

Geo-Skills

Basic cross sections

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Introduction to cross sections

Objectives:

- By the end of this exercise you should:
 - Understand the importance of cross sections.
 - Be able to construct cross sections from basic geological maps.
 - Be able to calculate true thickness of beds.

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Introduction to cross sections

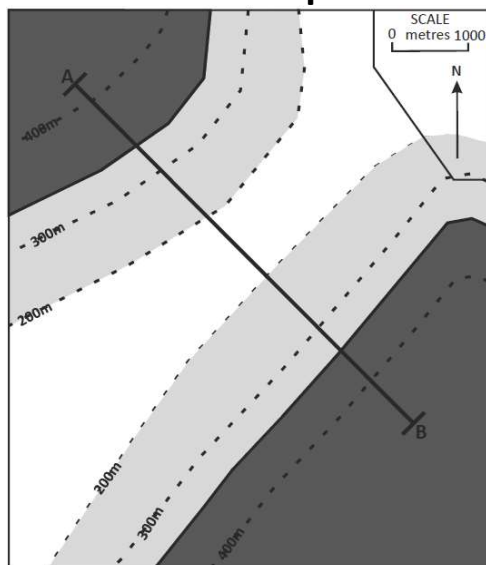
- A key goal of structural geologists is to understand the three dimensional geometry of rocks.
- Unfortunately all that can be directly observed are rocks at the Earth's surface or, in special cases, one dimensional information obtained from well logs.
- The shape of the structures below the surface and the projection of those features into the air (before they were eroded) must be inferred.
- Cross sections are 2-D educated guesses at the geology along a plane different from the Earth's surface.
- Although this plane is almost always vertical, there are instances where it is desirable to project geologic structures into a dipping plane.
- As is true of many problems in geology, there are often numerous possible interpretations of the same data.
- The best we can do in drawing a cross section is to come up with an interpretation that is consistent with all the available data.

Constructing a cross section: Example

Here is our original map.

Step 1 :

- First determine the line along which you are going to draw the section. It should:
 - Be representative of the study area.
 - Cross all major structural features (e.g. faults and folds)
 - have appropriate data on the map or well logs to draw a complete section.
 - Often be drawn perpendicular to major structural features.



Constructing a cross section: Example

Step 2:

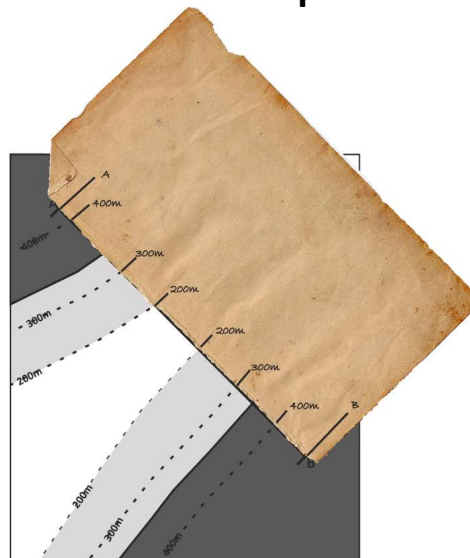
- Now on some graph paper draw an x axis with the same scale and length as the line of the cross section.
- Then add y axes to both ends, that have a relevant scale to the topographic contours.
- So that it looks something like this:



Constructing a cross section: Example

Step 3 :

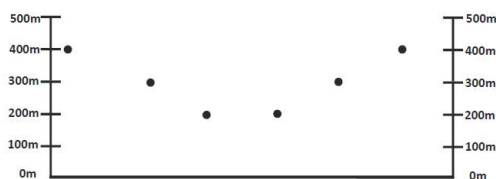
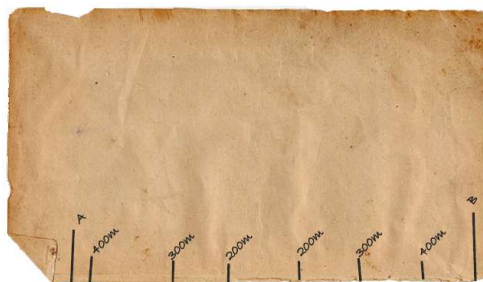
- Using a scrap piece of paper, mark on where structure contours intercept your cross sectional line.



