

# Tools, Tips, and Workflows

## Macro QC before Micro QC



Karrie-Sue Simmers, Darrick Wagg  
November 2012  
Revision 1.0

In order to minimize the amount of effort required for performing quality control on data it is best to run macro-level control checks to quickly assess whether to invest the labor in micro-level quality assessments. Hillshade images can be used as part of a quick quality control analysis by providing an overview perspective on the dataset. This tool would typically follow an execution of statistical review of the data using some of the LP360 tools such as LAS Statistics Extractor and Control Point Reporting (see previous articles in past editions of LP360 News for more information) before extensive manual review is performed to validate individual point classification consistency.

*Hillshade uses a specified sun position to determine a hypothetical illumination of the surface. The effect is based upon elevation variations within the landscape and generally mimics the sun's illumination, shading and shadows, on hills and canyons. Hillshade imagery is created using illumination or brightness values where terrain that is hidden or protected from the specified light source have low or no illumination or brightness. Hillshade values can range from 255 (high illumination) to zero (no illumination).*

By examining the hillshade imagery one can quickly and easily determine if the dataset in question has any major calibration issue, colloquially “busts”, or if all there are major misclassifications within the data, such as buildings and vegetation being included within the ground dataset. These images can also be used to get an idea of surface smoothness and continuity spanning processing blocks.

Hillshade imagery is created via the Export Wizard tool.



*Figure 1 - Export Wizard Tool*

The first step in the process is to select the Hillshade export option which is listed under Surface Attribute(s) to Export. Upon selection of this option another tab enables in the dialog where specifics about the sun position may be set.

