

Exercise 12

Generate Slope and Aspect from DEM

About this exercise and the data set

To create a slope and aspect map for a particular area, all we need is a Digital Elevation Model (DEM). The DEM used in this exercise was downloaded from the USGS web site. DEMs consist of a raster grid of regularly spaced elevation values that have been primarily derived from the USGS topographic map series. The USGS produces five types of elevation data. The type used in this exercise is the 7.5-Minute DEM which corresponds to the USGS 1:24,000 topographic quadrangle maps. These are cast to the Universal Transverse Mercator (UTM) projection system and are referenced to either the North American Datum (NAD) of 1927 (NAD27) or the NAD of 1983 (NAD83). Most files will have a grid spacing of 30 meters, but 10-meter grids are also available for some locations. The average file size of a 30-meter DEM is 1.1 megabytes and 9.9 megabytes for a 10-meter DEM. They are available in Native and Spatial Data Transfer Standard (SDTS) format.

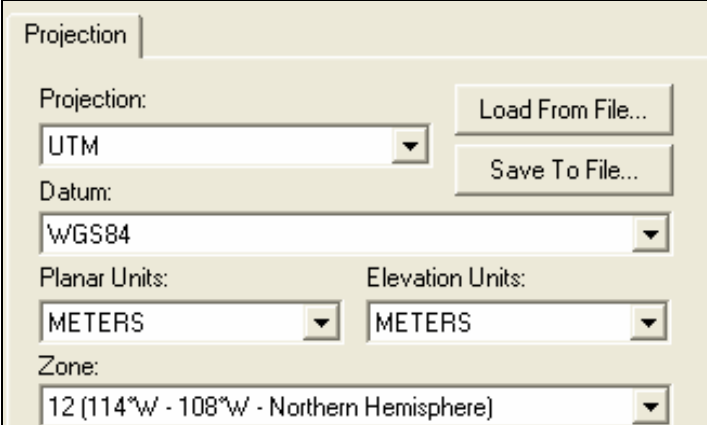
You can learn more about USGS DEM using the following link:

<http://edc.usgs.gov/products/elevation/dem.html>

To download (FTP site) USGS DEM click on the following link:

<http://seamless.usgs.gov/website/seamless/viewer.php>

To properly fit over data set the data was projected to UTM WGS84 Zone 12.

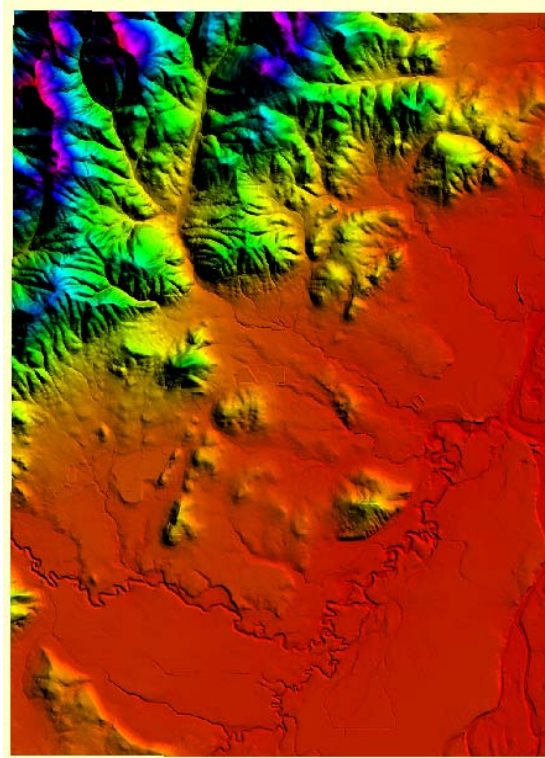


The image shows a 'Projection' dialog box with the following fields and buttons:

- Projection: UTM (dropdown menu)
- Datum: WGS84 (dropdown menu)
- Planar Units: METERS (dropdown menu)
- Elevation Units: METERS (dropdown menu)
- Zone: 12 (114°W - 108°W - Northern Hemisphere) (dropdown menu)
- Buttons: Load From File... and Save To File...