Constructing a cross section: Example

Step 4 :

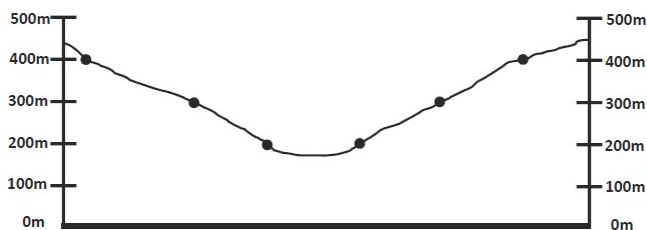
- Now, overlay your scrap piece of paper with your cross section and mark on the different topographical contour points.



Constructing a cross section: Example

Step 5 :

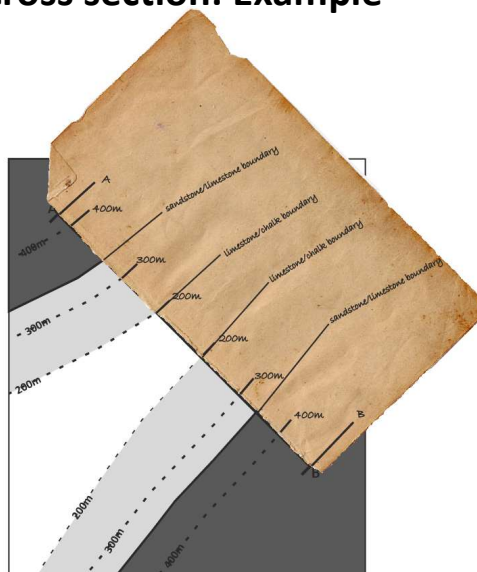
- If you join these dots up, you should end up with an accurate scaled topographic cross section that looks something like the one below.



Constructing a cross section: Example

Step 6 :

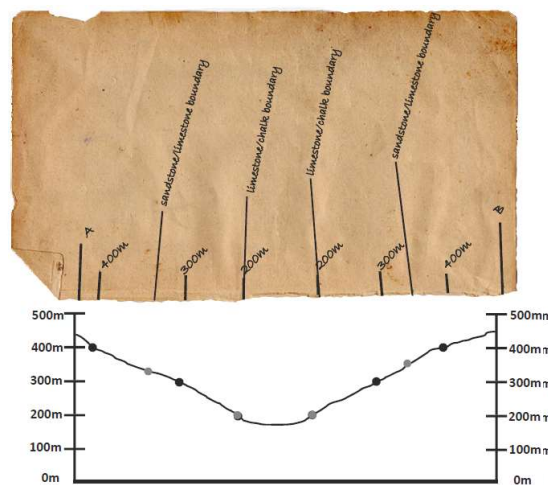
- Now, with your scrap piece of paper add in where the lithological boundaries intercept your cross sectional line



Constructing a cross section: Example

Step 7 :

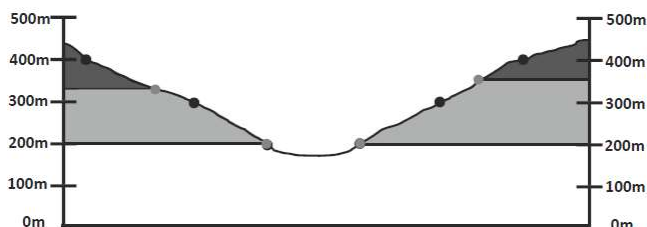
- Now, overlay your scrap piece of paper with your cross section and mark on the different lithological boundaries.



Constructing a cross section: Example

Step 8 :

- Now, extrapolate from these points the bed boundaries; If they dip, then draw the lines at the correct angle of dip for each bed.
- However for this example, as the unit boundaries followed the contours, they are evidently horizontal (remember The Law of "V's")
- Now you have drawn an accurate, to scale, cross section.

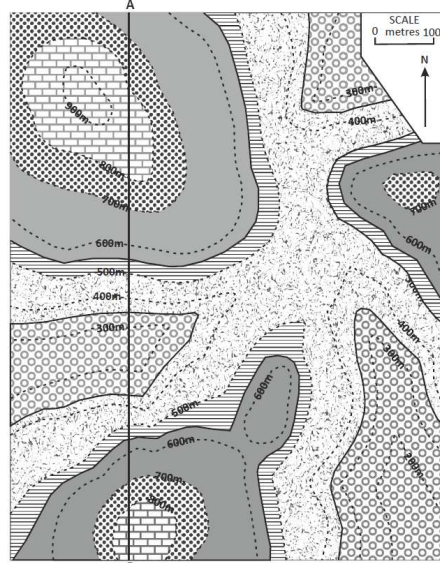


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Constructing a cross section: Problem

KEY			
	Sandstone		Conglomerate
	Grit		Siltstone
	Shale		Limestone



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