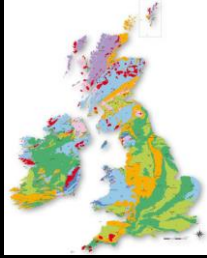


An Introduction To Geological Maps



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Week 5

Unconformities

Exercise 3 – part (c) and (d)

Evolution of Geological Mapping

Changing thinking

Changing techniques

Faults in my teaching?



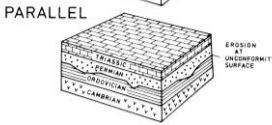
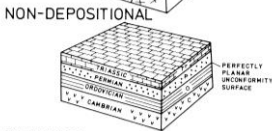
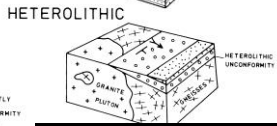
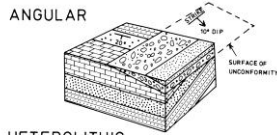
<http://www.see.leeds.ac.uk/stepup/pdfs/Introduction%20to%20maps.pdf>

Unconformities



Buried land (or seabed) surfaces

Types of unconformity



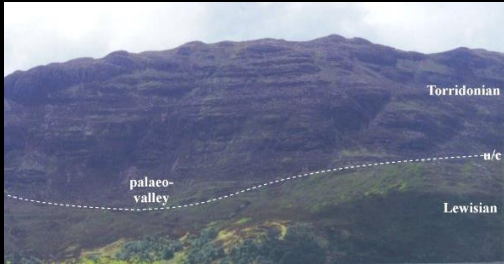
Non-depositional
a.k.a. 'Disconformity'

Angular



Siccar Point: Devonian on Silurian

Heterolithic



Assynt: Torridonian sandstone
unconformable above Lewisian gneiss

Disconformity



Cretaceous strata, Czech Republic

Unconformities on maps

Assynt

Lewisian-Torridonian U/C

Torridonian-Cambrian U/C

Tay-Forth

Silurian-Devonian U/C

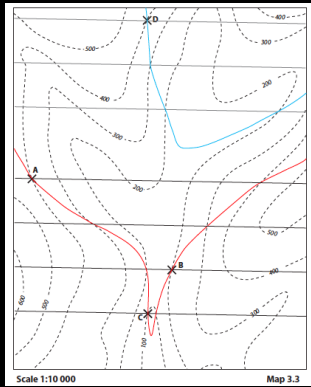
Wakefield

Lower Magnesian Limestone U/C

Exercise 3 – part (a + b)

Red = siltstone-
limestone boundary

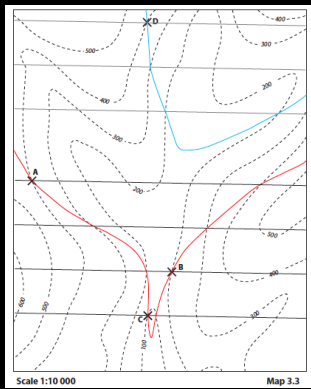
Blue = sandstone-
siltstone boundary



Exercise 3 – part (c + d)

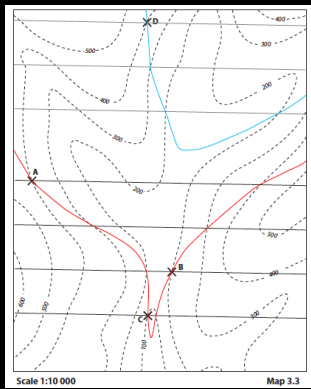
What is dip and
strike of strata?

How thick is
siltstone unit?



Exercise 3 – part (c + d)

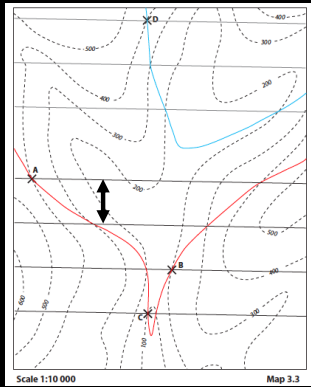
Strike ~094–274
(can be measured
off map using
compass)



Exercise 3 – part (c + d)

100m vertical
interval between
strike lines

~22.5mm = ~225m
horizontal spacing

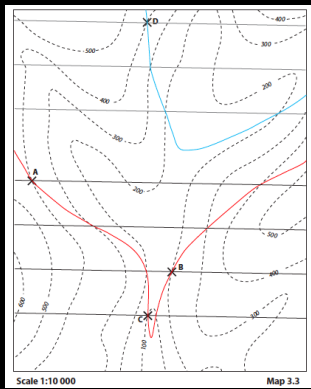


Exercise 3 – part (c + d)

