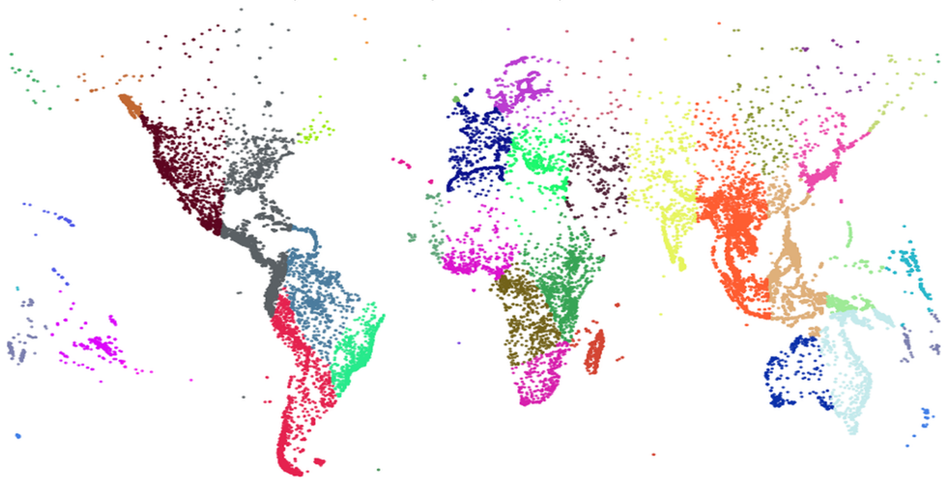
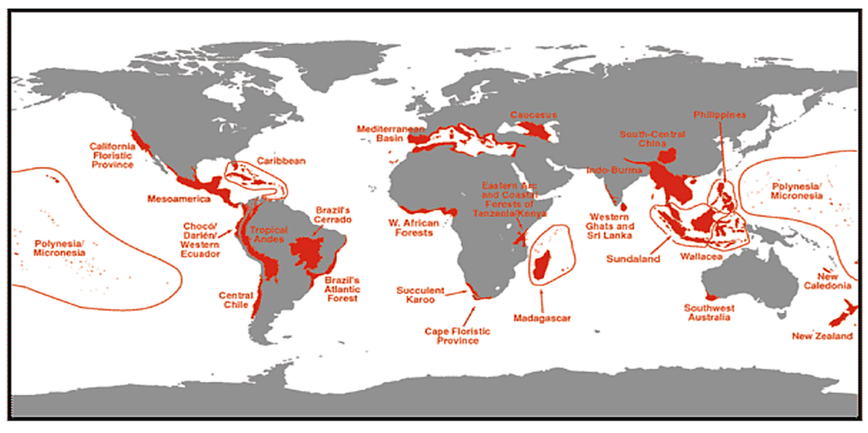
Clustering Biodiversity

Clustering Centroids

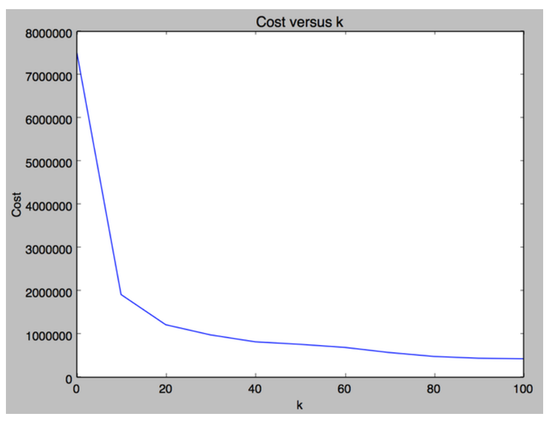
k = 40 Gonzalez Clusters Using Centroids of Endangered Species' Ranges



