

Lecture On

# Generation of Elevation Contours and Slope

Training Course on  
'Marine GIS for Operational Oceanography'

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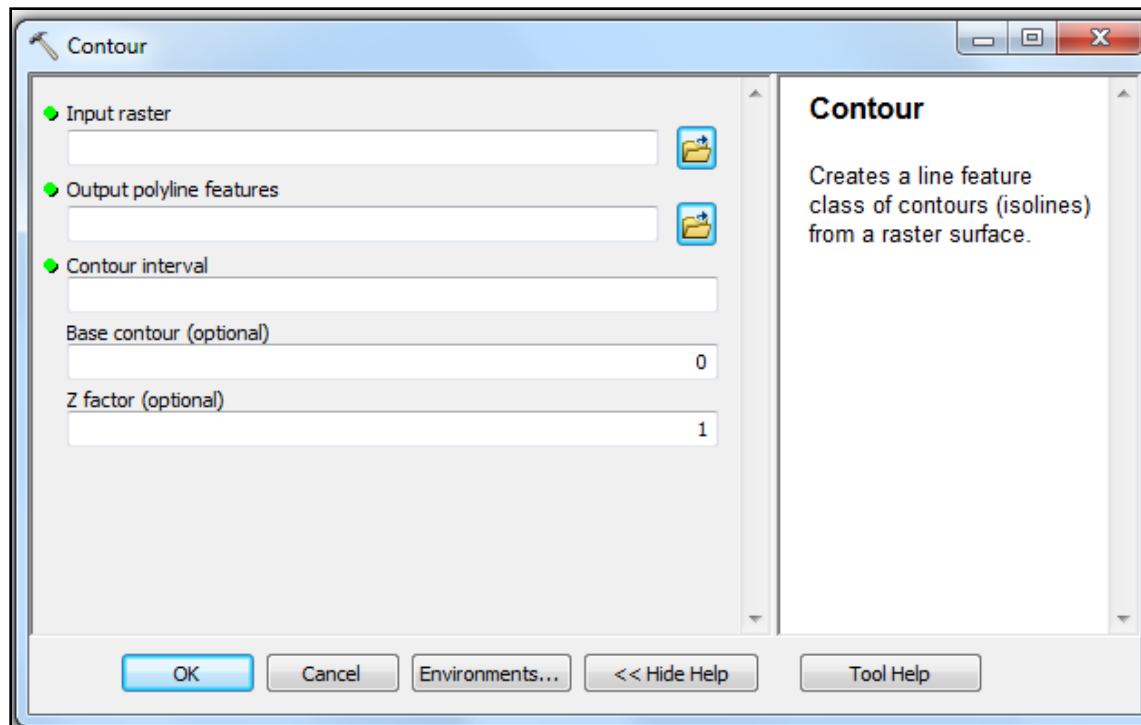
International Training Centre for operational Oceanography (ITCO),  
INCOIS, Hyderabad, India



# Generation of elevation contours

Contours are lines that connect points of equal value (such as elevation, temperature, precipitation, pollution, or atmospheric pressure).

The distribution of the lines shows how values change across a surface. Where there is little change in a value, the lines are spaced farther apart. Where the values rise or fall rapidly, the lines are closer together.



