MBES Segmentation

Rationale:

This tool creates a segmented vector polygon output file which characterises and segments the combination of bathymetry and corresponding backscatter mosaic grids. Segmentation is a method to aggregate pixels together to create a thematic map. The segmentation process creates a set of polygons defined by the statistics associated with the input images. Clusters of the imagery pixels are created in 3-dimensional space and created into classes. Aggregation into geographic regions (polygons) is done according to a minimum polygon size rule, and clustering rules.

The segmentation process uses a technique of k-means clustering and uses the iterative removal of outliers via a sieving process.

The bathymetry file is processed to give a slope and roughness derivatives. It is these two derivatives files which are used in conjunction with backscatter imagery which are the 3 inputs to the object-based imagery analysis (OBIA) process.

The resulting shapefile of polygons may take some time depending on the data complexity, file sizes, and number of clusters. Each polygon will have attributes of:

- VALUE – The Class Number of each polygon
- backs_mean – The average of all pixel values in the polygon from the backscatter input file
- backs_stde – The standard deviation of pixel values in the polygon from the backscatter input file
- slope_mean – The average of all pixel values in the polygon from the calculated slope data
- slope_stde – The standard deviation of pixel values in the polygon from calculated slope data
- rough_mean – The average of all pixel values in the polygon from the calculated roughness data
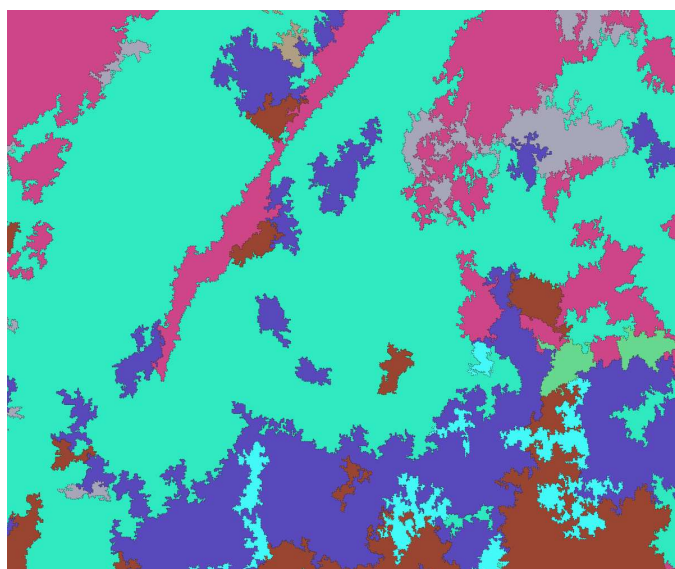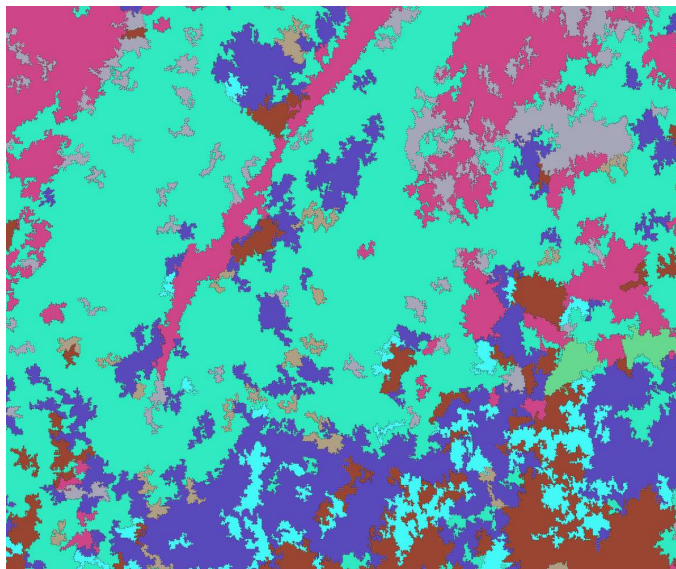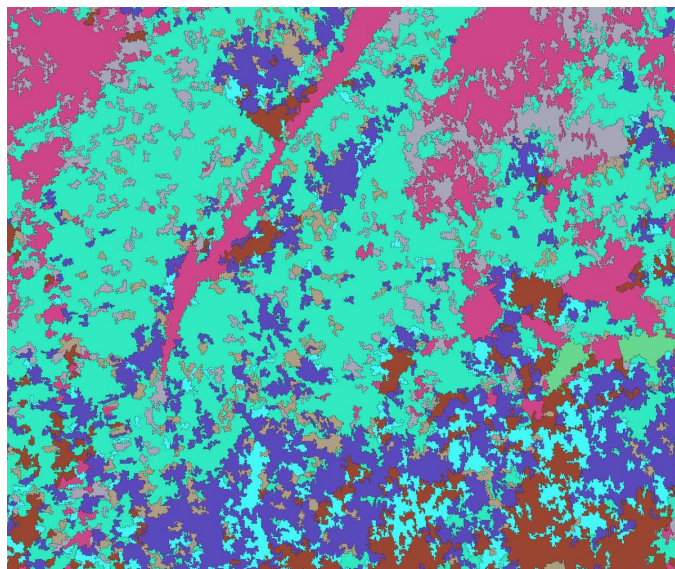- rough_stde – The standard deviation of pixel values in the polygon from calculated roughness data

Usage:

There are four parameters required for this analysis:

- A bathymetry single layer grid either from a pulldown list or by the directory and filename.
- A backscatter single layer grid either from a pulldown list or by the directory and filename.
- The number of classes is the number of expected characteristic clusters of data in n-dimensional space. A default value of 10 is suggested but can be altered by the user. Often the number of output classes actually produced is less than the number entered due to the small areal extent of a particular class and therefore deemed insignificant.
- The minimum size is a value in pixels for the smallest areal extent of any polygon class. Small polygons are merged with the largest neighbouring polygon.

Output is a single polygon vector shapefile and its default filename is the same as the bathymetry filename with "_MBESseg" added to the name. Format output is .shp (plus its associated companion files).

It is envisioned that this tool may be run several times to get the level of interpretation desired. Example below shows 10 classes but a change in the minimum size of polygons (from 30 to 100 to 400).

If the number of classes is reduced from 10 to 5 the classification boundaries are changed, and the analysis gives a similar but differing result: