

## Applying head/tail breaks classification on DEM data

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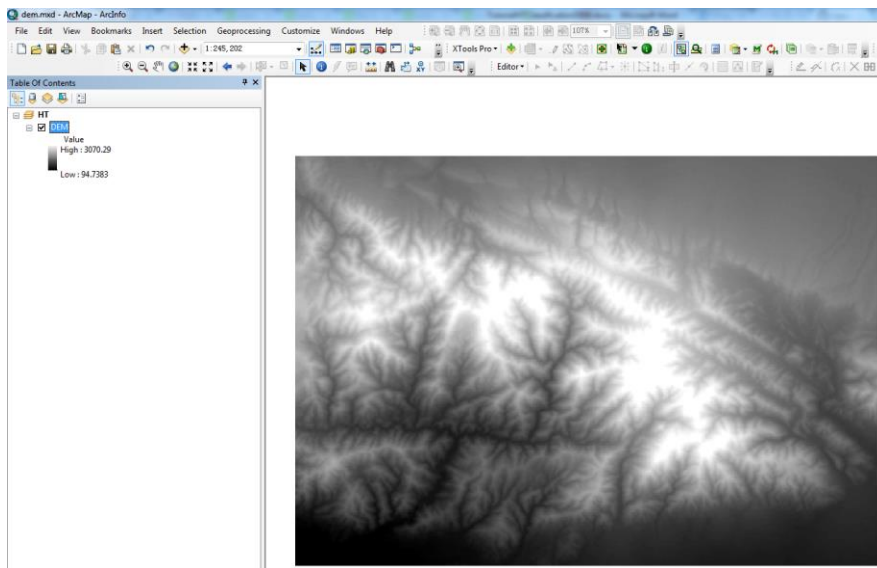
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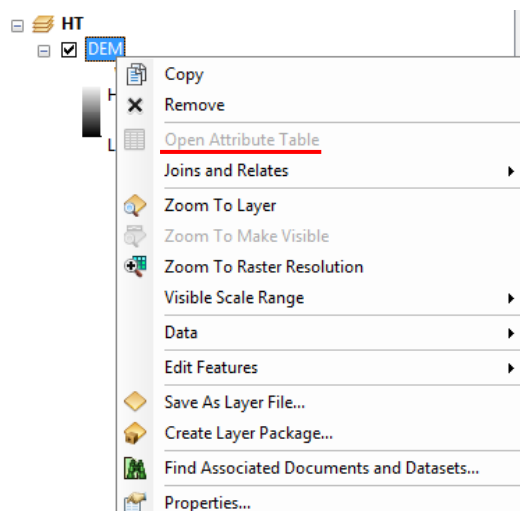
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For DEM data of a natural landscape, its pixel values always possess a scaling property, which means there are far more low height pixels than high ones. However, existing classification methods (e.g. equal interval, natural breaks) have inadequacies in capturing such key characteristics. In this respect, head/tail breaks (Jiang 2013) as a new classification scheme for data with a heavy-tailed distribution can be used for uncovering the underlying scaling pattern of DEM data. This tutorial will guide you step by step on how to apply the head/tail breaks classification on DEM data.

