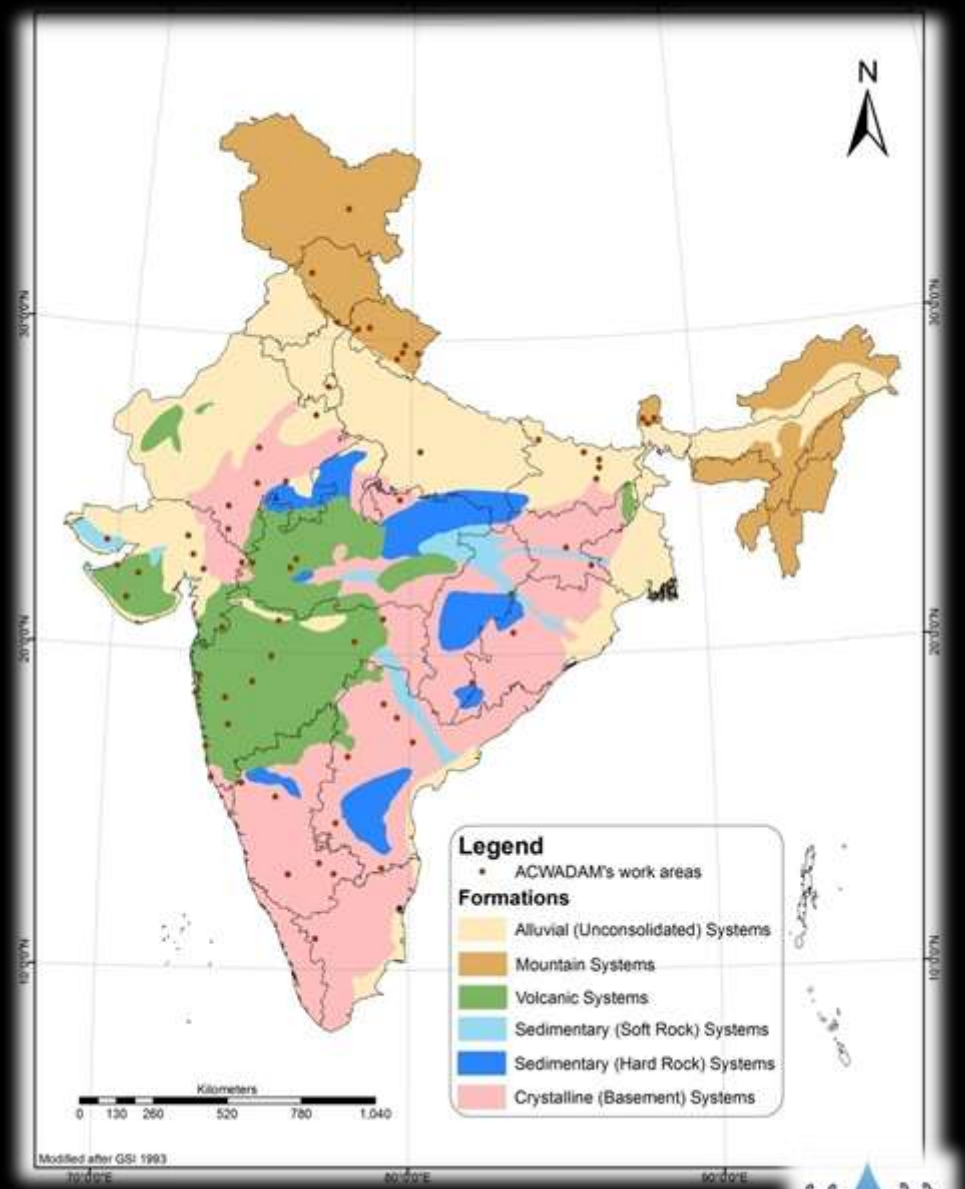
Maps and Mapping



A map

-is a 2-dimensional representation of a 3 -dimension

3D

-selective, symbolised and generalised graphical representation of a whole or a part of the earth's surface on a plane surface at a definite scale

2D

A map: basic requirements

- SCALE

- REFERENCE

-LEGEND

Scale

-Relationship between objects on the map with those on ground

- 3 basic types of representation

  -Verbal scale

  -Graphic scale

  -Fractional scale(RF)

Scale

- **Verbal scale**

To express distance as a statement, such as "one centimeter is equal to one kilometer,"

- **Graphic scale**

Consist of a line that represents a certain distance,
such as 5 km or 5 miles. The line is labeled, and then broken down into sections

- **Fractional scale**

It shows how much the real world is reduced to fit on the map

1:50,000

Latitude and Longitude

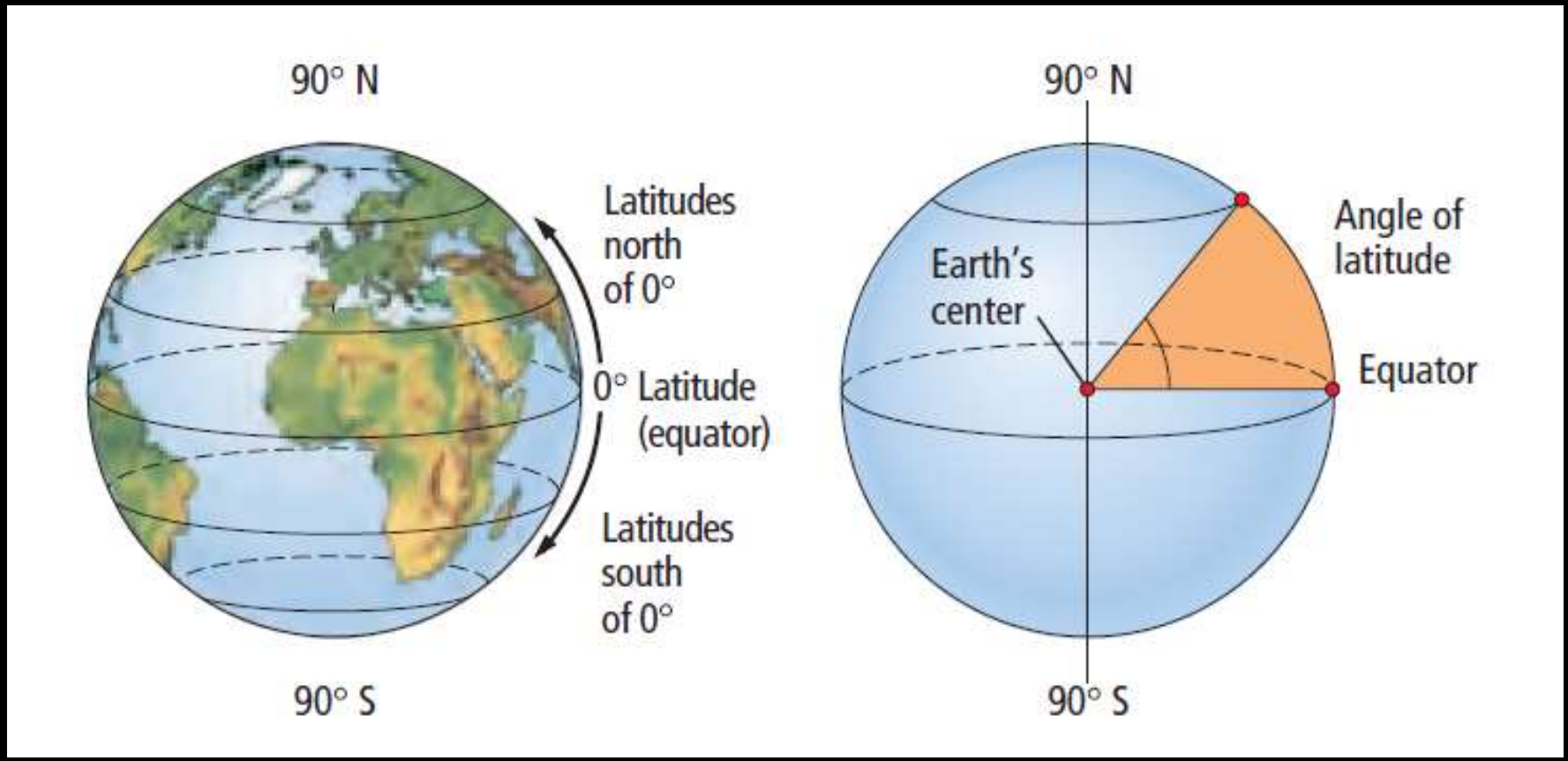
Latitude

An imaginary grid of parallel lines is used to locate exact points on Earth. In this grid, the equator horizontally circles Earth halfway between the north and south poles.