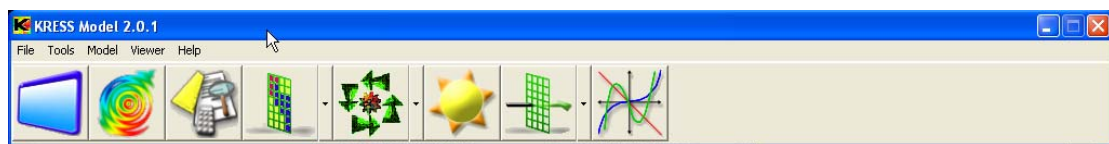
Source: GlobalMapper Software

For the purpose of this exercise we are using the Corvallis 7.5' quad sheet.



Step 1: Starting the KRESS Program

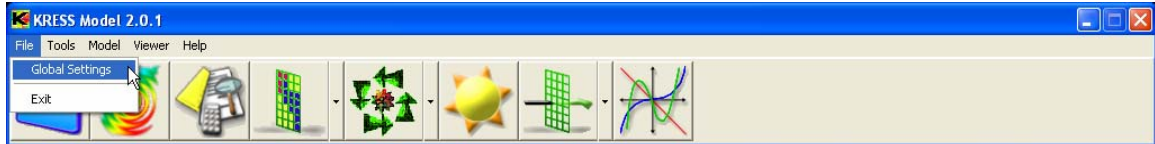
To launch the KRESS model, double click on the icon.



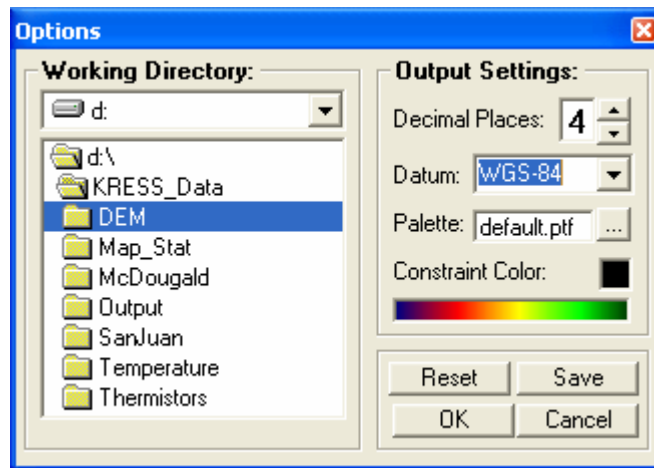
Once the system has loaded, notice that the screen has two types of command menus, the top one consisting of drop-down menus and the bottom one showing pictorial emblems. The drop-down menus – File, Tools, Model, Viewer, and Help – are used for the most control and manipulation of the program. The tool bar of icons is used to control display preferences and to access commonly used facilities.

Step 2: Setting the Working Directory and Output Setting

A project is a compilation of data files. Therefore, it is necessary to create a “Working Directory”. This is the most fundamental element in organizing data files; both the input files to be used and the output files subsequently created by you, as well as your written analysis results. Creating a working directory activates the “Project Environment” module, allowing you to set the data paths of your file folders. In order to access the working directory, go to the drop-down menu labeled “File” and click on “Global Settings”.



This will open a new window, as pictured below.



The first time KRESS Model is launched, the program refers to the default working directory, usually found in the c (or data) drive, named c:\Program Files\KRESS. If it is not set up this way, use the drop-down menu to change the working directory drive. On the right-hand side of this window there are options for the output settings. You can either use the default settings or reset your preferences pertaining to the number of decimal places, the display palette and the constraint color. Factors are displayed in multiple colors, in contrast with the constraints, which are shown in a single solid color. For this example, we are using the default palette, or the “KRESS Model Default Quantitative Palette”.