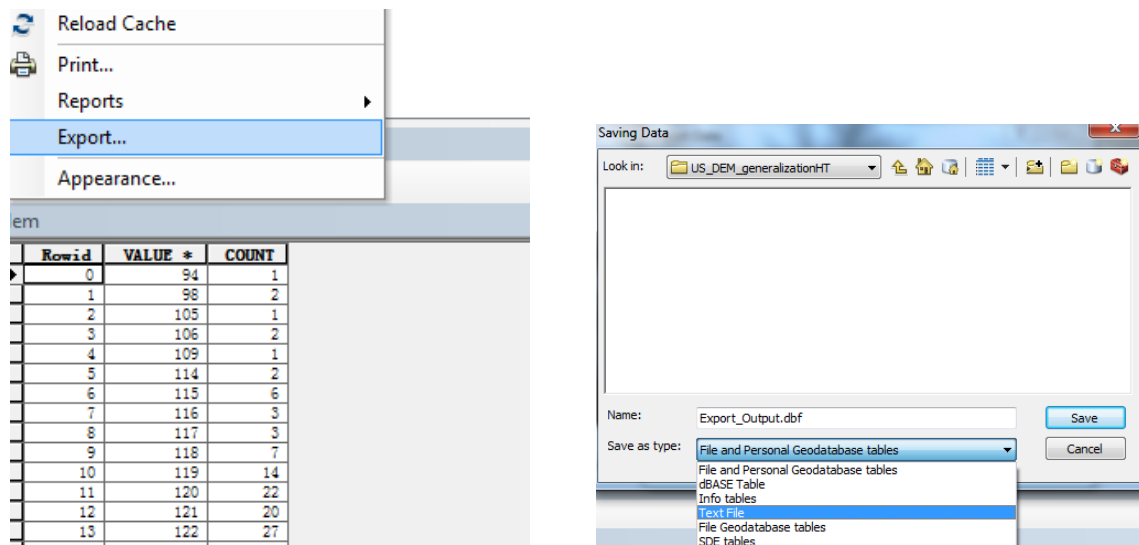
1. Find and open DEM.mxd in the directory.



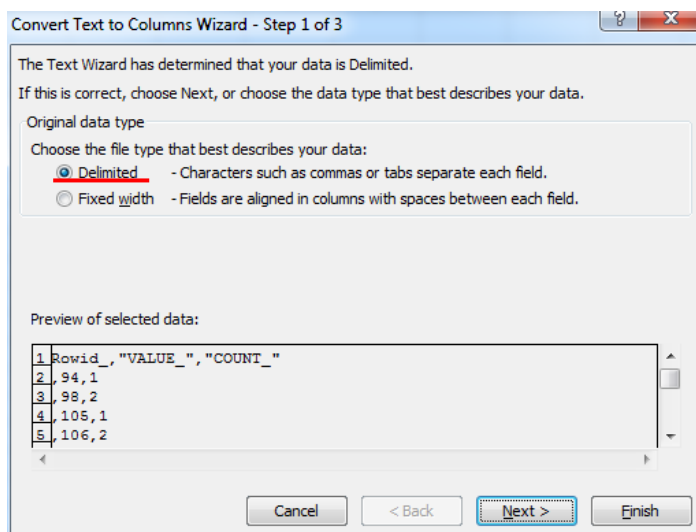
2. Right click the layer, choose *Open Attribute Table*. Note: ArcGIS does not support cell value in double format. So if “*Open Attribute Table*” is inactivated, go to *ArcToolbox > 3D Analyst Tools > Raster Math > Int*, which converts each cell value of a raster to an integer by truncation.

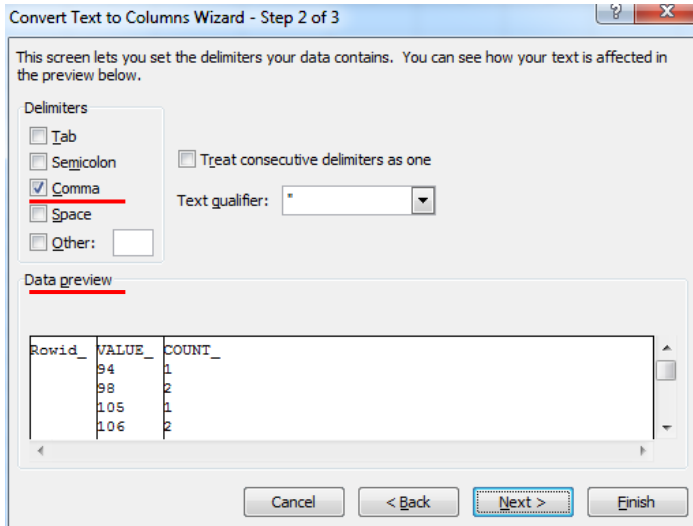


3. Click *Table Options* , choose *Export* and save the table as a text file (.txt) in your working directory.

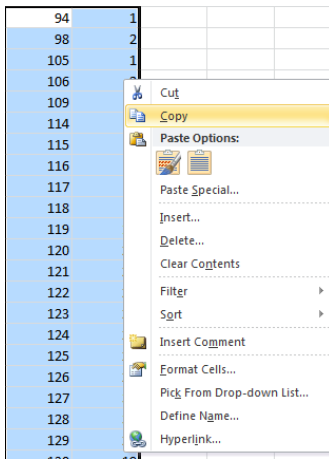


4. Open the exported txt file in Excel, there might be only one column of which the values are delimited by comma “,”, in this case go to *Data tab > Text to columns*, choose *Delimited* in the pop-up window then click *next*, check box *comma* and you will see the columns become separated in the data preview, then click *finish*.