The equator separates Earth into two equal halves called the northern hemisphere and the southern hemisphere.

Lines on a map running parallel to the equator are called lines of latitude

The value in degrees of each line of latitude is determined by measuring the imaginary angle created between the equator, the center of Earth, and the line of latitude as seen in the globe on the right



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Longitude

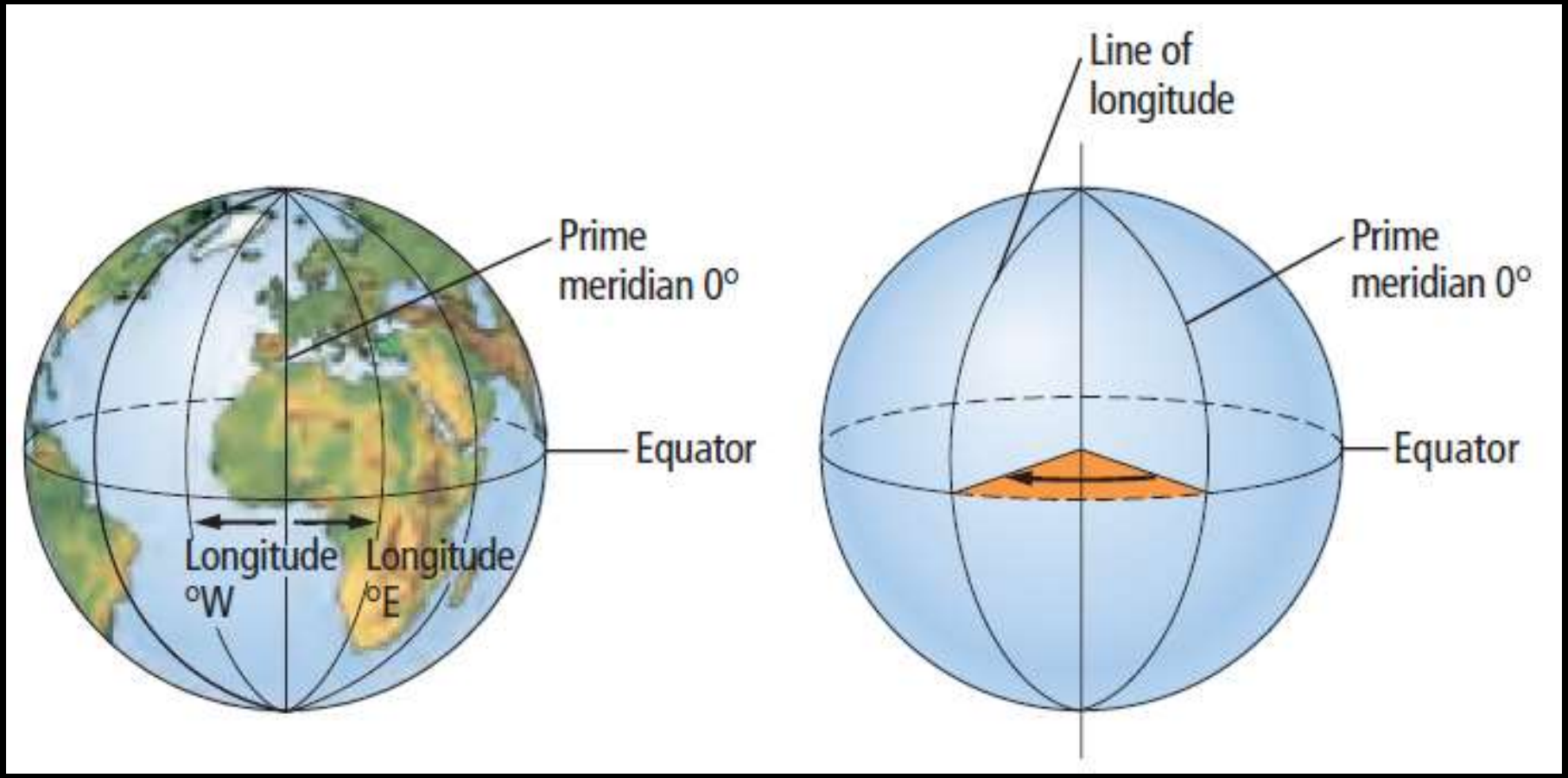
To locate positions in east and west directions, cartographers use lines of longitude, also known as meridians.

Longitude is the distance in degrees east or west of the prime meridian, which is the reference point for longitude.

The prime meridian represents 0° longitude.

Points west of the prime meridian are numbered from 0° to 180° west longitude (W); points east of the prime meridian are numbered from 0° to 180° east longitude (E).

Longitude



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Using Latitude and Longitude