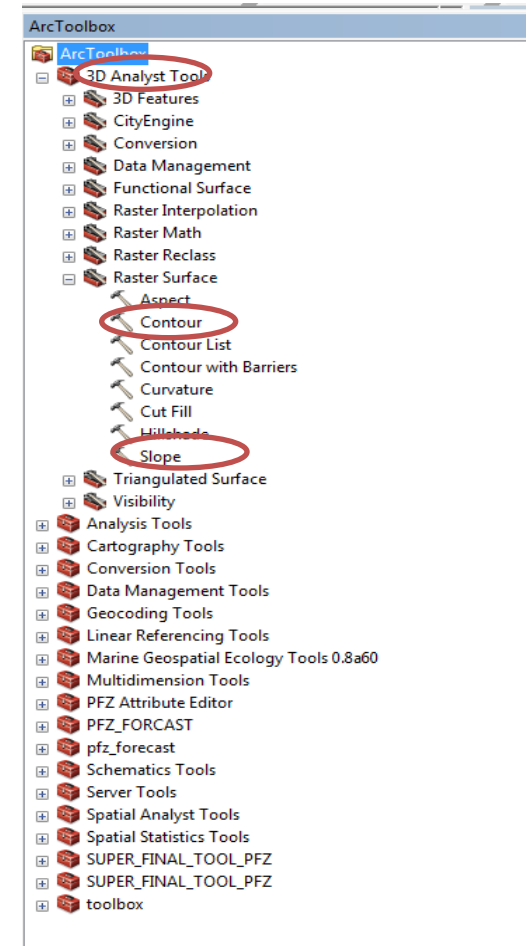
## •3D Analyst > Raster Surface> Contour

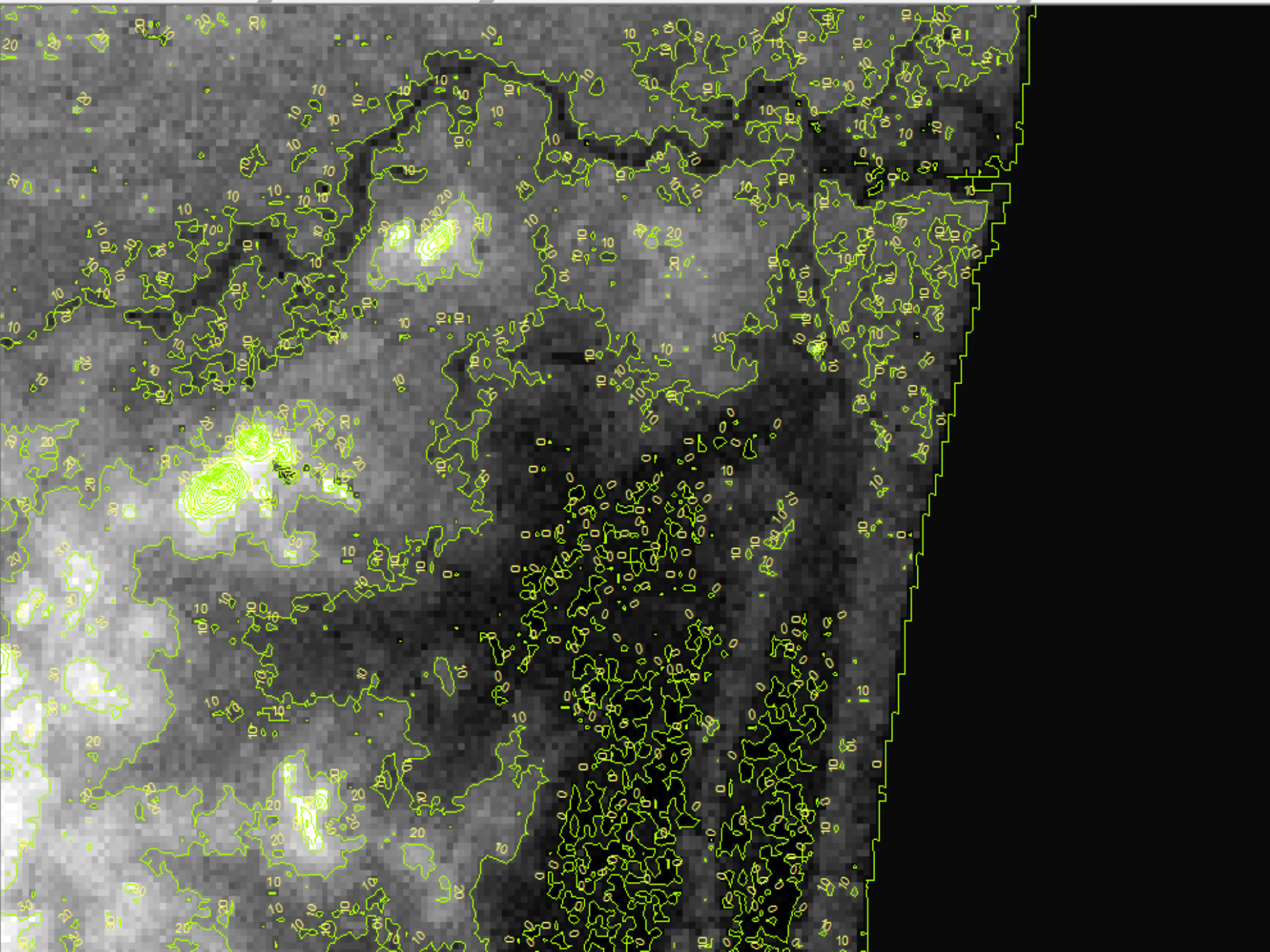
•**Input raster** The input surface raster.