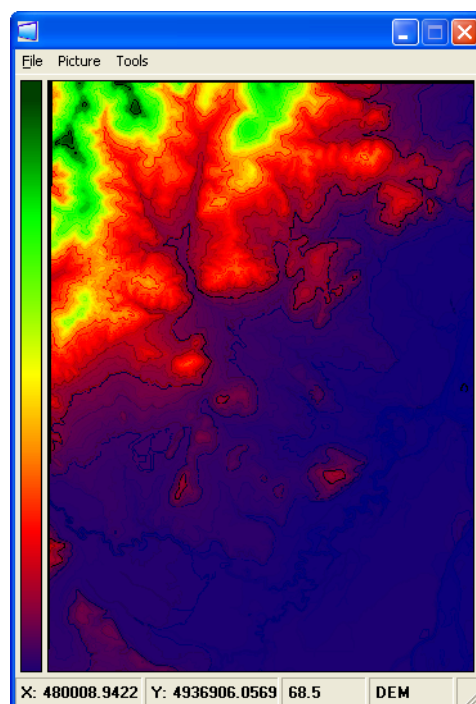
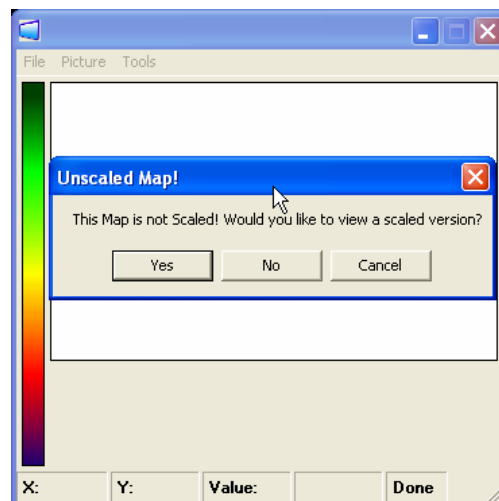
It is possible to specify a different input or output path using the browse button (“...”) and selecting from another folder. The instructions are written assuming that all default paths were accepted during installation. If the tutorial data was installed and then routed to a different location, the files will be found there rather than in the default settings; therefore, these instructions may not be applicable and should be adjusted accordingly.

Step 2: Displaying the DEM

First, using the “Viewer,” display the study area DEM.

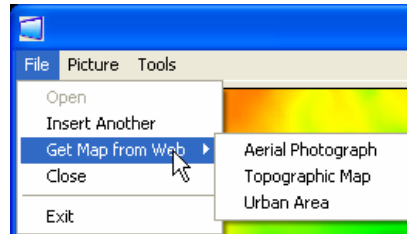


When asked to scale the map, click on “Yes”.

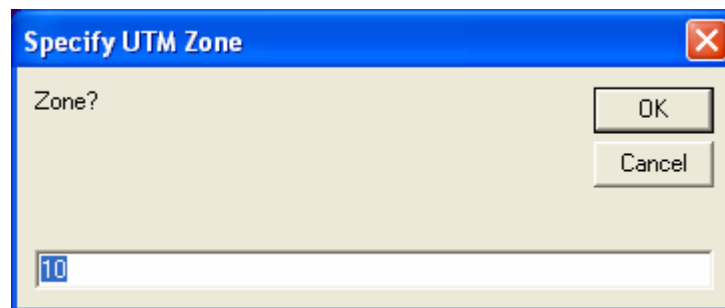


Step 3: Displaying Additional Maps

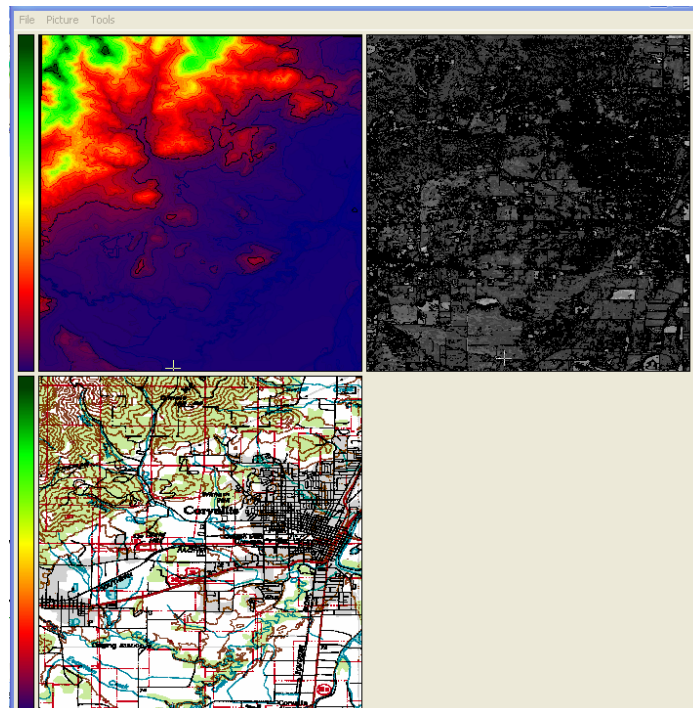
If you have connection to the internet and would like to open additional viewer for the same area, go to the “File” menu, click “Get Map from Web”, and select the kind map you want.



