focus on savanna and woodland mosaic areas. We also compare land cover classifications derived from wet and dry season images to determine