•**Output polyline features** Output contour polyline features.

•**Contour interval** The interval, or distance, between contour lines. This can be any positive number.

•**Base contour (optional)** Base contour value. Contours are generated above and below this value as needed to cover the entire value range of the input raster. The default is zero.





## Generation of Slope

- Identifies the slope (gradient, or rate of maximum change in z-value) from each cell of a raster surface.

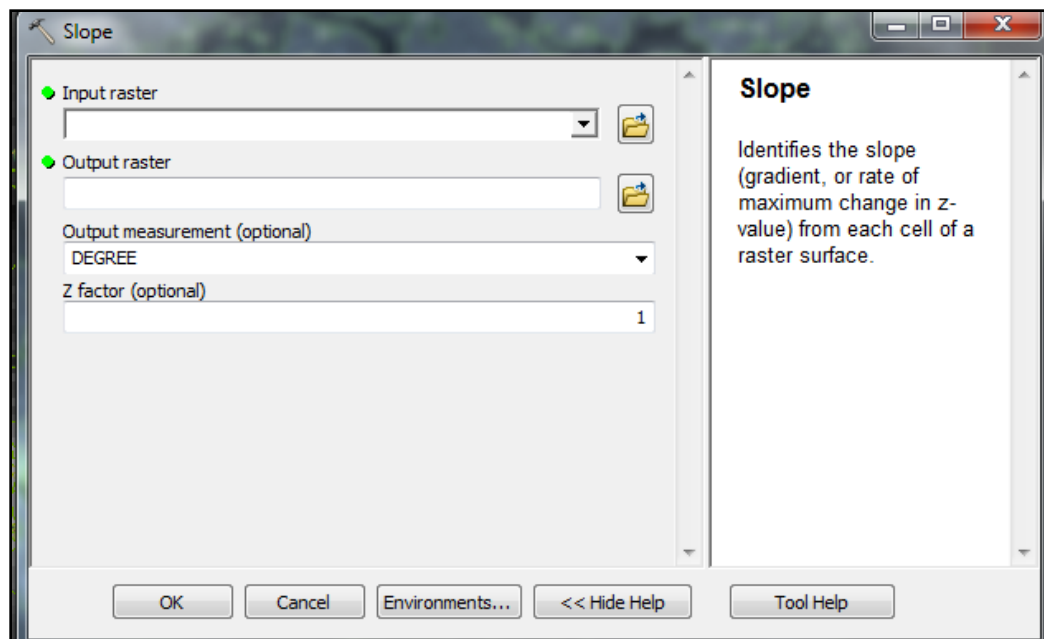
- Slope is the rate of maximum change in z-value from each cell.

The use of a z-factor is essential for correct slope calculations when the surface z units are expressed in units different from the ground x,y units.

The range of values in the output depends on the type of measurement units.

For degrees, the range of slope values is 0 to 90.