Known Biodiversity Hotspots According to Myers



K-Medians Cost for Gonzalez Clustering



k = 40 Gonzalez Clusters Using Point Cloud

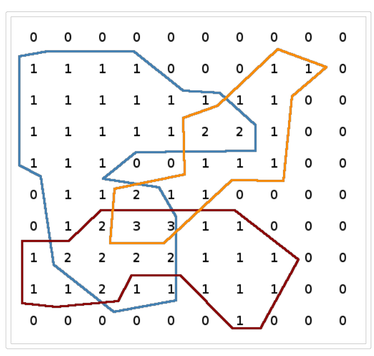
Density Based Approach

Polygon Depth

For each longitude, latitude point on a grid on a sphere, find how many polygons contain that point.

- Retains more information about the shape of the polygon than centroids.

- Since points are organizedon a grid, calculations can be optimized.



Density > 100

Density > 125

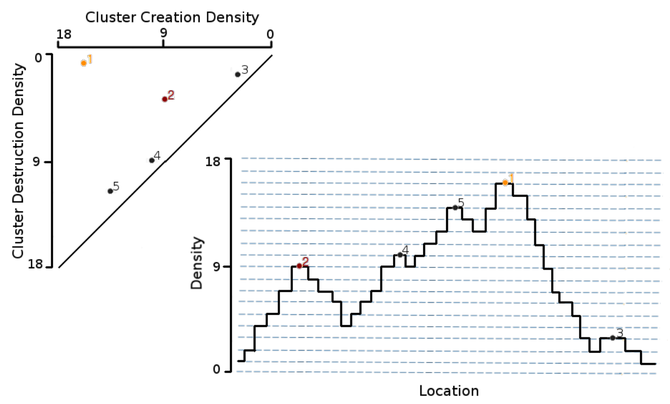
DBSCAN

Algorithm that clusters areas together that have similar minimum average depth (i.e. density) that are in close proximity.

How to choose minimum average depth?

Different choices result in different visible clusters. (see graphics)

We want to be able to find peak areas of different densities, how dense they are, and how prominent they are.