Tangent of dip =
100/225

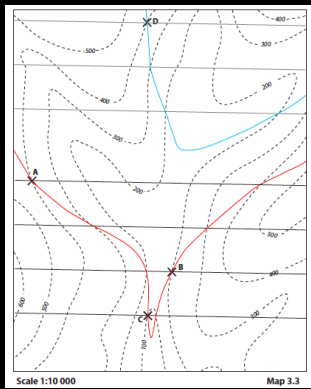
Dip = inverse
tangent of 100/225

Dip = 24° South



Exercise 3 – part (c + d)

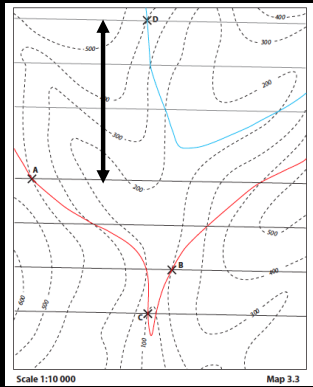
What is thickness
of siltstone unit?



Exercise 3 – part (c + d)

What is thickness
of siltstone unit?

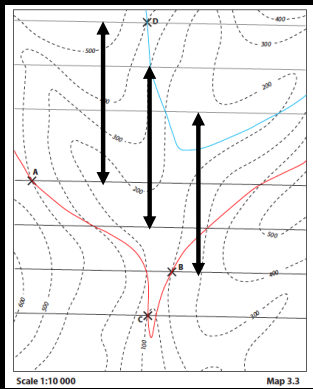
Measure horizontal
distance between
base and top of unit
at same stratum
contour height



Exercise 3 – part (c + d)

Apparent thickness:
~82.5m = ~825m

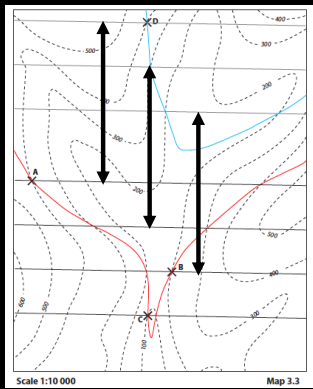
(But beds are
dipping at ~24°
South)



Exercise 3 – part (c + d)

Apparent thickness:
~82.5m = ~825m

(But beds are
dipping at ~24°
South)

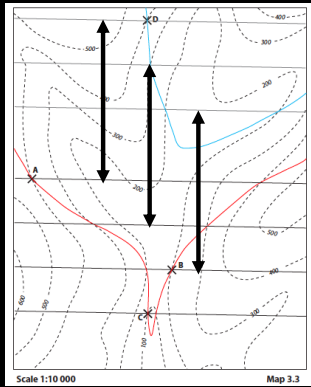


Exercise 3 –
part (c + d)

$$\sin 24 = x / 825$$

$$X = 825 \sin 24$$

$$X = 336 \text{ m thick}$$



Evolving geological maps

Increasing coverage

Maps That Changed The World

Increasing understanding

The Highlands Controversy

Increasing techniques

New technology

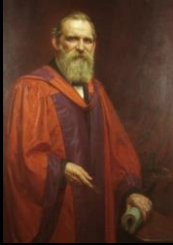
More data



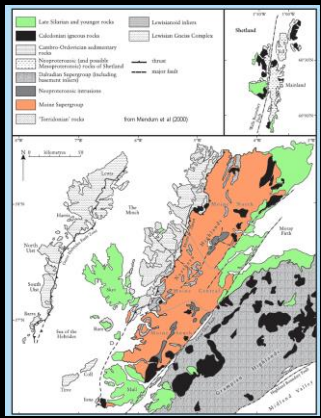
William Smith



Better understanding



Charles Lapworth



New techniques

Geophysics

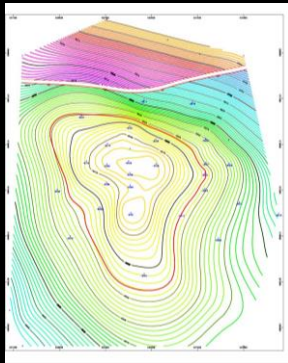
New data sources

Satellites

Greater precision

Digital technology

Rapid, high-resolution surveys



Next Week

(Peer observation)

Igneous Rocks

Exercise 4!

Solid & Drift

Mapping bedrock vs superficial geology

Resources (www.fossilhub.org)

An Introduction to Geological Mapping:

<http://www.see.leeds.ac.uk/stepup/pdfs/Introduction%20to%20maps.pdf>

The making of Siccar Point:

<http://all-geo.org/highlyallochthonous/2011/01/the-making-of-an-angular-unconformity-huttons-unconformity-at-siccar-point/>

Digital technology & geological mapping:

http://www.utdallas.edu/~aiken/LASERCLASS/KM_digitalmapping.pdf
