Summer 2013 Issue 3

PREDICTS Newsletter

Projecting Responses of Ecological Diversity In Changing Terrestrial Systems

A busy summer for PREDICTS

We continue to be amazed by your willingness to share your hard-earned diversity data with us. As I write this, our database now holds data from 130 different papers - with nearly as many more in the queue to be curated and added in. The map shows how these studies are spread across the globe and among biomes - we now have sites within 133 ecoregions and 45 countries. The database already includes more than 12,000 different species - more than 2,000 species each of higher plants and Hymenoptera, nearly 2,000 species of beetles, and over 1,300 bird species. Thanks once again to everyone who has contributed!

Handling so much information is quite a challenge. We've had to develop processes and software for every aspect – collection, validation, curation, visualization and extraction of the data. In practice, this has meant lots of Python software, a PostgreSQL database with PostGIS spatial and geographical extensions, running on Linux. The map is actually a screenshot from the database. We hope to start soon on a 'metadatabase' manuscript: this will detail how we put the database together and indicate which data sets are in there. We'll look to publish it in an open-access journal, and all the data contributors will be authors.

We're also getting ready for our first major analysis, which will model how land cover and land use intensity affect local biodiversity. The Spring newsletter showed a tentative first step; this time – thanks to everyone's generosity – we'll have around three times as many sites.

Prof. Andy Purvis, Imperial College London

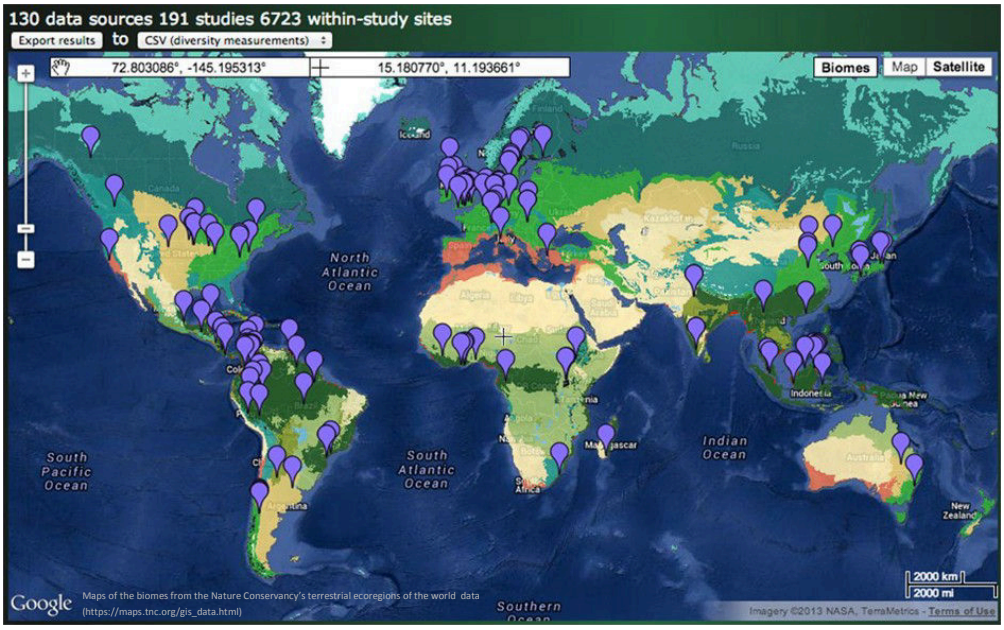

Figure: Recent screenshot from our database showing the geographic distribution of the 130 data sources included in the database today

PREDICTS team will be presenting at:

11th INTECOL Congress, Ecology: Into the next 100 years 18-23 August, London, UK

- Tim Newbold: "*Past, present and future projection of local biodiversity change in response to human drivers, at a global scale* "
- Dominic Bennett: "*Phylogenetic non-randomness in the responses of biodiversity to human impacts: a global analysis of local responses*"
- Susy Echeverria-Londoño: "*Modelling and projecting the responses of Colombian biodiversity to human impact*"
- Daniel Ingram "*Effect of agriculture on local biodiversity in the tropics: a meta-analysis*"

Royal Entomological Society Annual Meeting (ENTO 13), 4-6 September, University of St Andrews, Scotland

- Adriana De Palma: "*Do ecological traits predict bee species' responses to human impacts*?"