www.glencoe.com

Classification of Maps

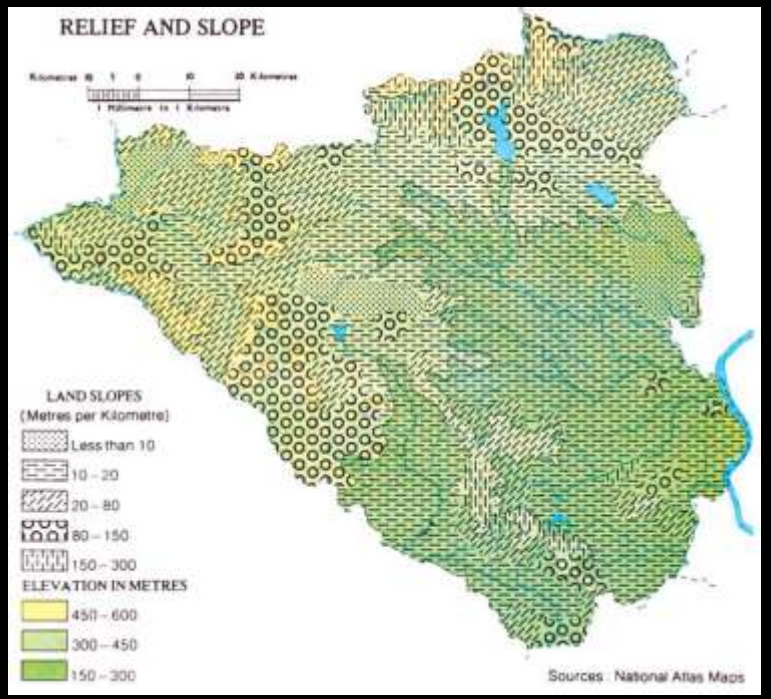
-On the basis of scale

- Cadastral Map
- Topographical Map
- Wall Maps
- Atlas Map

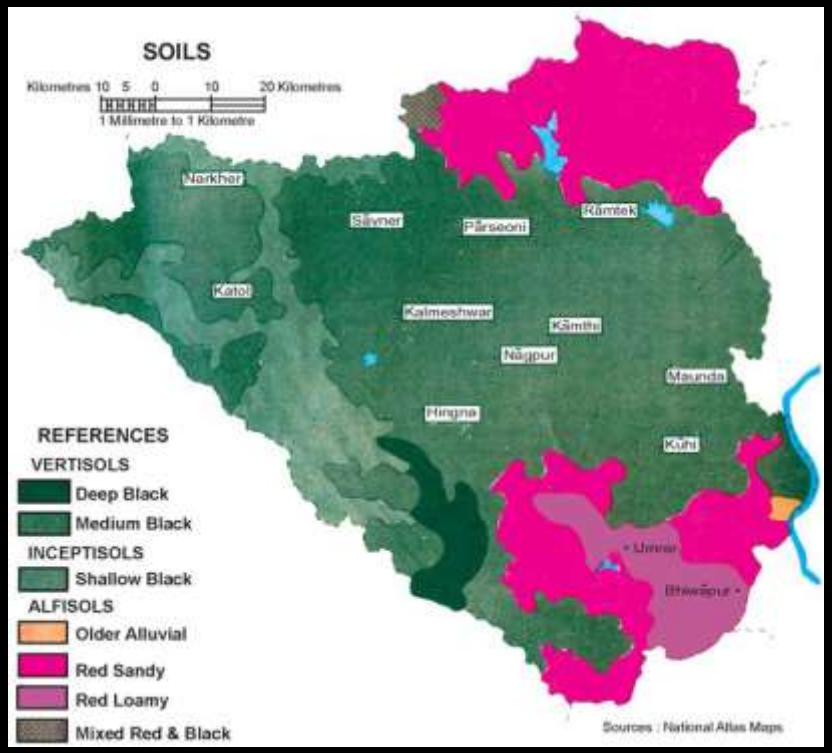
-On the basis of content and purpose

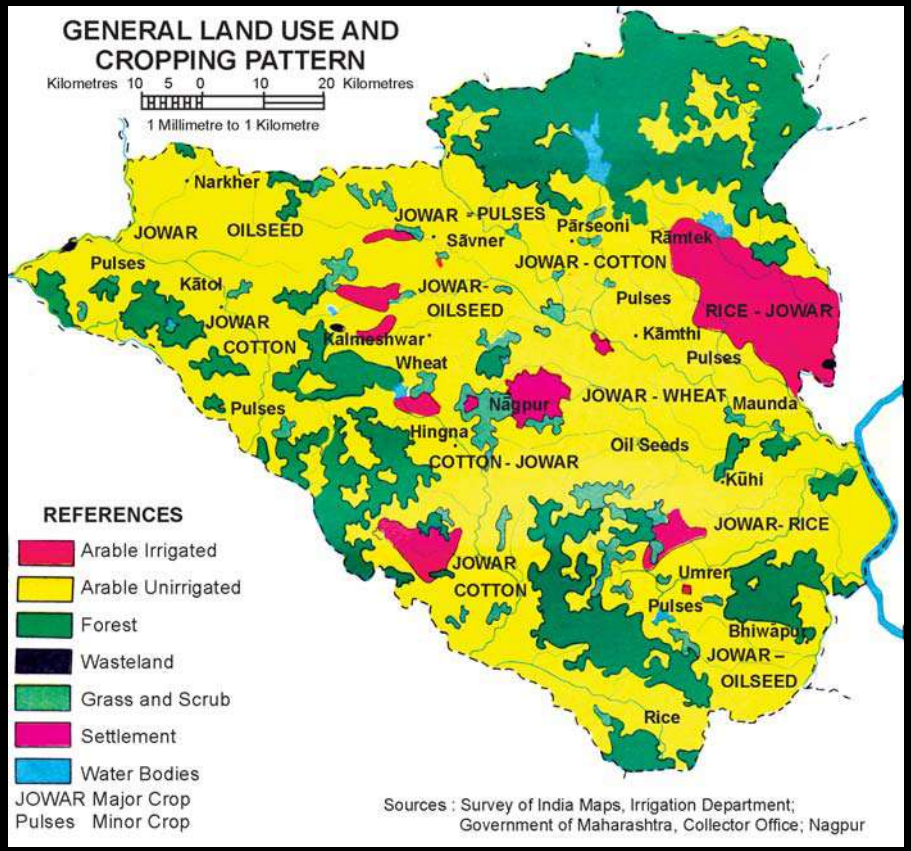
- Agriculture Map
- Population Map
- Climatic Maps

Types of maps



Types of maps





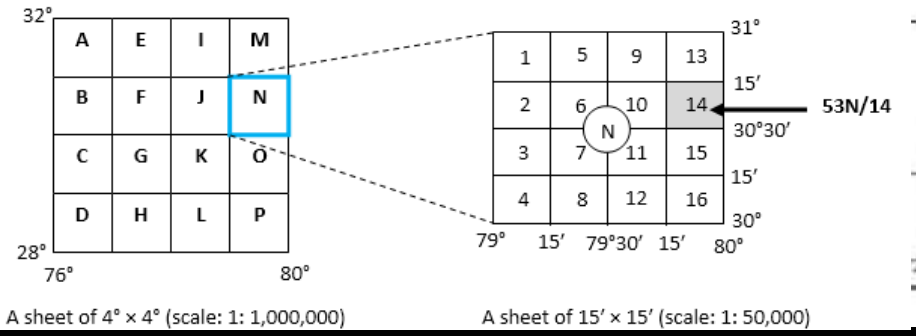
Toposheet

-1: 10,00,000

- 1: 2,50,000

- 1: 50,000

- 1: 25,000



A sheet of 4° × 4° (scale: 1: 1,000,000)

A sheet of 15′ × 15′ (scale: 1: 50,000)