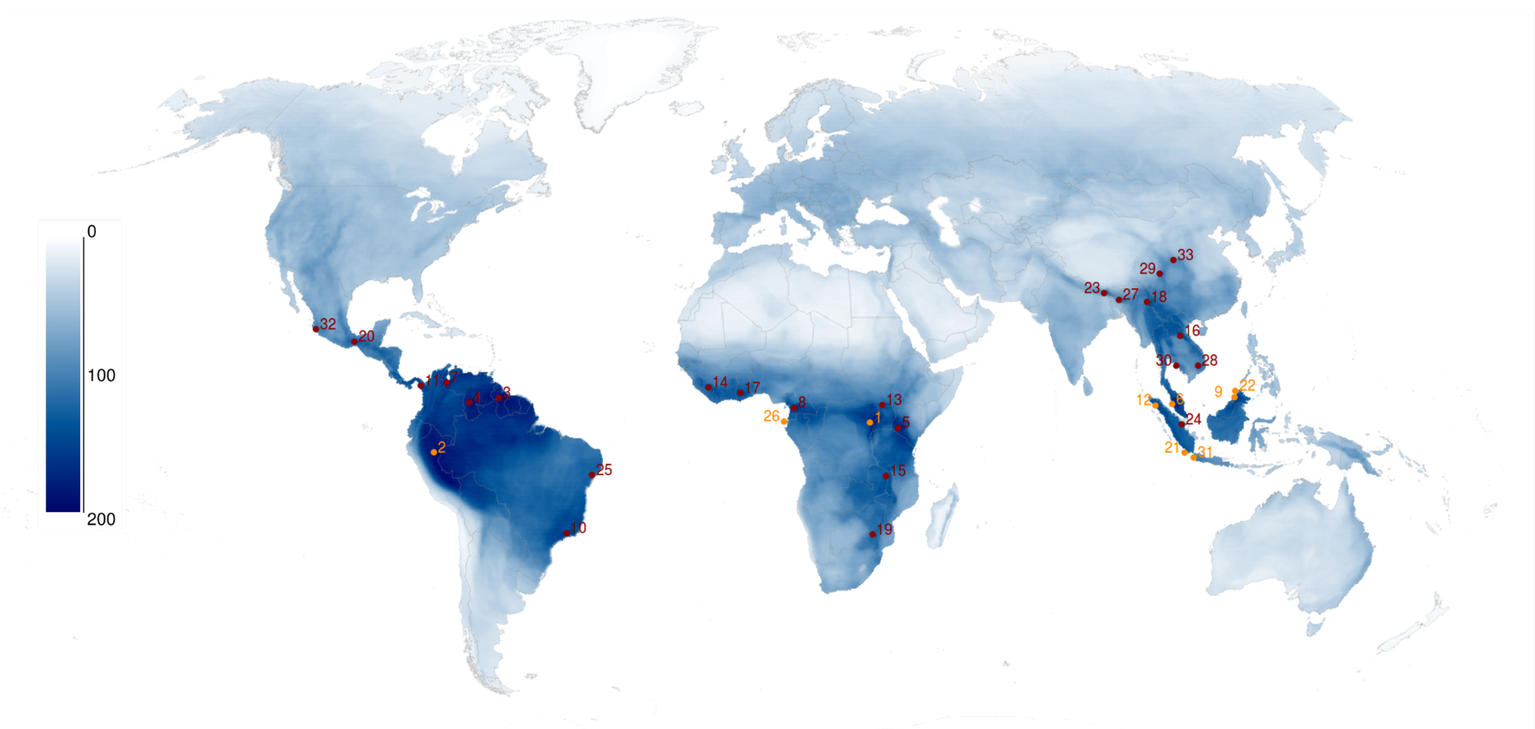
Cluster persistence

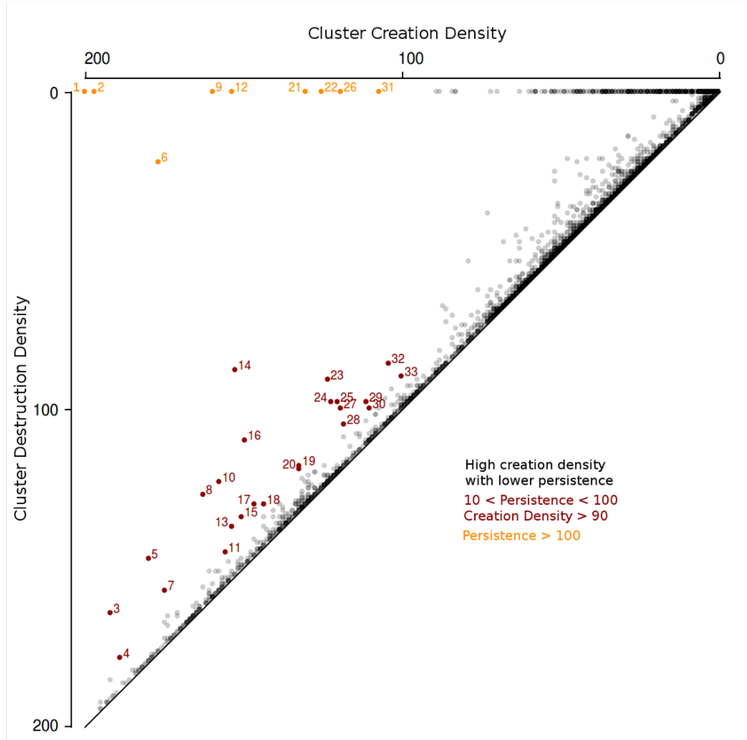
Run DBSCAN from high density to low density.

- Clusters are created when they form at a given density.
- Clusters are destroyed when DBSCAN clusters them with a cluster of higher creation density.

- Peak density measured by *Cluster Creation Density*.
- Peak prominence measured by distance from diagonal.

Mammals





Amphibians