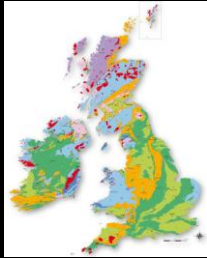


An Introduction To Geological Maps



Dr Liam Herringshaw: lgh865@hotmail.com

Week 6

Recap from last week
Evolving geological maps

Igneous Rocks
Mapping bedrock vs superficial geology

Exercise 4!

Unconformities



Any questions from last week?

Evolving geological maps

Increasing coverage

Increasing understanding

Increasing techniques

Since 1815...

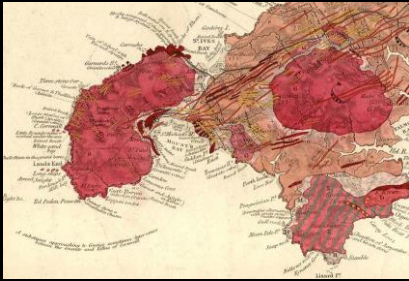


William Smith



G. B. Greenough (1819)

"beautifully draughted and engraved, but in terms of its geological content and accuracy...by no means superior to Smith's"



St Ives



Scottish struggles

Murchison's stratigraphic sequence
rocks get younger from West to East

West East

Murchison's major mistake

Scottish struggles

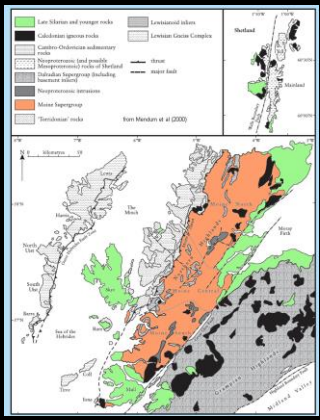
http://www.see.leeds.ac.uk/structure/assyntgeology/maps/history/geikie_1876.htm

Geikie's 1876 Map of Scotland

Better understanding



Charles Lapworth



New techniques

Geophysics

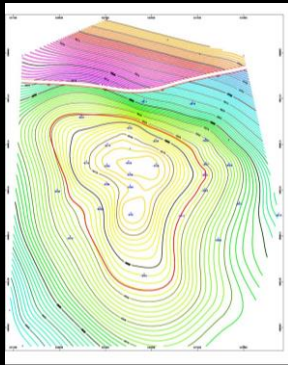
New data sources

Satellites

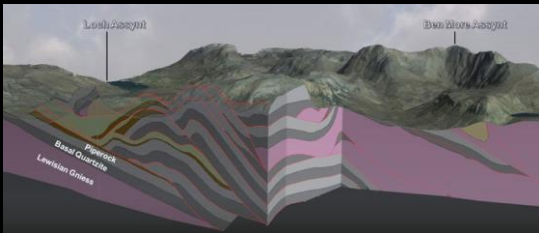
Greater precision

Digital technology

Rapid, high-resolution surveys



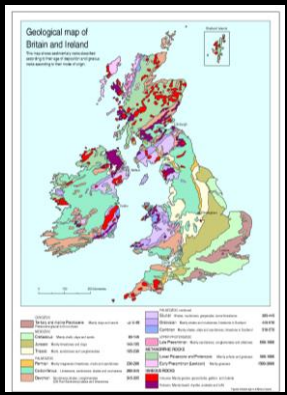
The Assynt Culmination (BGS)