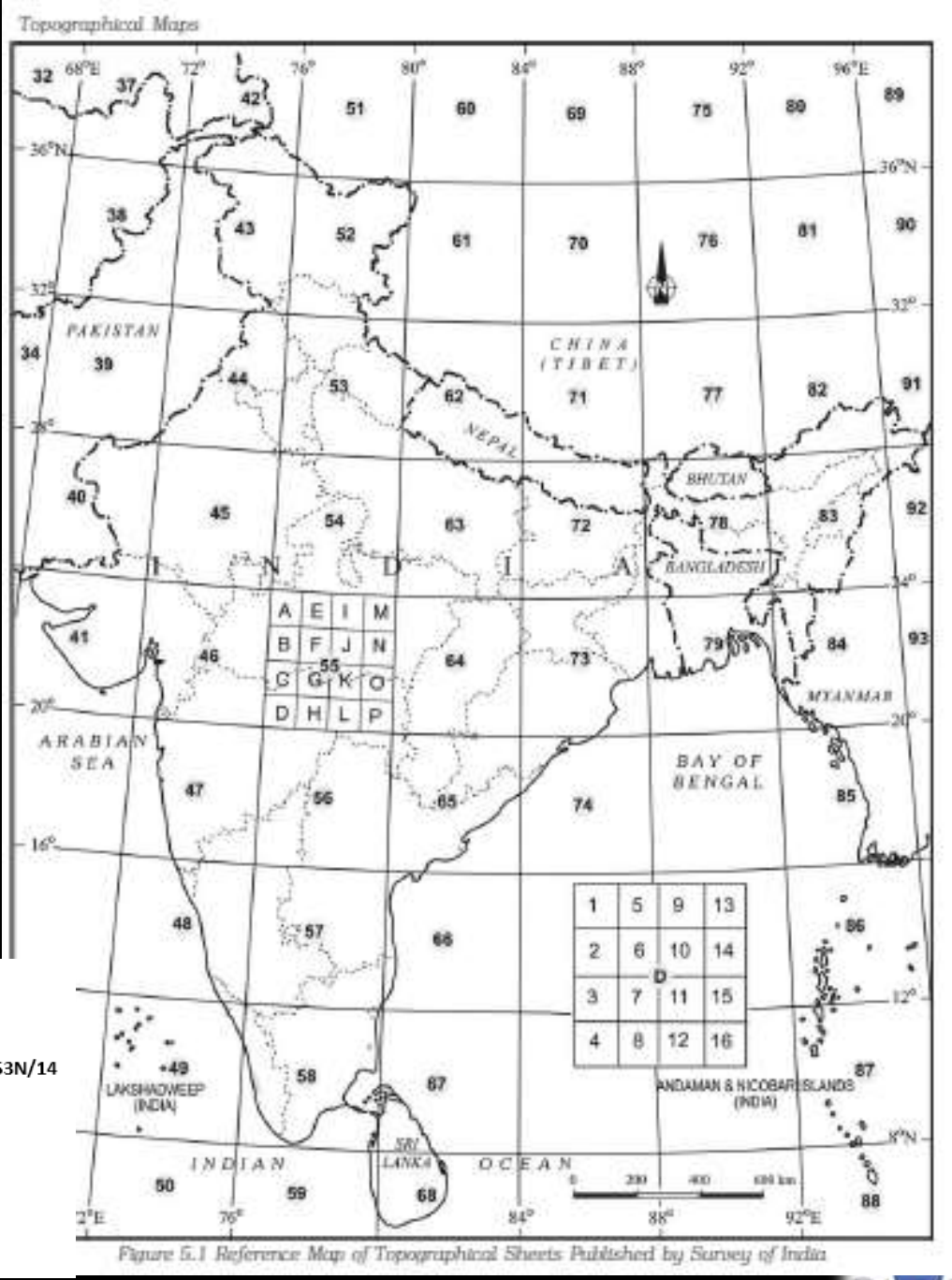


Figure 5.1 Reference Map of Topographical Sheets Published by Survey of India

Map Projections

-Classification of Projections

- Nature of developable surface- Plane/Zenithal , Cylindrical, Conical
- Properties of projections-Correctness of area, shape, bearing, scale: Equal area, True shape, Azimuth, Equidistant
- Method of construction-Perspective and Non Perspective
- Location of source of light in globe- Gnomonic, Stereographic, Orthographic

Enlargement or Reduction of Map

-Methods

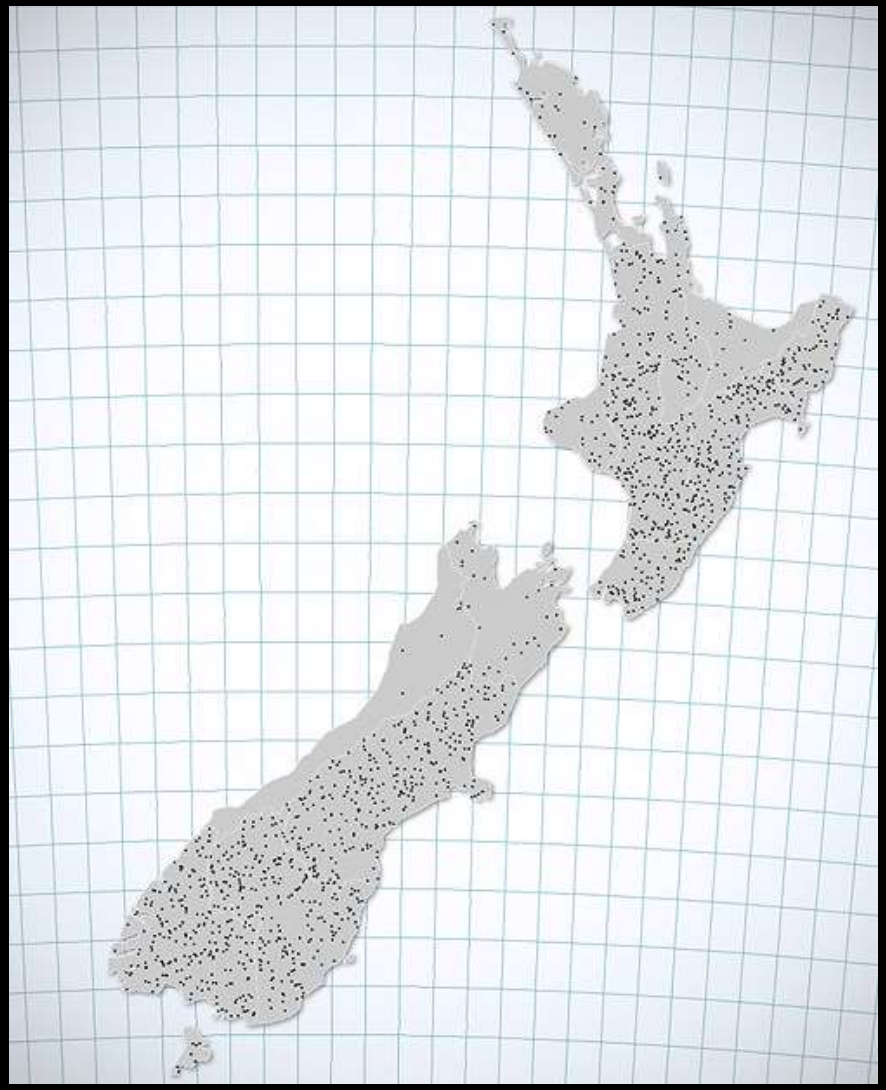
- Square Method- Original map is divided into squares. Another map is drawn with enlarged or reduced scale of squares but with same number of squares. Former map is transferred to new map with change in scale.

- Triangle Method- Enlargement or reduction of scales is done with the help of triangles instead of squares.

- Instrumental Methods- Proportional compasses, Eidograph, camera Lucida, Photostat, etc.

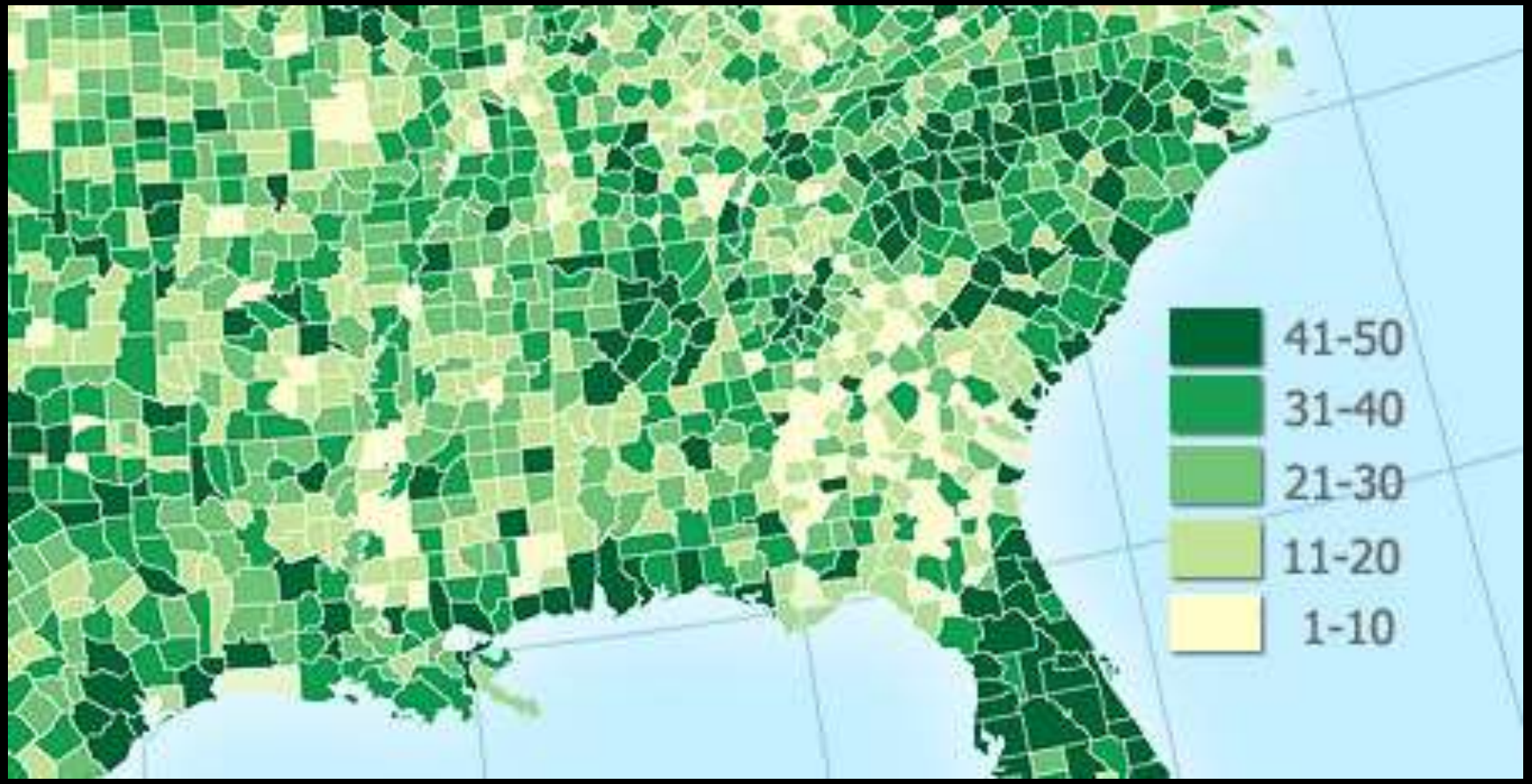
Nature of Information and Technique of Mapping

