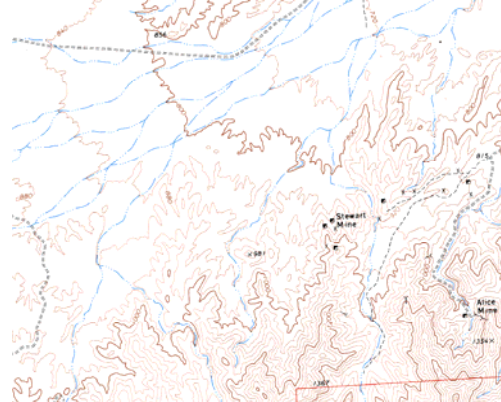


Geography 12: Maps and Spatial Reasoning
Lecture 14:
Representing heights on maps

Professor Keith Clarke



Contours on maps. What CI?



What is a contour line?

- Imaginary line joining points of equal elevation above or below a datum
- Contour lines have a specific *contour interval*
- Interval is the vertical distance between contours
- CI is a function of scale and units
- Relief is the highest elevation shown minus the lowest

Contour lines

CONTOURS	
<i>Topographic</i>	
Index	
Approximate or indefinite	
Intermediate	
Approximate or indefinite	
Supplementary	
Depression	
Cut	
Fill	
Continental divide	
<i>Bathymetric</i>	
Index***	
Intermediate***	
Index primary***	
Primary***	
Supplementary***	

Features of contours

- Contour interval
- Index contours
- Intermediate contours
- Supplementary contours
- Depressions
- Uncertain contours
- Bathymetry: isobaths

Contour interpretation

Contour Lines

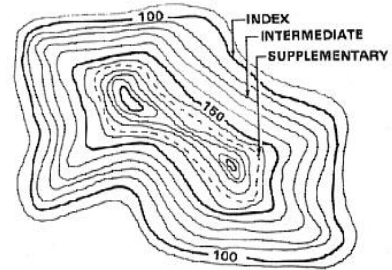
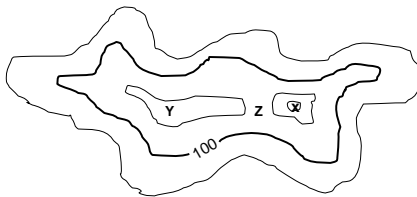


Figure 3

Interpolation



CI=20m

X > 140 and < 160
Y > 120 and < 140
Z > 100 and < 120

Slope

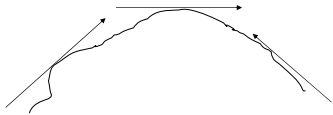
Slope = Rise vs. Run

Four expressions:

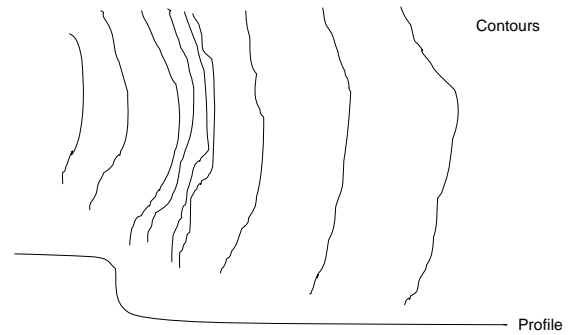
- Slope ratio (e.g. 1:10)
- Slope fraction (e.g. 1/10)
- Percent slope (rise per 100 units of run)
10%
- Degrees from horizontal ($\tan S = \text{rise} / \text{run}$)
5.71 degrees (Note 90 is vertical)

Slope and gradient

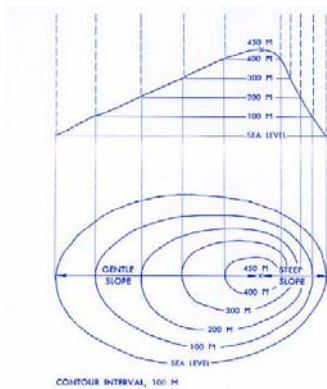
- Slope varies by direction
- Direction of maximum slope = aspect
- “Fall line”
- At a peak or pit, slope becomes zero



Convex and concave



Closer means steeper



Contours per cm = slope



In 3D



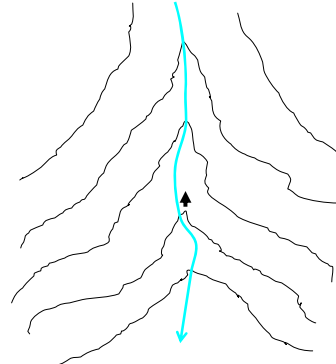
Slope Map for Construction



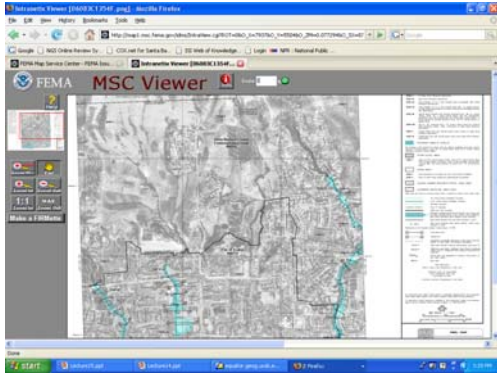
Slope map legend: Slope classes

LEGEND				
Color	Range Beg.	Range End	Percent	Area
Light Yellow	0.00	5.00	54.8	3720254.33
Yellow	5.00	10.00	32.1	2182130.43
Orange	10.00	15.00	11.0	746587.81
Dark Orange	15.00	20.00	1.8	121541.93
Brown	20.00	100.00	0.2	16934.00