As mentioned earlier, the study area is in Zone 12.



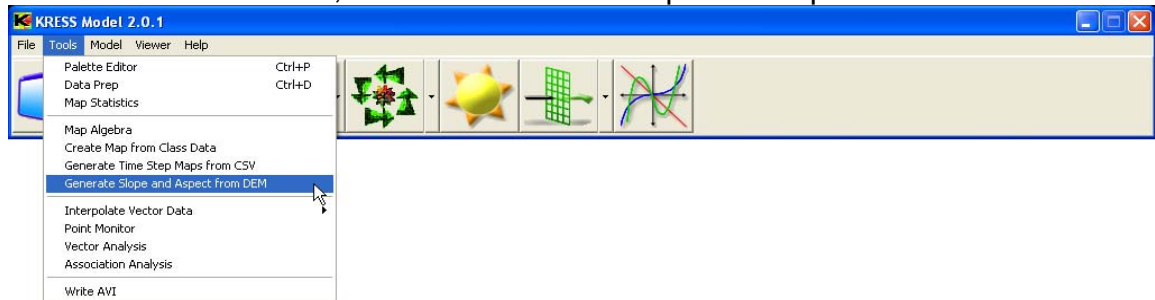
Add the Aerial photograph (DEQ) and the topographic map (Digital Raster Graphic).



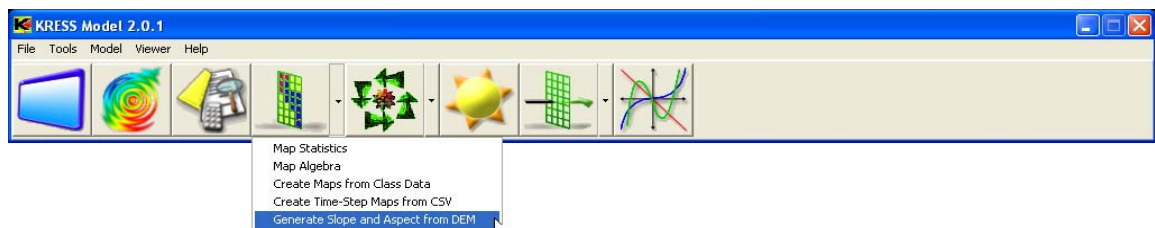
Step 4: Generating Slope and Aspect Maps

Before we can run the insolation modeler we need to create the slope and aspect maps.