-Dot Map

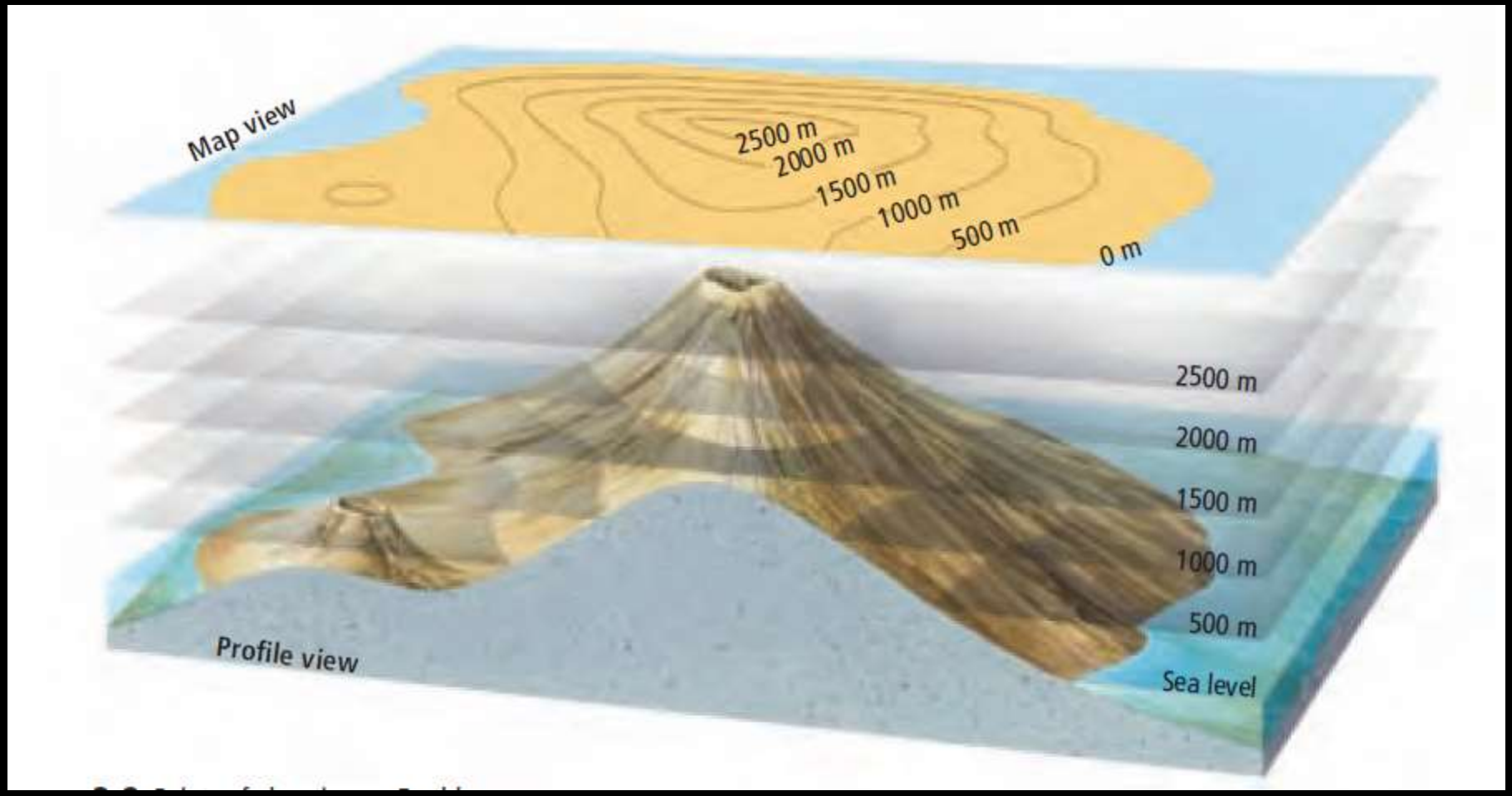


http://indiemapper.com/

-Choropleth Map



Isopleth Map\ Contours



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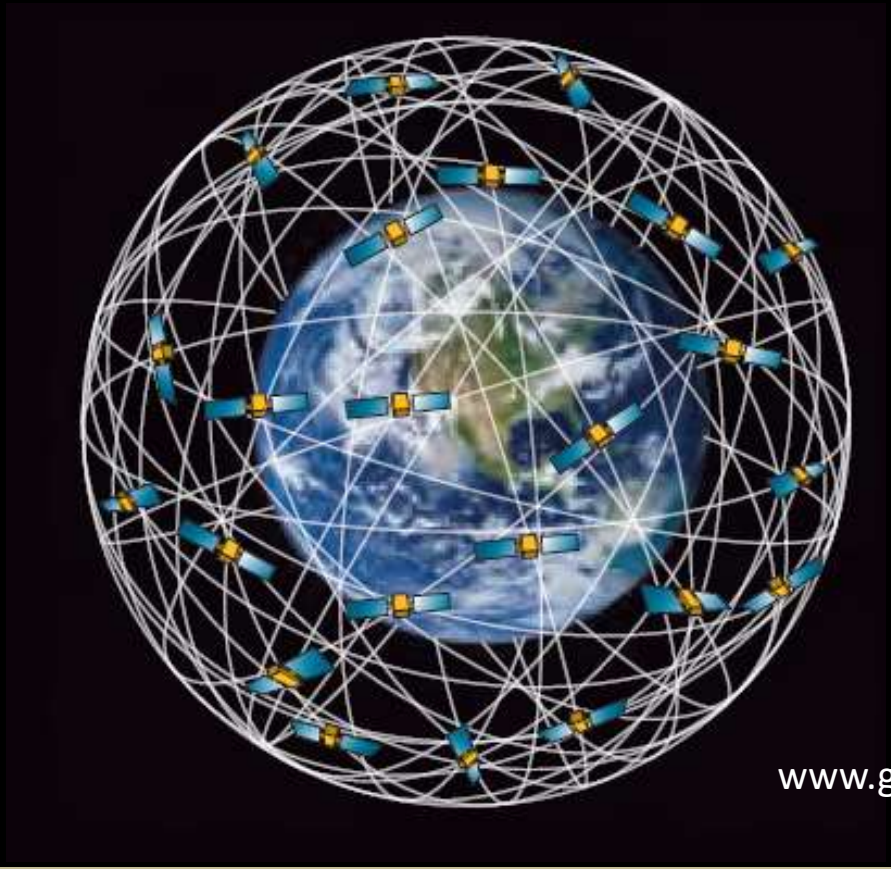
Global Positioning System

The Global Positioning System (GPS) is a satellite navigation system that allows users to locate their approximate position on Earth. There are 24 satellites orbiting Earth.



