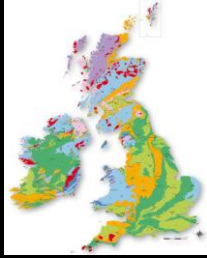


An Introduction To Geological Maps



Dr Liam Herringshaw: lgh865@hotmail.com

Week 4

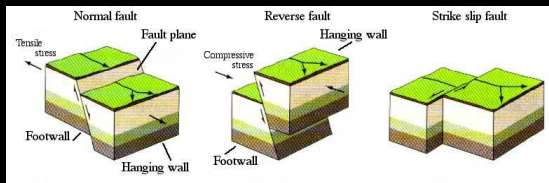
Faults and mapping faulted strata

Exercise 3 – part (a) and (b)

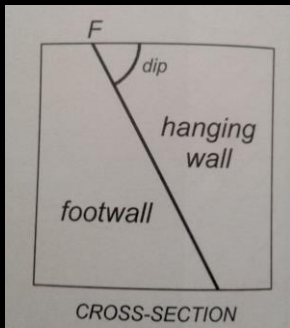
Darwin Goes Mapping

Faults

A fracture in the lithosphere (“crust”) across which motion takes place



Normal – Reverse – Strike-slip



Hanging wall above the fault plane;
Footwall below the fault plane

Normal faults



Rocks pulled apart – fault usually steep

Reverse faults

Rocks compressed –
fault usually less steep

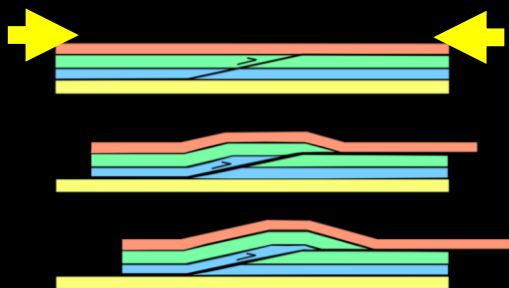


Reverse faults

Rocks compressed –
fault usually less steep



Thrust faulting & stacking



Faults in the field



Clashach Cove,
near Hopeman,
NE Scotland

Fault orientation



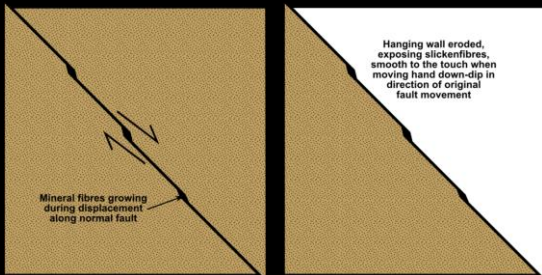
Measure dip and strike of fault plane?

Fault movement?



Look for slickensides

Slickensides?



Minerals deposited/deformed in fault

Mapping faults



Look for regions of fractured rock

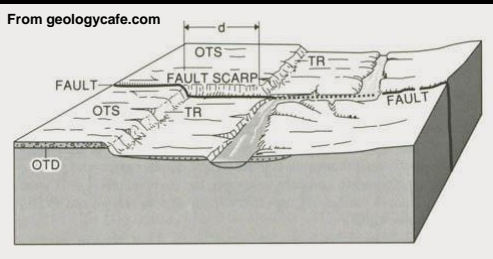
Use sea-level to help



Whitby

Displacement can be inferred

Use topography to help



Streams and rivers often follow faults

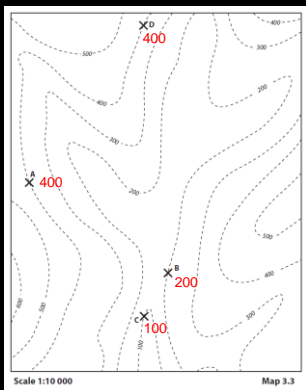
Faults on maps

Assynt, NW Scotland
Avalon Peninsula, Newfoundland
Tay-Forth region, E. Scotland
Wakefield region, W. Yorkshire

Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

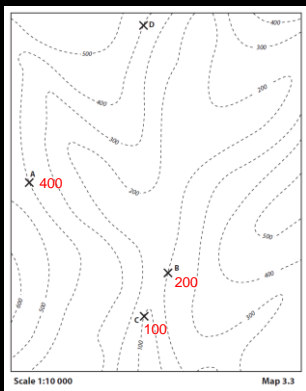
D = sandstone-
siltstone boundary



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

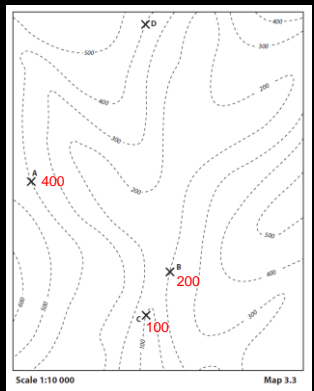
Map the outcrop of
the boundary –
How?