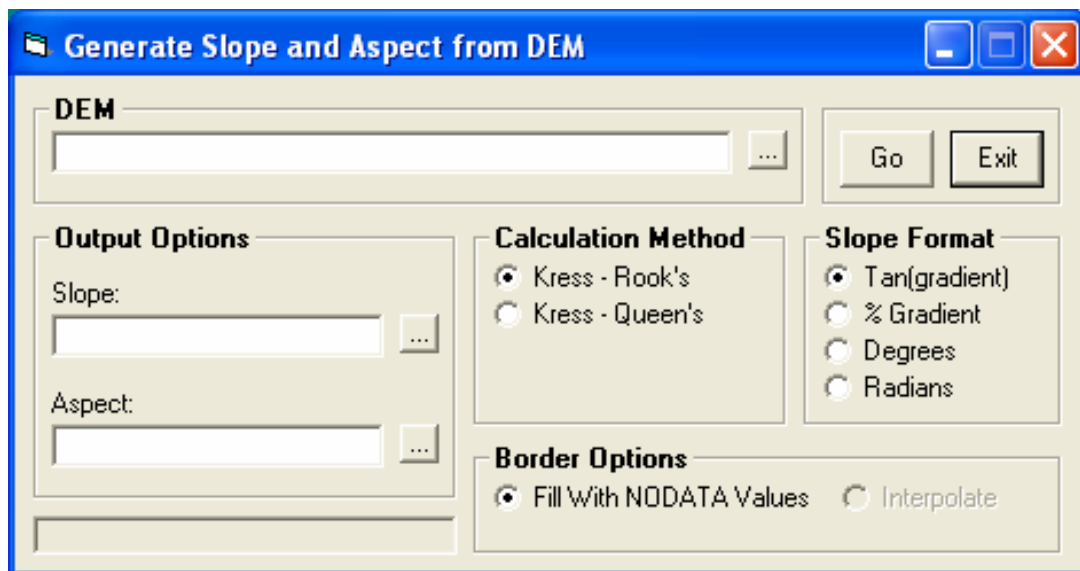
From the “Tools” menu, click on “Generate Slope and Aspect from DEM”.



You can also access the same function from the raster tools button:



A new window will open.

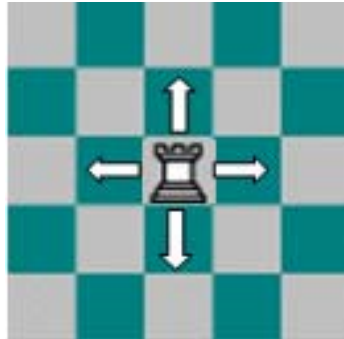


Load DEM: Idaho_Dome
Name output “Slope” and “Aspect”, respectively.

Calculation methods:

The rook's method uses 5 cells (North, South, East and West)

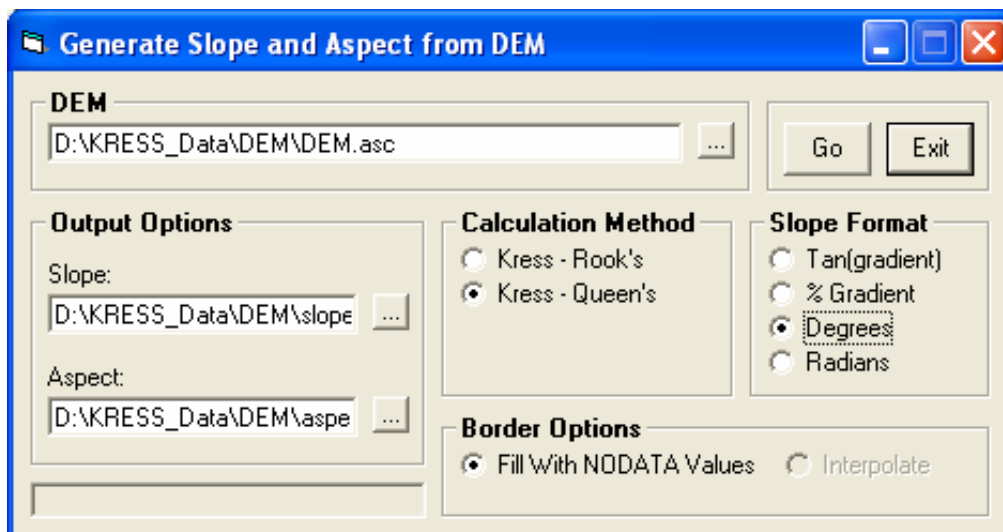
The queen's method uses 9 cells (All directions)



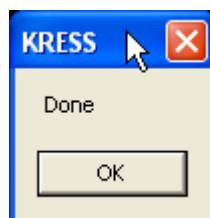
Choose the Queens method

Slope format: Degrees

Border options: Fill with no data values



Click "Go".



Click on "Exit" to exit the "Generate Slope and Aspect" window.

Step 5: Displaying Both Maps

Click on the viewer icon and open the slope and aspect maps.