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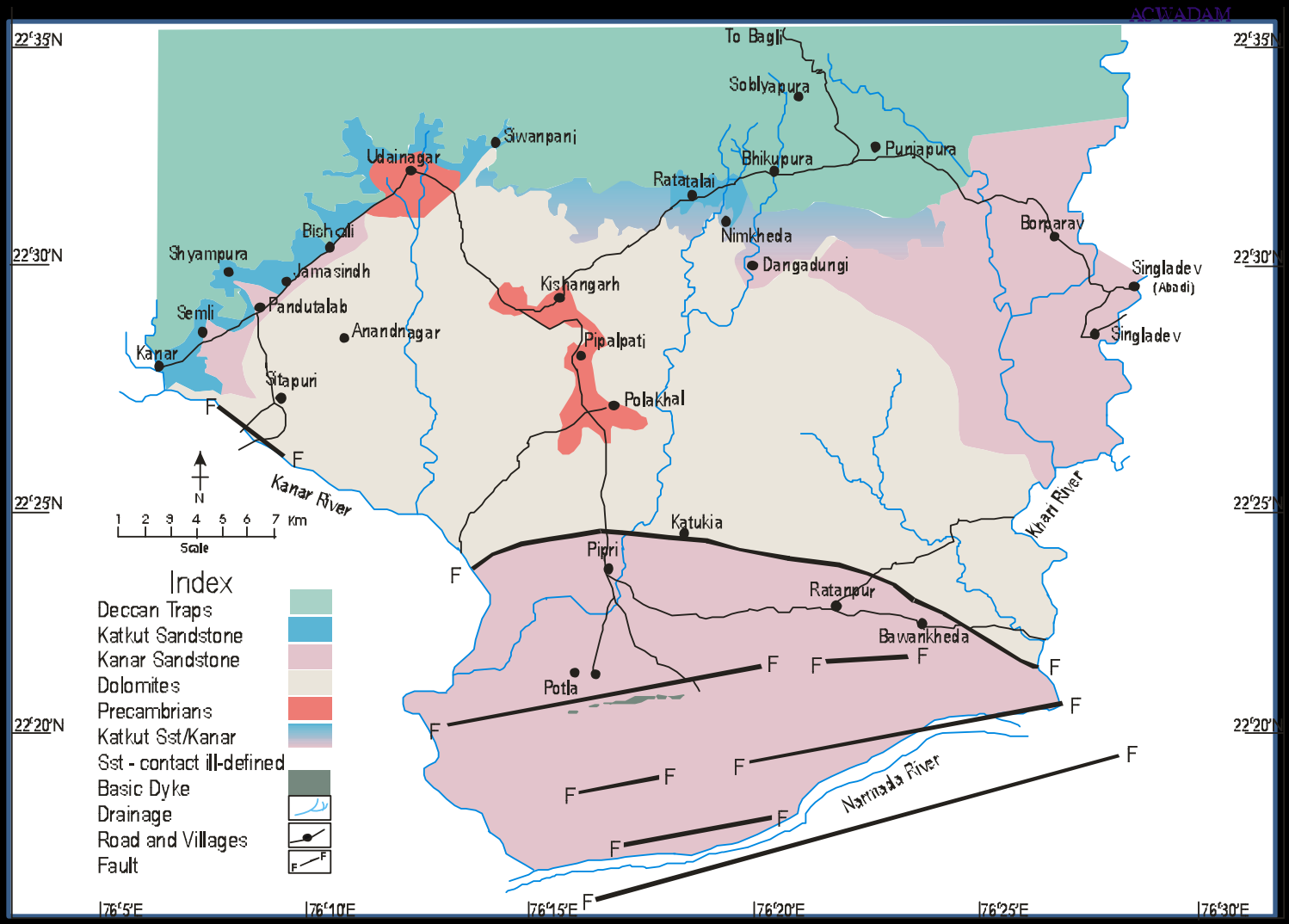
Geological mapping



Types of rocks

Igneous Rocks

THE BURNT ROCKS

- Igneous means of fire.
- They are formed of magma or lava.
- The cooling of magma under the surface gives Intrusive Igneous Rocks.
- The cooling of lava on the surface gives Extrusive Igneous Rocks.

Sedimentary Rocks

THE BEDDED ROCKS

Rocks formed by processes that cause material to …

- Settle
- Accumulate
- Precipitate

Metamorphic Rocks

THE DIFFERENTIATED ROCKS

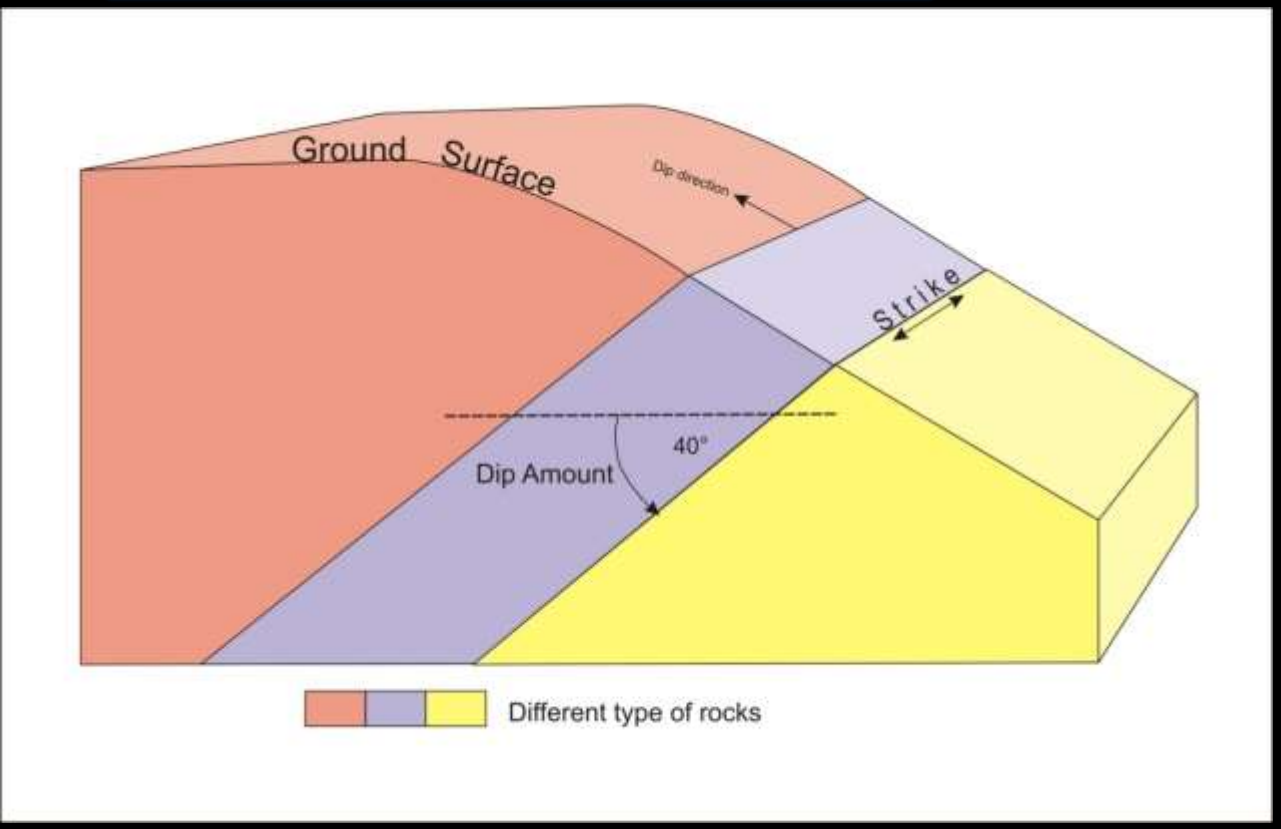
Change in form.
Caused by Temperature, Pressure or Solution.