For percent rise, the range is 0 to essentially infinity. A flat surface is 0 percent, a 45 degree surface is 100 percent, and as the surface becomes more vertical, the percent rise becomes increasingly larger



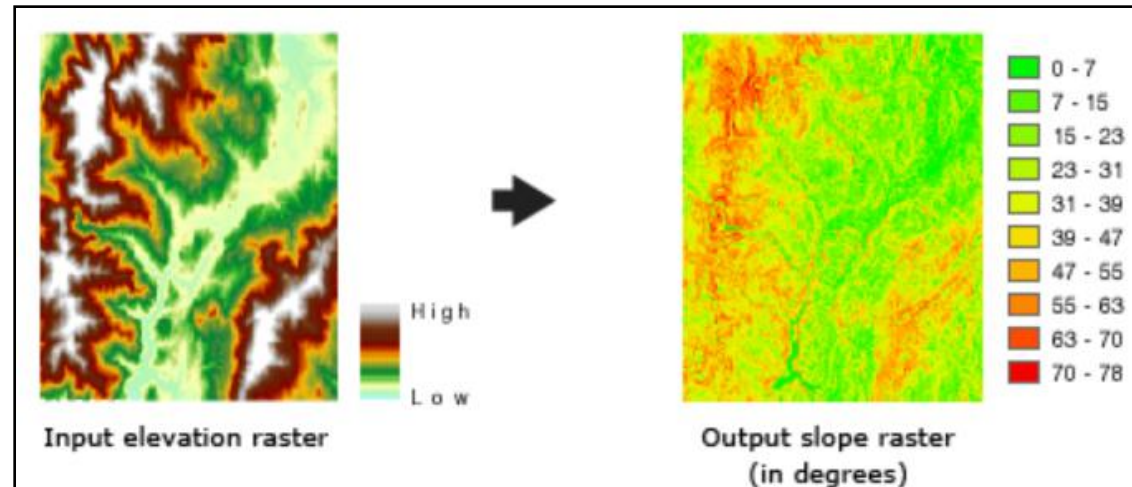
**Input raster** The input surface raster.

**Output raster** The output slope raster.

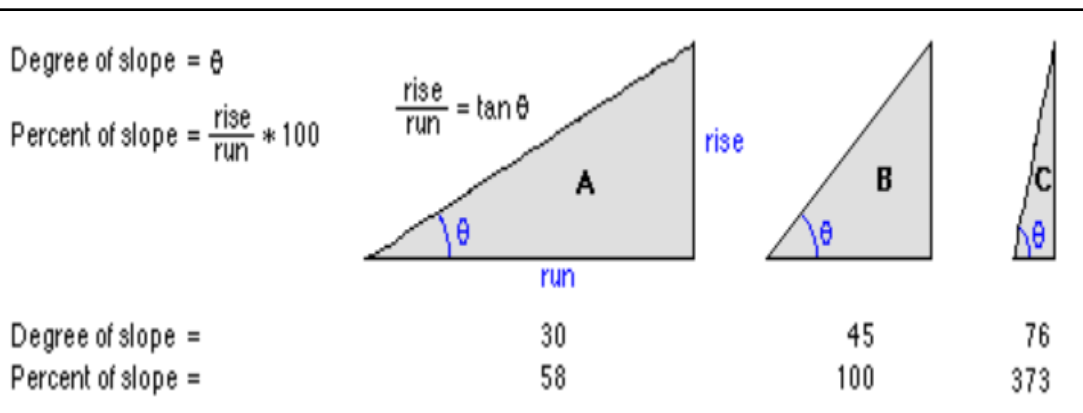
**Output measurement (optional)**  
Determines the measurement units (degrees or percentages) of the output slope data.

# How Slope works

•For each cell, the [Slope](#) tool calculates the maximum rate of change in value from that cell to its neighbors. Basically, the maximum change in elevation over the distance between the cell and its eight neighbors identifies the steepest downhill descent from the cell.



•The output slope raster can be calculated in two types of units, degrees or percent (percent rise). The percent rise can be better understood if you consider it as the rise divided by the run, multiplied by 100.



•Consider triangle *B* below. When the angle is 45 degrees, the rise is equal to the run, and the percent rise is 100 percent. As the slope angle approaches vertical (90 degrees), as in triangle *C*, the percent rise begins to approach infinity.