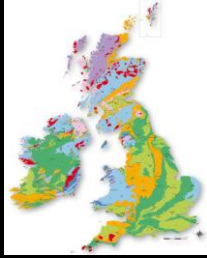


# An Introduction To Geological Maps



Dr Liam Herringshaw: [lgh865@hotmail.com](mailto:lgh865@hotmail.com)

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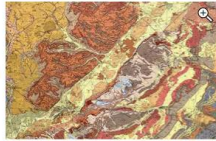
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## New!

### BGS maps portal — maps and sections 1832 to 2014

#### Free online viewing of over 6000 BGS maps and sections

This resource provides high resolution viewing images of almost all small and medium scale maps produced by the British Geological Survey since mapping started in 1832. It includes the key 1:63 360/1:50 000 maps of England and Wales and of Scotland. For users who just want to consult the latest editions of the 1:63 360/1:50 000 maps 'Quick links' have been provided below.



The BGS maps portal incorporates all the earlier maps and history pages that were previously made available through the BGS 'Historical maps of the Geological Survey of Great Britain and Ireland' web resource.

Click image to view the Nottingham sheet, Geological Survey of England and Wales, 1:63 360/1:50 000 geological map series, New Series

#### BGS Maps Portal:

<http://bgs.ac.uk/data/maps/home.html>

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## Week 2

### Introduction (cont'd)

### Uniformly dipping strata

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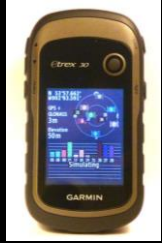
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# How to map?

## The mapper's tool kit



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# Map terminology

## Geological Map Symbols

- Inclined stress, dip in degrees
- horizontal stress
- vertical stress
- axial surface trace of anticline
- axial surface trace of syncline
- fold hinge line, fold axis or other linear structures, plunge in degrees
- inclined cleavage, dip in degrees
- horizontal cleavage
- vertical cleavage
- geological boundary
- fault line, mark on downthrown side
- younging direction of beds
- metamorphic aureole

Requires a brief introduction to geology...

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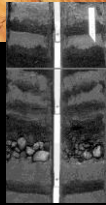
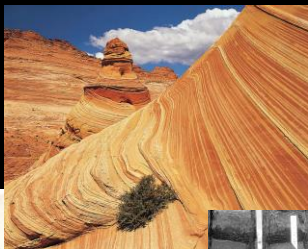
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# Geology



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## Strata



Stacked layers of (sedimentary) rock

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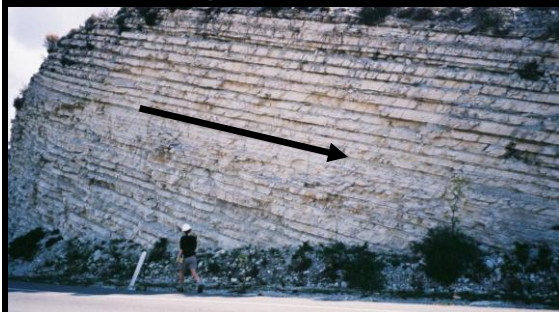
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## Dip and Strike



Strata tilted by tectonic forces

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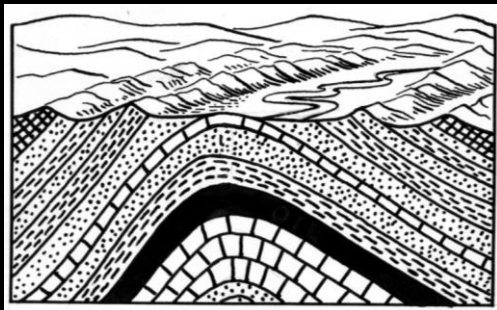
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## Folding: Antiforms & Synforms



Strata deformed by tectonic forces

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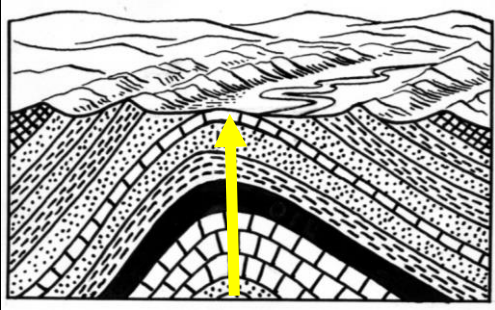
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## Younging direction



Are the oldest beds at the bottom?

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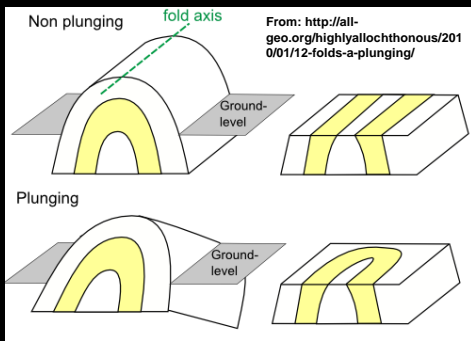
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## Folding: Hinges & Plunges



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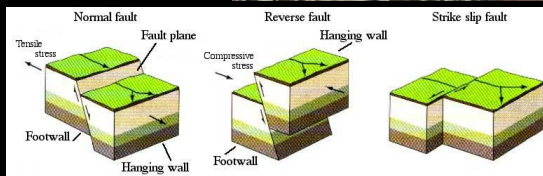
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## Faulting

