**Session 2: Individual projects**

Recall that the general progression we are following for individual projects is as follows:

1. Obtain and import species’ occurrence records (session 1)
2. Obtain and manipulate environmental layers (sessions 2, 3)
3. Run and evaluate species distribution models (sessions 4, 5)
4. Apply the models and discuss applications (sessions 6, 7)
5. Prepare final report and present to the class (session 8-10)

The aim this session is therefore to obtain and format environmental layers for your study region. During the lecture we have outlined various sources of data, and during the lab we have covered the basic GIS tasks that will be useful. We have also provided a global terrestrial climate dataset (WorldClim) ready to use, so as a minimum you will have these data layers. Those working in marine environments may face a bigger challenge to find suitable data – please chat about this with the instructors.

Specifically, tasks for session 2 are as follows:

1. Read Kozak et al., 2008 *TREE* 23:141-148. This paper provides a review of many different applications of environmental GIS layers and points you toward potential data sources (see Table 1). Additional, updated data sources are listed below under additional resources.
2. Explore online data sources that may provide additional data for your project. If possible, obtain and import these data into QGIS. (*Note*: many different data formats exist for distributing GIS data and you may find it difficult at this stage to manipulate the data. Check in with the instructors about data formats, but be prepared to stick with the climate layers that we have already formatted, if all else fails).
3. Complete the lab exercise for your chosen study region, including generating ASCII files and drawing a map showing your species occurrence localities (from session 1) overlaid on an environmental layer. On the map be sure to include appropriate units for this layer in the legend.
4. Make any revisions to your project proposal in light of instructor comments and class discussion, and update your proposal with further details on data sources (in the style of a Methods section for a manuscript).

Please email your revised project proposal to Pete (pgalante@amnh.org) by 6pm before next session.

Please also email Pete a single presentation slide with your new map from the lab exercise, and be prepared to very briefly give update on your project to the group at the next class.

*Additional Resources related to session 2 – to find environmental layers for your projects:*

CIESIN – Center for International Earth Science Information Network

<http://www.ciesin.org/>

USGS – Land Cover Datasets

<https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/land-cover/>

IRI/LDEO Climate Data Library

<http://iridl.ldeo.columbia.edu/index.html?Set-Language=en>

paleobioDB:  downloading, visualizing and processing data from the Paleobiology Database <http://paleobiodb.org/navigator/>

Downscaled GCMclimate portal <http://www.ccafs-climate.org/>

The Top 10 best free GIS data resources

<http://gisgeography.com/best-free-gis-data-sources-raster-vector/?utm_source=feedly&utm_reader=feedly&utm_medium=rss&utm_campaign=best-free-gis-data-sources-raster-vector>

Soilgrids

([https://soilgrids.org](https://soilgrids.org/))

CHELSA Climate layers

<http://chelsa-climate.org/>

NicheMapR – An R package to generate microclimate data

<https://onlinelibrary.wiley.com/doi/full/10.1111/ecog.02360>

And update – integration with NicheMapR and the microclima package

<https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/2041-210X.13330>

Global Forest Change dataset (Hansen et al.)

<http://data.globalforestwatch.org/datasets/14228e6347c44f5691572169e9e107ad>

OsciiLayers: Plio-Pleistocene climate oscillations dataset

<https://onlinelibrary.wiley.com/doi/pdf/10.1111/geb.12979>

ENVIREM climate data - mostly moisture (potential evapotranspiration and related indices) parameters especially good for plants

<https://deepblue.lib.umich.edu/data/concern/generic_works/gt54kn05f>,

<http://onlinelibrary.wiley.com/doi/10.1111/ecog.02880/full>