Usually the rocks become harder and more compact due to metamorphism.

Realignment of grains along the weak planes.

Base Map

Trends : Strike and Dip



In geology there is a way of orienting the rock formations such that they can be visualized in a horizontal as well as a vertical frame of reference.

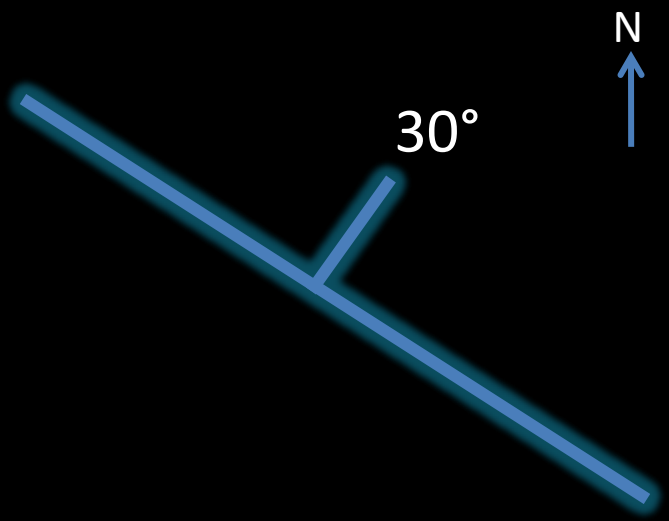
The measurement of rock unit orientation is called its ***attitude***.

Strike --Measurement of horizontal attitude in relation to true north on a map.

Dip - Measurement of vertical attitude as unit trends into the earth.

Strike and Dip of ……

- Rocks
- Bedding planes
- Fractures
- Joints
- Faults
- Foliation
- Dyke
- Folds



Strike and Dip

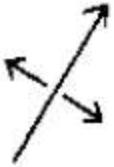
Vertical layers

Strike and slip of overturned strata

Horizontal layers

Axis of an antiform or anticline

Axis of a synform or syncline



Axis of a plunging antiform or anticline

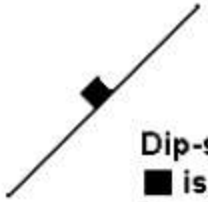
Axis of a plunging synform or syncline

Lateral or strike-slip fault
Arrows indicate relative movement

High angle fault.
U=uptrown block
D=downtrown block

Reverse fault.
Teeth are in the side of the hanging wall (upper block)

Contacts
(solid) known contact
(dotted) approximated contact (infered)



Dip-slip fault.
■ is on the hanging wall

SYMBOLS

Igneous Rocks

Basalts

- Contacts
- Dykes
- Joints

Igneous Rocks

Granite

- Felspathic/Mica rich
- Weathered zone
- Fractures

Sedimentary Rocks

Sandstone

- Bedding
- Dip
- Fractures

Sedimentary Rocks

Shale

- Lamination
- Dip

Sedimentary Rocks

Limestone

- Texture
- Karst (sink holes)