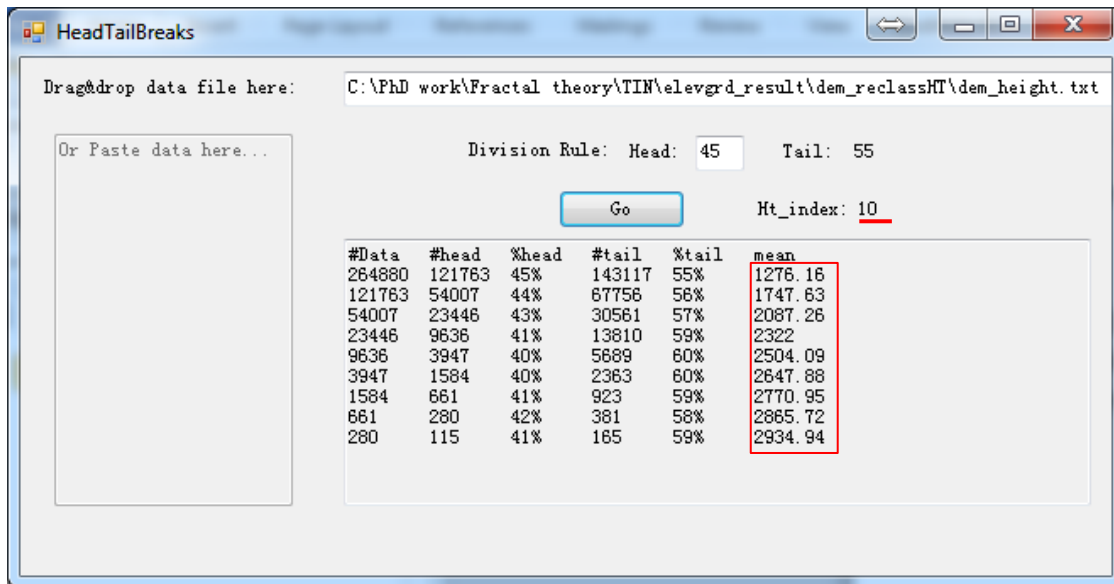




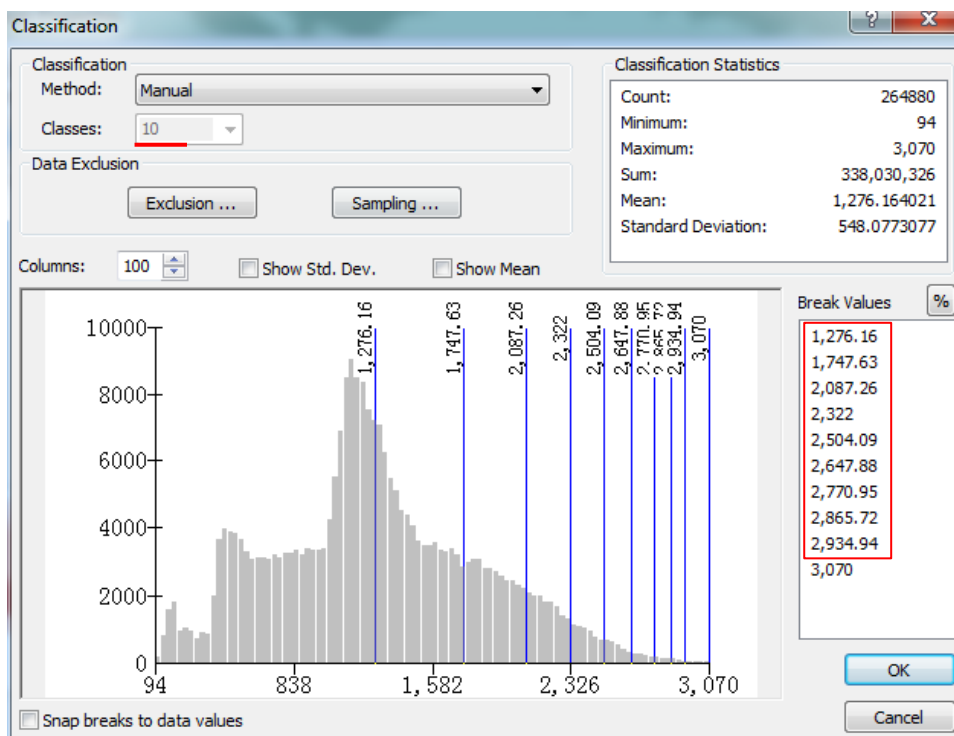
5. Copy the columns named “Value” and “Count\_” and paste them in a new txt file. Note please copy only the number, NOT include any text information. And make sure that do not use space as the last row in the txt file.



