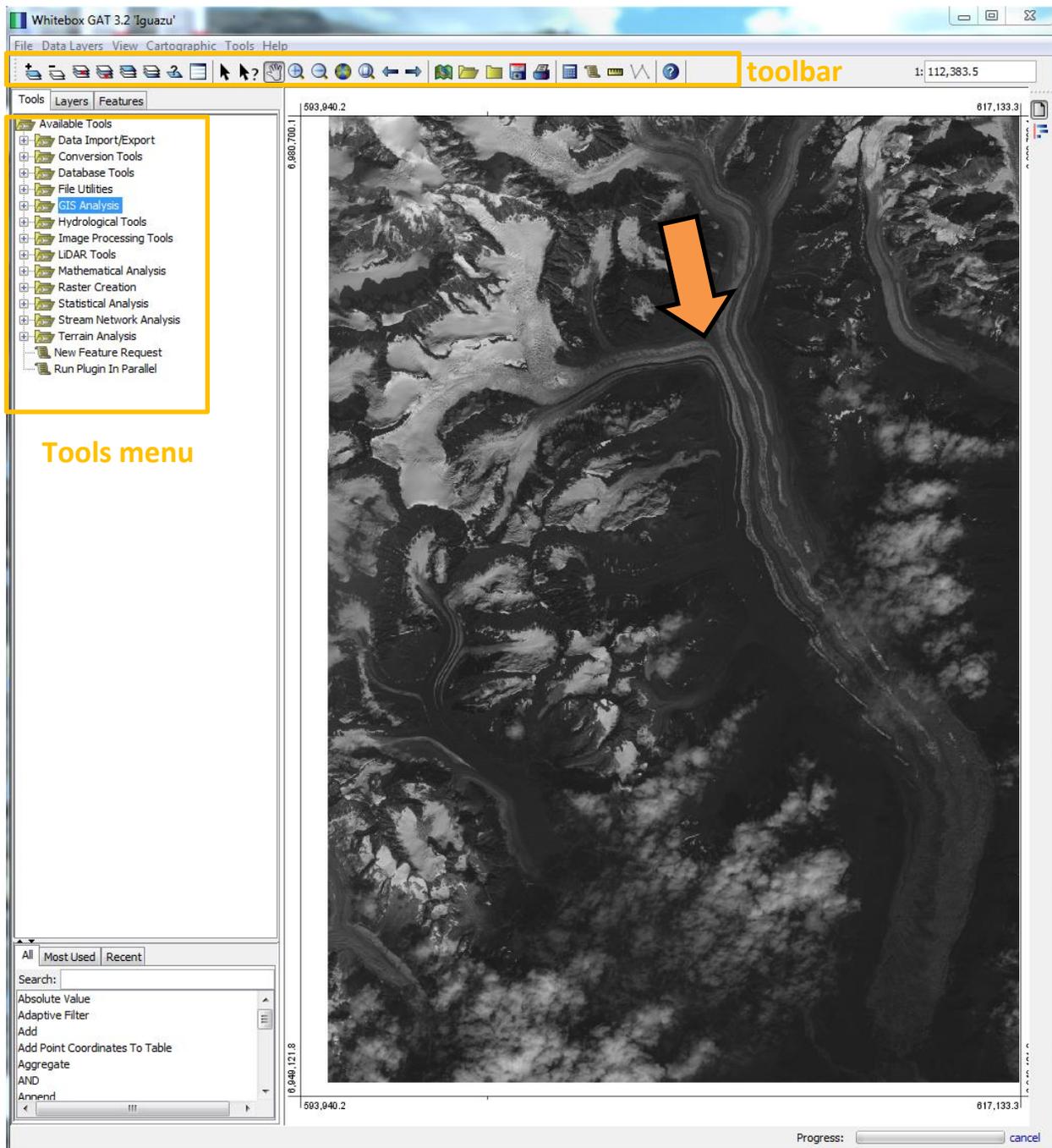


SOFTWARE TUTORIAL

Measuring Geological Features from Satellite Imagery in Whitebox GAT

The following tutorial is intended to help you get up and running with Whitebox GAT. Whitebox is an open-source GIS package designed by John Lindsay at the University of Guelph, Ontario, intended for basic geospatial analysis and education. The software can be downloaded from the Guelph website (<http://www.uoguelph.ca/~hydrogeo/Whitebox/>) and can be run from the desktop of any Java-enabled system (Mac, Windows, Linux), and can even run from a USB drive. Many of the functions and tools in Whitebox are available from other commercial and open-source GIS and remote sensing software



packages, but the simple and intuitive interface of Whitebox make it amenable to performing quick analyses, even for students with little or no prior experience with GIS.

How-to:

Below are some basic procedures for using Whitebox to view and pan across georeferenced satellite imagery, digitize features (i.e., overlay lines that trace features of interest), and make manual measurements. The small graphics to the right show some key icons to look for in the Whitebox toolbar or tools menu (as of Whitebox version 3.2.2).



1. Add a satellite image:

- a. Click the Add Layer icon on the left side of the toolbar. A dialog box will open up to allow you to navigate to the directory where your image is stored. Select the image you want to open. 
- b. If the image is in a format the Whitebox is familiar with (including .TIF) but not native to Whitebox (.tas and .dep), a warning may appear to indicate that Whitebox needs to convert the file. Click OK to proceed. If the image format contains georeferencing information (like a geotiff) or if a world file with the same filename as the image is available in the same directory, the image will be displayed projected in the proper coordinates. Preferred coordinates in most cases will be UTM, where northing and easting are expressed in meters.
- c. Use the mouse wheel or the zoom tool in the toolbar to zoom in or out, and use the pan (hand) tool in the toolbar to click-and-drag your way around to explore the image. 

2. Digitize a feature:

- a. Use the Whitebox GAT polyline tool (GIS Analysis > Vector > Create New Shapefile) to create a "shapefile". In the new pop-up window, you will be asked to supply a filename and select the type of shapefile. Name your feature, choose "polyline" and click "Run". 
- b. Click on the Digitize New Feature tool in the main toolbar. You'll be asked to supply a FID number code. Click OK. Now your cursor changes to a digitizing target, and you can click on the image to digitize the feature of interest. While digitizing, you can use your mouse wheel to zoom in or out, and you may still pan by clicking and dragging. It is usually beneficial to have the image zoomed sufficiently that you're confident that your digitized features are properly located. If you make a mistake, you can Undo the last point. When finished, double-clicking will complete the feature. 

- c. You can change the appearance of the feature by raising the "Layers" menu in the left panel, and right-clicking anywhere in the description of the line or feature. The top choice in the context menu is "Layer Display Properties", which allows you to modify color, line thickness, etc. 

3. Make measurements:

- a. Use the distance tool (in the toolbar) to measure distances on the image. Distances can be measured along a straight line or a polyline. The distance is shown in the lower-left corner of the Whitebox window. Double-clicking clears the measurement. 