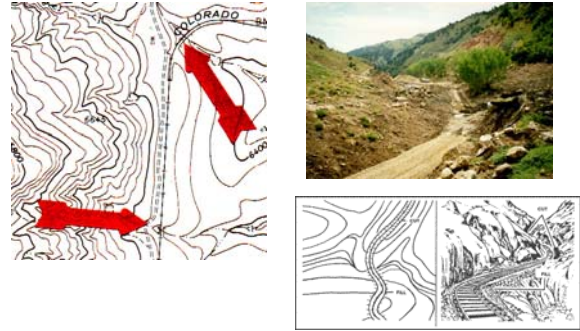
The Rule of V's



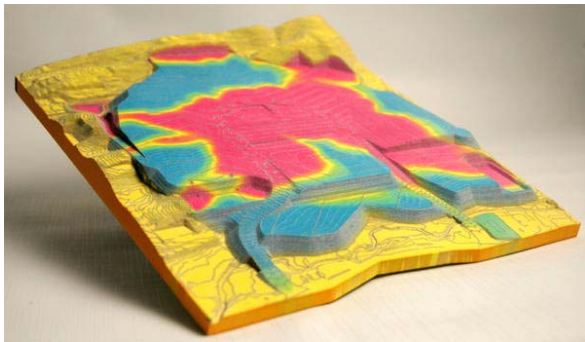
FEMA: FIRMs



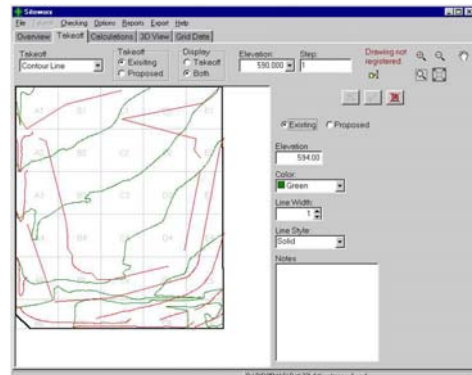
Cut and fill



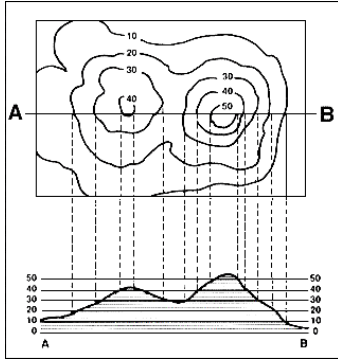
Cut & Fill from Contours



Cut and Fill: Cartometry



Profile



Profile along a transect

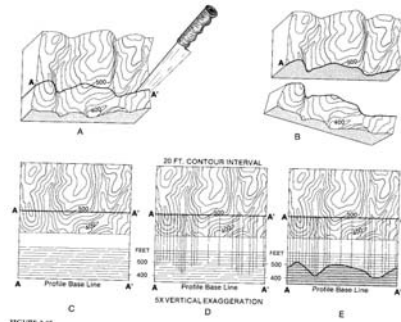
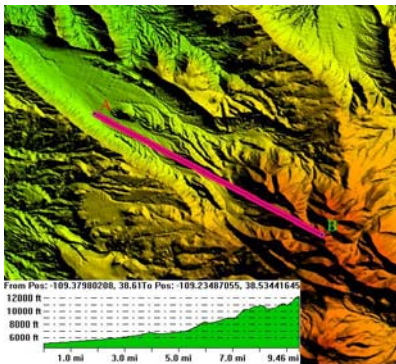
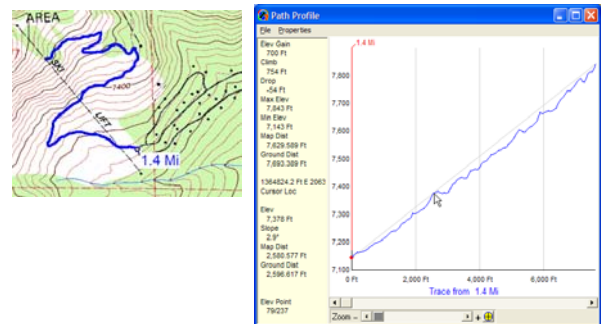


FIGURE 3.18
Cross-sectional profiles. (A) Illustrating the concept of a cross-sectional profile using a perspective terrain model with contour lines. (B) Profile A-A' revealed. (C) Layout of parallel elevation lines in relationship to profile line A-A'. (D) Transferring elevation data to profile diagram. (E) Completed profile diagram.

Profile by Computer: GlobalMapper



Profile along route



Heights on maps

- Contours: CI, relief, interval, depressions
- Interpretation hard, but can tell height
- Slope = contour density
- Convex, concave, peak, pit, saddle
- Rule of V's
- Cut and fill, transects, profiles