Modelling land use changes on biodiversity: using China as a case study

My project used China as a case study. Although many data have been collected for other regions around the world, Chinese data were lacking before my project. This is mainly due to papers being published in Chinese, resulting in a language barrier. During the last three decades, China's economy has increased at an unprecedented speed and this has threatened the local biodiversity. The major threats include: rapid urbanisation, industrialisation, intensive agriculture and deforestation. Despite many environmental problems, it is often easy to forget that China is one of the most biodiverse countries in the world, consisting of many different types of biomes. The potential loss of so many endemic species in one country would be an ecological disaster. Therefore, I investigated the effects of land use changes on Chinese biodiversity. Then I compared China with other countries in the same biomes. The results show that land cover class and land use intensity can act as useful indicators of Chinese biodiversity and within biomes. In the same biomes, the response of Chinese and non-Chinese biodiversity to land use changes are similar. Primary vegetation has the highest species richness and must be the priority for conservation.

Yuan Pan, MRes student in Ecology, Evolution and Conservation, Imperial College London

Fanjing Shan National Nature Reserve, Guizhou Province, China © Yuan Pan

New PREDICTS MRes Students

Welcome to Stewart, Morgan, Daniel, Callum and Sylvester who have started MRes projects at Imperial College and are working within the PREDICTS framework.

MRes student: Sylvester Choimes, Dan Ingram, Morgan Garon, Callum Martin, Stewart Jennings (from left to right).

Stewart Jennings

"My project aims to model the relationship between biodiversity and remotely-sensed vegetation index data. The vegetation index data (the Enhanced Vegetation Index) provides a quantitative measure of habitat disturbance. I'll be looking at the best spatial scale at which to model this disturbance."

Argyrios (Sylvester) Choimes

"My project focuses upon human impact to biodiversity in the Mediterranean biome, which is one of the most imperilled biomes to date. With a very high degree of endemism and plant biodiversity, the Mediterranean biome is expected to experience biodiversity loss in the future due to its sensitivity to land-use. I am currently contacting authors for their data, in order to model how Mediterranean biodiversity responds to anthropogenic threats and to make projections for the future."

Morgan Garon

"Both invertebrates and plants are important components of agricultural systems, providing services such as pollination, pest control and maintenance of soil structure and decomposition as well as increasing crop productivity. My project aims to model and predict the response of invertebrate and plant communities to a variety of human impacts including habitat fragmentation and chemical use in temperate agricultural systems."

Callum Martin

"My research aims to quantify the recovery of biodiversity in secondary habitats over temporal gradients. Conservation schemes typically focus on primary habitat, but with the increasing prevalence of secondary habitat there is a need to explore its potential conservation value."

Daniel Ingram

"World-wide there are now considered to be 34 biodiversity hotspots, and as 20 of these are found in the tropics, research on the potential impacts to biodiversity in this biome is of paramount importance. With increasing human population size and increased demand for resources, shifting agriculture is a common practice in the tropics. My project investigates the responses of biodiversity to different types and intensifications of agriculture, and I aim to test whether agriculture's residence time is indeed around 15 years, as is currently assumed by the IPCC's Integrated Assessment Models."

Attention all PREDICTS data providers

Thanks to all those who responded to our invitation to publish names and webpages on our website as detailed in our last newsletter. If you would like us to say who you are on our website (www.predicts.org.uk), or if you've a webpage you'd like us to link to, please e-mail the URL to us at enquiries@predicts.org.uk. Thanks!