<http://www.bgs.ac.uk/research/ukgeology/assyntCulmination.html>

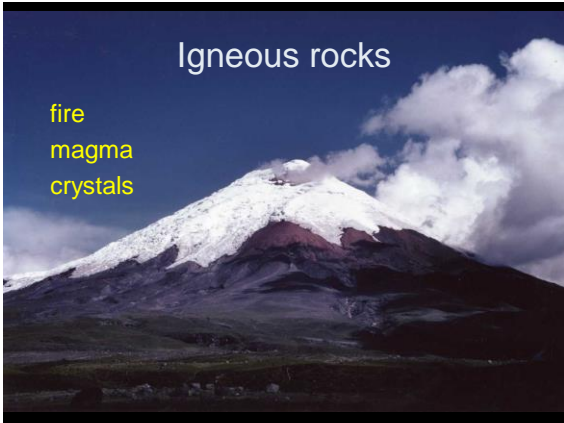
Igneous rocks

Magmatic mapping



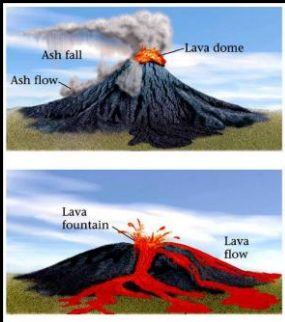
Igneous rocks

fire
magma
crystals

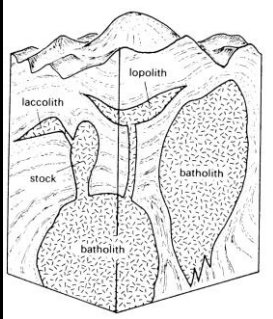


Extrusive igneous rocks

Volcanic
Lava / ash
Gassy
Fine-grained

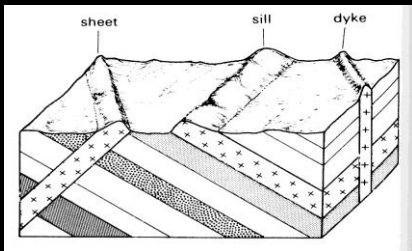


Intrusive igneous rocks



Cooled at depth
Coarse-grained

Hypabyssal igneous rocks



Sills / dykes
Medium-grained

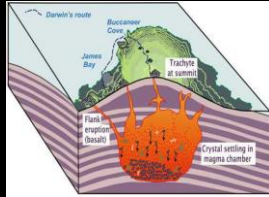
Textures and temperature

Fine-grained = fast-cooled

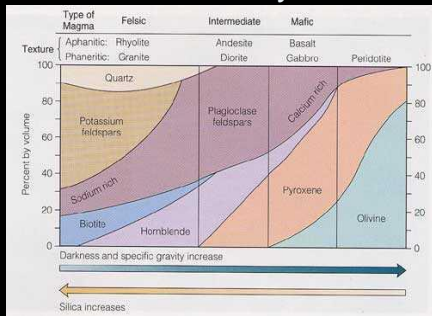


Textures and temperature

Coarse-grained = slow-cooled



Chemistry



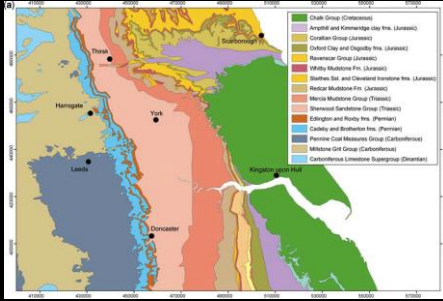
Felsic – Intermediate – Mafic – Ultramafic

Solid & Drift



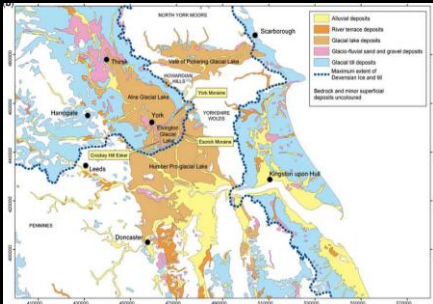
Mapping bedrock vs superficial geology

NEXTMap – Vale of York



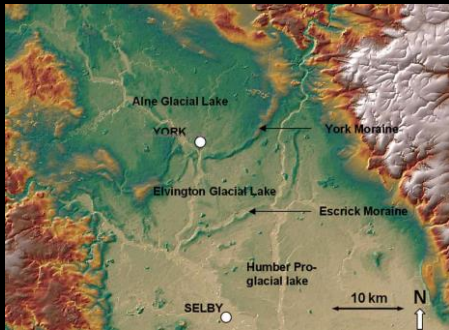
<http://nora.nerc.ac.uk/12805/>

NEXTMap – Vale of York



<http://nora.nerc.ac.uk/12805/>

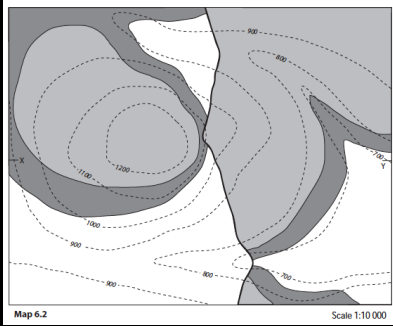
Digital Terrain mapping



<http://nora.nerc.ac.uk/12805/>

Exercise 4 – part (a + b)

Construct
stratum
contours
for beds
and fault



Next Week

Metamorphism and cleavage



Resources (www.fossilhub.org)

NEXtMap – Vale of York:

<http://nora.nerc.ac.uk/12805/>

MacCulloch's magnificent map

<http://www.newscientist.com/article/mg19526142.000-second-sight-an-early-geological-map-of-scotland.html>

Lapworth's map worth:

<http://www.birmingham.ac.uk/facilities/lapworth-museum/collections/maps/index.aspx>