Rupturing of strata by tectonic forces



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## Cleavage

Planes of weakness formed by metamorphism

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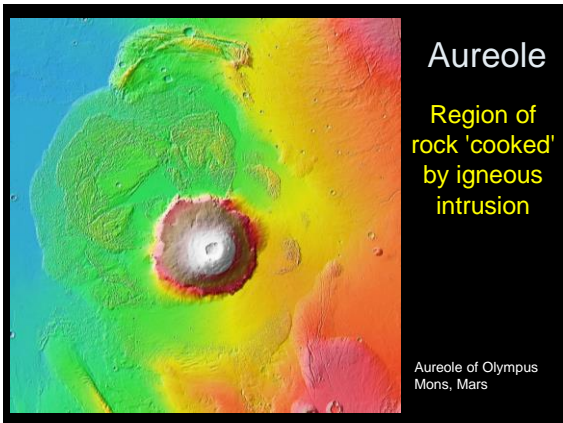
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## Aureole

Region of rock 'cooked' by igneous intrusion

Aureole of Olympus Mons, Mars

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## Terminology

**Geological Map Symbols**

	inclined strata, dip in degrees
	horizontal strata
	vertical strata
	axial surface trace of anticline
	axial surface trace of syncline
	fold hinge line, fold axis or other linear structure, plunge in degrees
	inclined cleavage, dip in degrees
	horizontal cleavage
	vertical cleavage
	geological boundary
	fault line, mark on downthrow side
	sampling direction of beds
	metamorphic aureole

**Complete BGS Guide to map symbols can be downloaded here:**

<http://www.bgs.ac.uk/downloads/start.cfm?id=303>

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## Mappable geological structures

1. Sedimentary deposits/erosion
2. Igneous intrusions
3. Igneous extrusions
4. Deformation (metamorphism)

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## Deposition/erosion

Unconformity



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## Igneous intrusion

Whin Sill, Northumberland



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## Igneous extrusion

### Giant's Causeway, Antrim



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## Deformation / metamorphism



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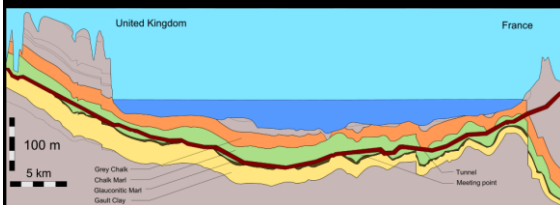
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## The importance of cross-sections



Crucial in showing structures  
(but often have to be vertically exaggerated)

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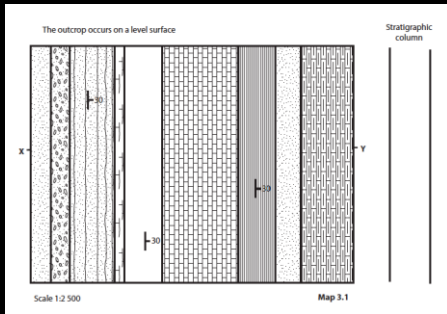
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## Ex. 1: Uniformly dipping strata



Rocks inclined in one plane at 30 degrees

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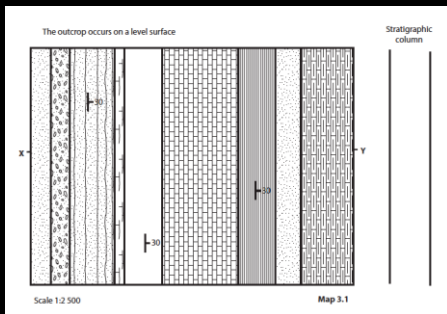
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## Ex. 1: Uniformly dipping strata



True thickness vs apparent thickness

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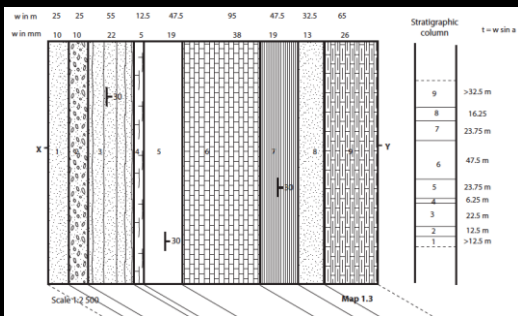
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## Ex. 1: Solution



True thickness vs apparent thickness

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Next week:  
Mapping folded strata



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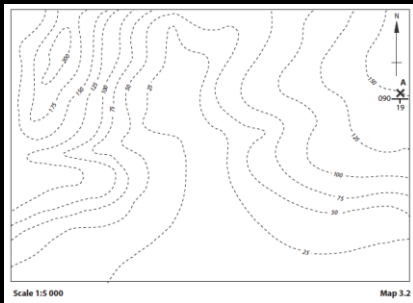
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Next week: Exercise 2



Stratum contours vs Topographic contours

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Resources ([www.fossilhub.org](http://www.fossilhub.org))

New! BGS Maps Portal:

<http://bgs.ac.uk/data/maps/home.html>

Why Do People Love OS Maps?

<http://www.bbc.co.uk/news/blogs-magazine-monitor-29524842>

100 Great UK Geosites:

<http://www.geolsoc.org.uk/100geosites>

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