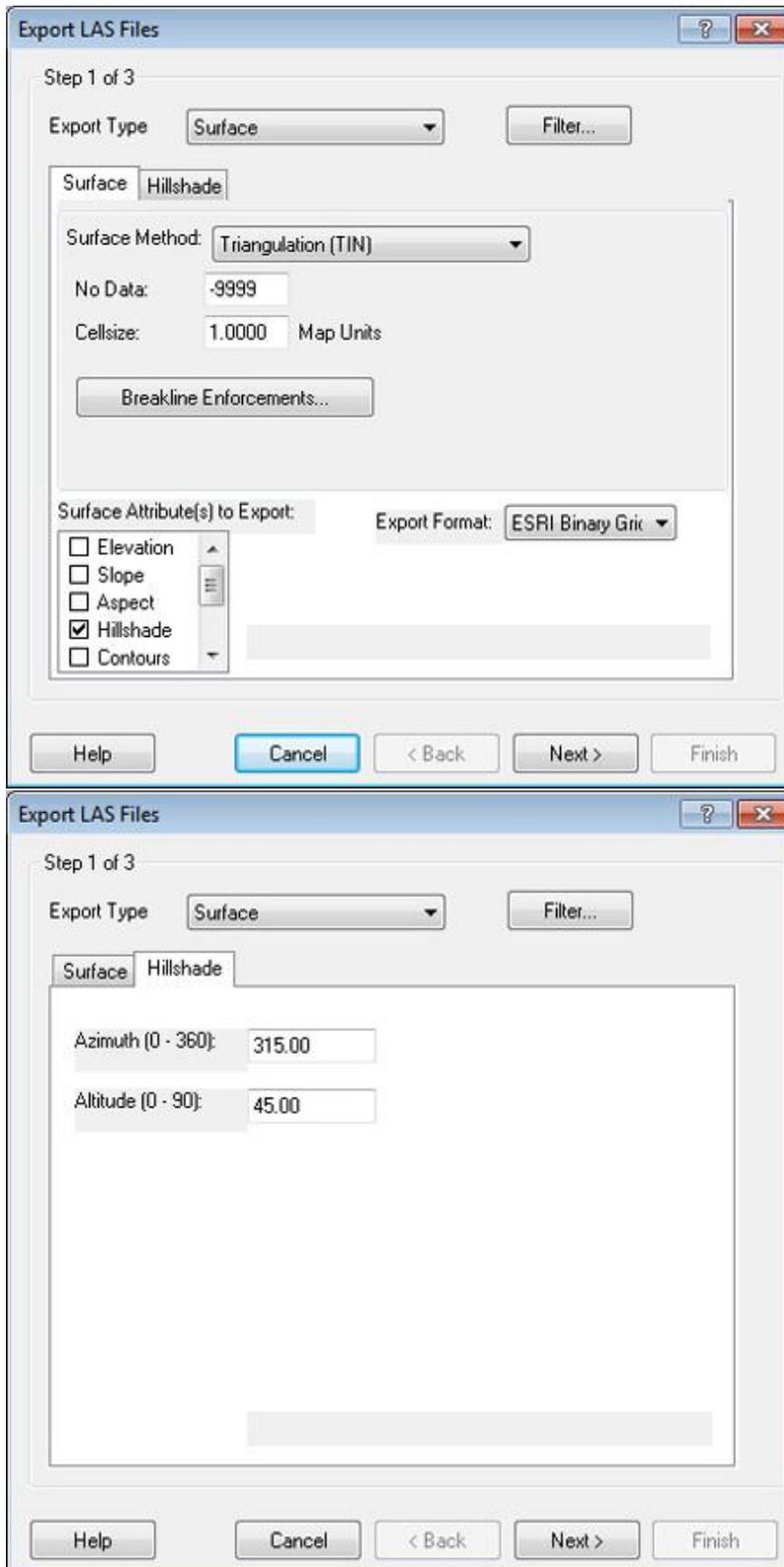


Figure 2 - Surface Attributes and Hillshade Options

## Tools, Tips, and Workflows

### Macro QC before Micro QC

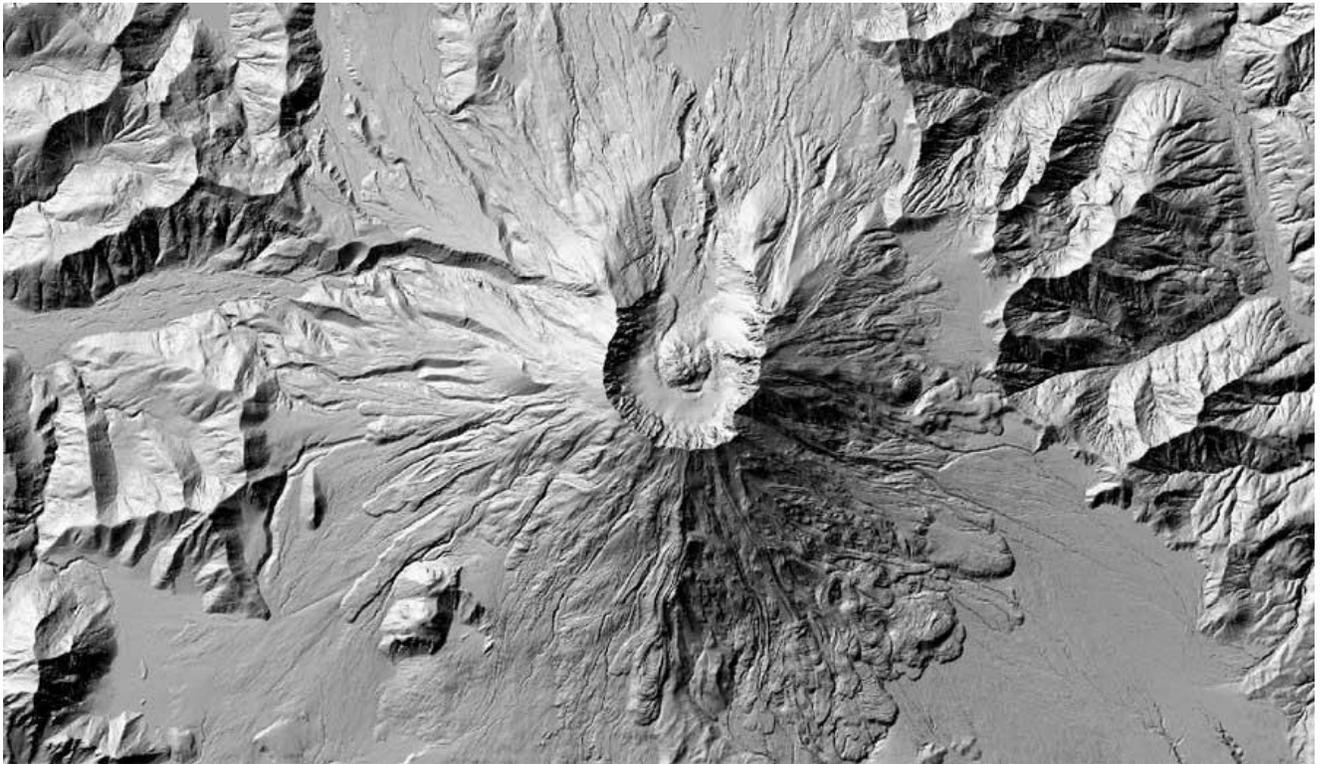


The position of the light source is determined based on two metrics, the altitude and the azimuth of the light source in the sky. The altitude controls how high the light source is in the sky and can be used to control the position of the sun at different latitudes or times of the day on Earth. The azimuth controls what direction the light source is in the sky and can be used to control the position of the sun at different times of the day or year on Earth. Positioning the light source perpendicular to specific features can highlight those features for easier review in the quality assurance/quality control process. For example, with flight lines flown trending north-south one may highlight edge mismatches between flight lines by placing the sun at 90°. The resulting image would show north-south trending steps in the dataset in places where the edges of individual flight lines didn't match well with the adjacent flight line. *Using a light source position of 315° azimuth and 45° altitude, one can produce the brightness values required to shade the terrain as it would appear in three-dimensions.*

The next two steps in the Export Wizard are used to define the export extent and export location. Once the export has been completed the user can then add the imagery directly into ArcMap to start the review process.



*Figure 3 - Hillshade example of Urban Area with all points surface*



*Figure 4 - Hillshade example showing Mount St Helens Volcano ground surface*



*Figure 5 - Hillshade example showing misclassifications in the ground surface*