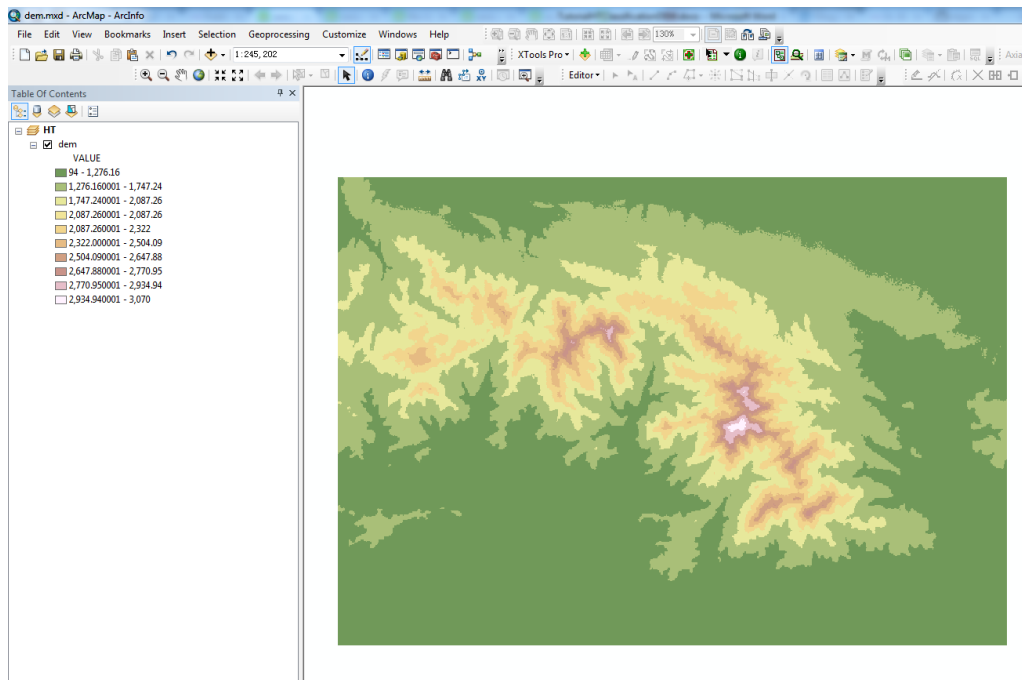
6. Download head/tail breaks application at <https://github.com/digmaa/HeadTailBreaks>. Open it and drag the file to the address field, set the division rule (e.g. 45/55 for sample data) and click Go. This way we can obtain the number of classes and class break values for head/tail breaks classification.



7. Go back to ArcGIS, right click the layer and choose *Properties>Symbology>Classified*, click *Classify* button, make the number of classes equals to the ht-index value and change the method to *Manual*, then copy each mean value to the corresponding class break value. Then click *OK*.



8. Choose a proper color ramp for visualization, finally click *OK*. Now the DEM has been classified by using head/tail breaks, from which we can see the scaling pattern that far more low locations than high ones that the data actually has.



## Reference:

Jiang B. (2013), Head/tail breaks: A new classification scheme for data with a heavy-tailed distribution, *The Professional Geographer*, 65(3), 482 – 494.