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

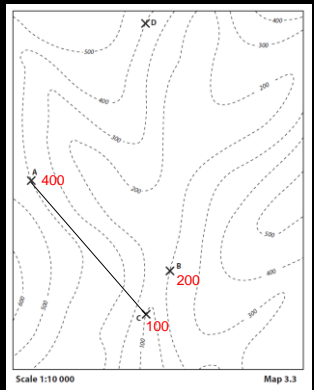
Need to work out
stratum contours



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

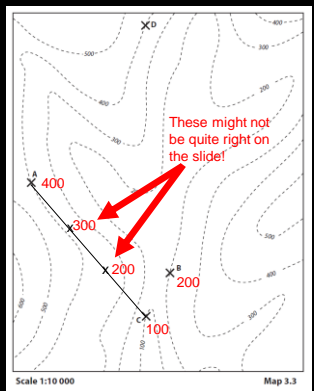
Join highest point
(A) to lowest (C)



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

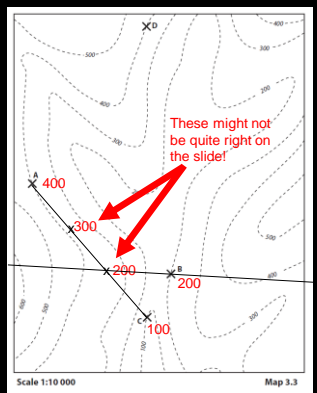
Divide line into 3
to get 200 and 300m
heights



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

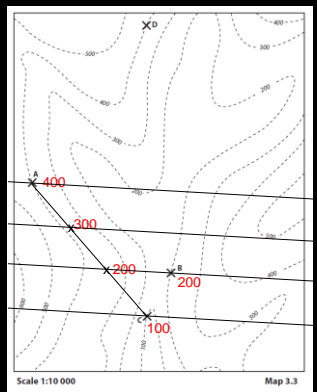
Connect 200m
points to draw first
stratum contour



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

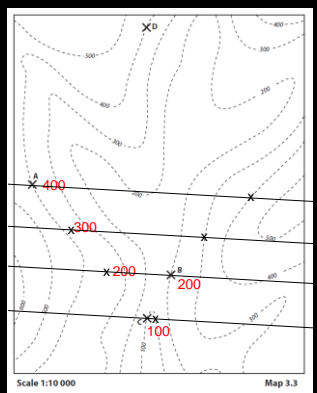
Other stratum
contour lines can
now be drawn
parallel



Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

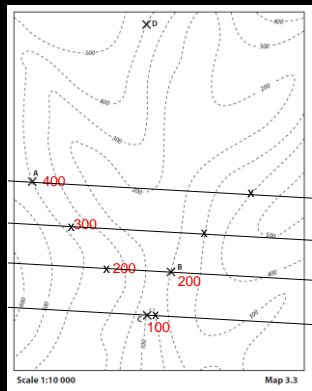
Topographic
intersections can be
marked...



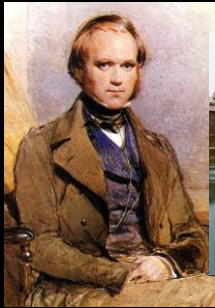
Exercise 3 – part (a)

A, B, C = siltstone-
limestone boundary

...and connected to
give the boundary
outcrop



Darwin Goes Mapping!



Geological education in the Welsh Borders

Darwin Goes Mapping!

August 1831:
Went west of
Shrewsbury



Image from Scientific
American blogpost

Darwin Goes Mapping!

December 1831:
Went a bit further!

Image from Cambridge University library



Next Week

Unconformities

More of Exercise 3!

The Evolution of Geological Mapping
Changing thinking
Changing techniques

Resources (www.fossilhub.org)

Geologizing with Darwin (Sci. Am.)

<http://blogs.scientificamerican.com/history-of-geology/2013/02/12/geologizing-with-darwin/>

Teaching Resources in Structural Geology
(University of Leeds):

<http://www.see.leeds.ac.uk/structure/learnstructure/>