Metamorphic Rocks

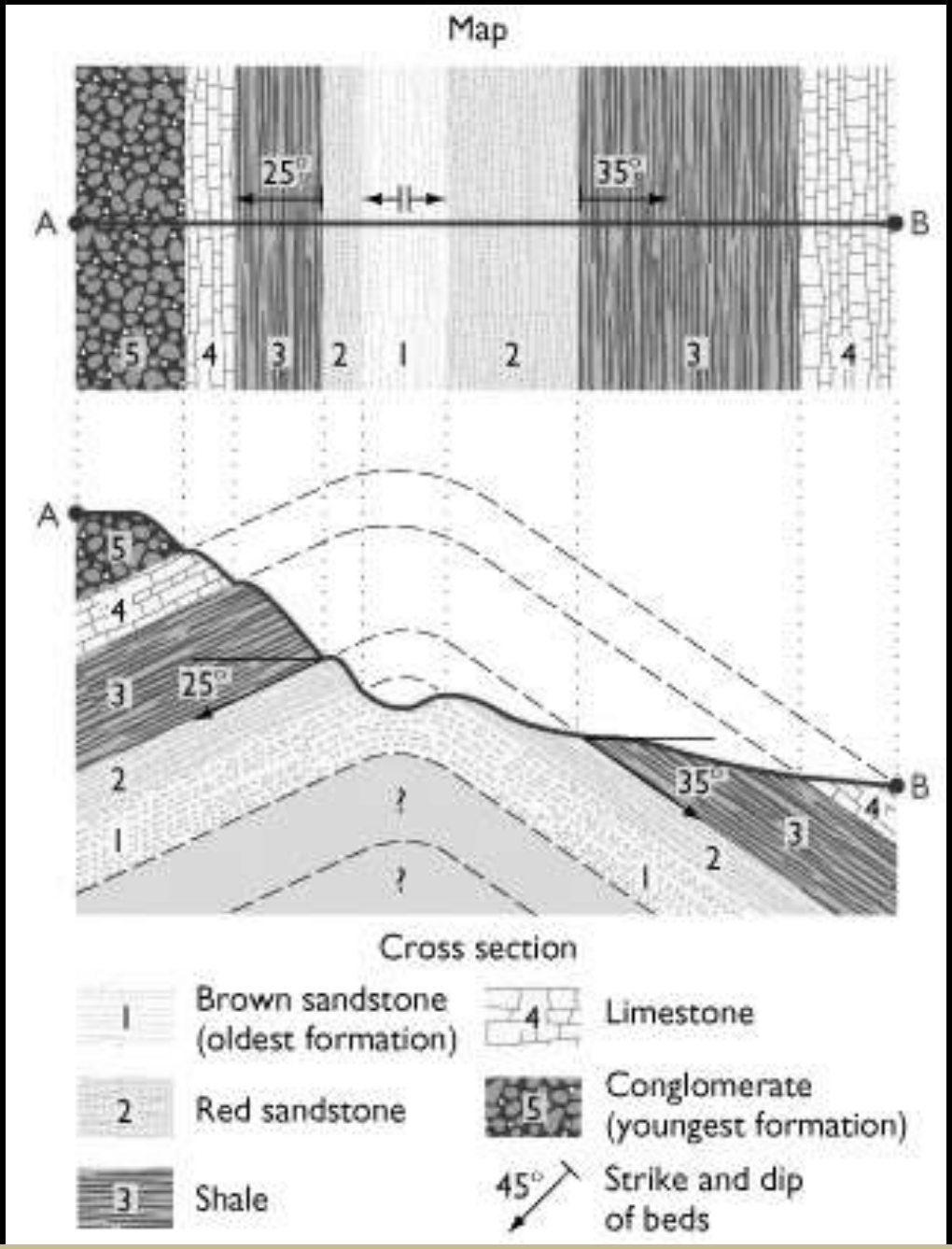
Gneiss, Schist

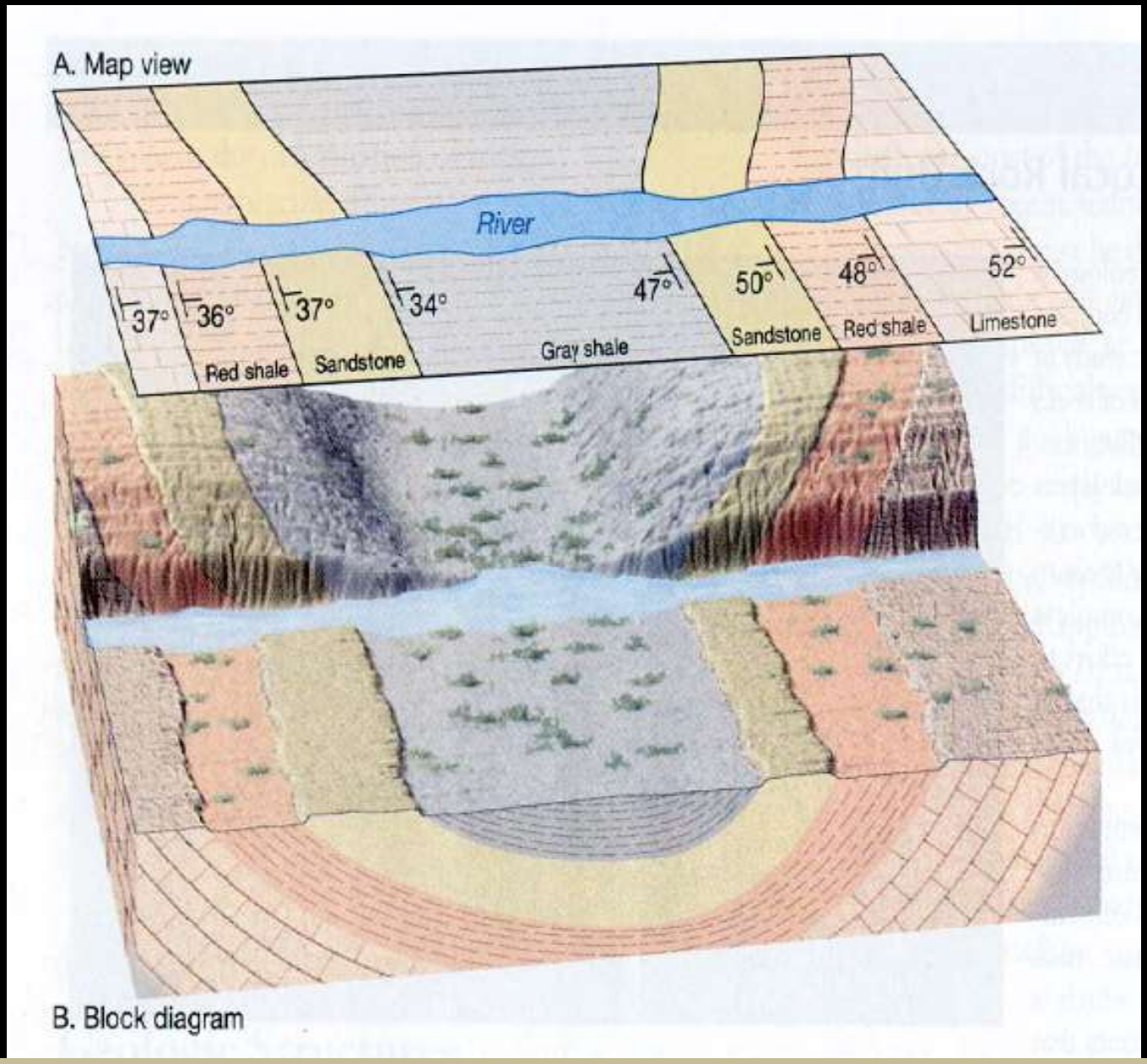
- Foliation
- Mica and Quartz bands

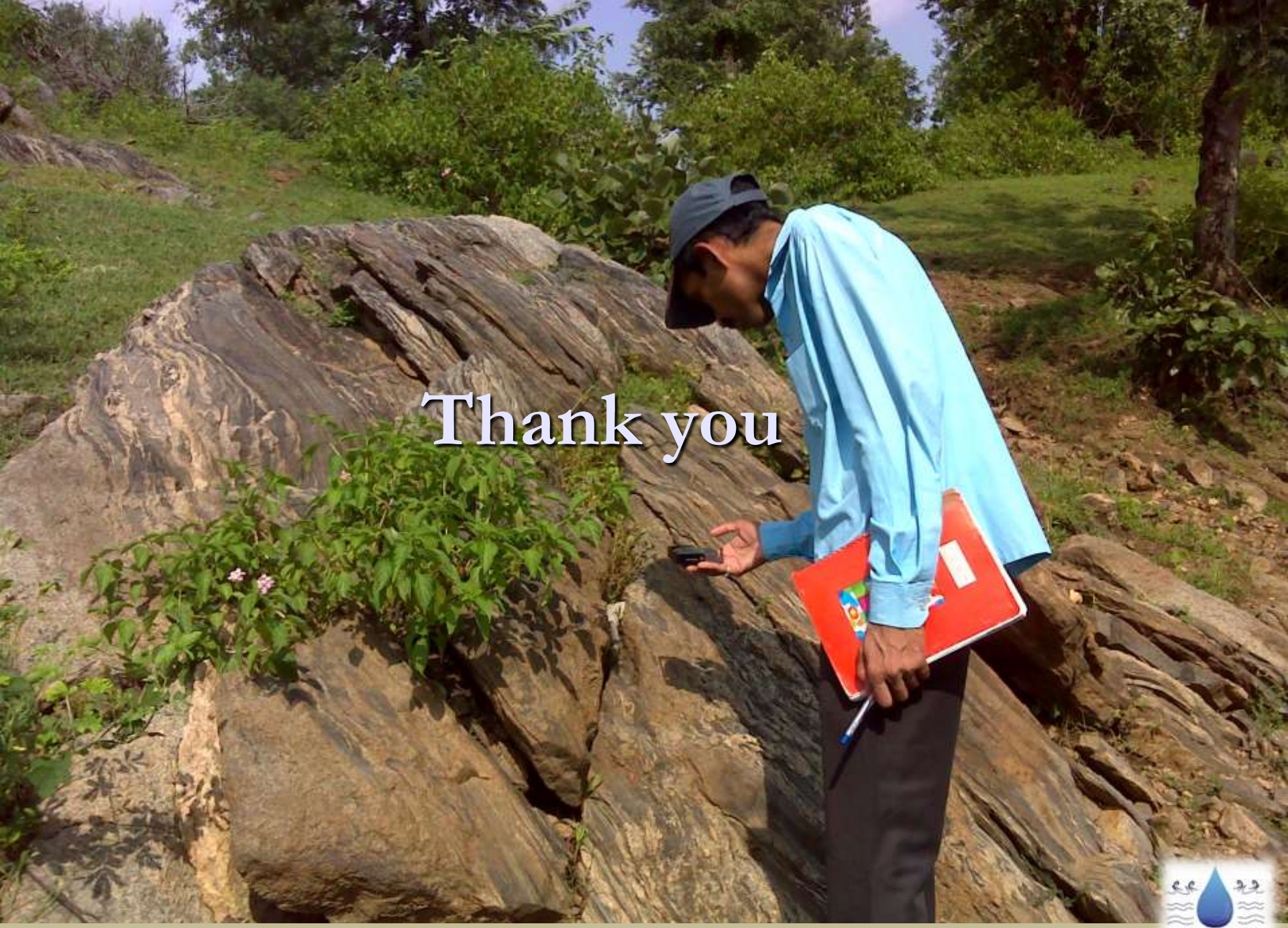
Metamorphic Rocks

Quartzite

- Bedding
- Fractures


Map
A
B
25°
35°
5
4
3
2
1
2
3
4
A
B
5
4
3
25°
2
1
?
?
1
2
35°
4
3
Cross section
1 Brown sandstone (oldest formation)
2 Red sandstone
3 Shale
4 Limestone
5 Conglomerate (youngest formation)
45° Strike and dip of beds


A. Map view
River
37°
36°
37°
34°
47°
50°
48°
52°
Red shale
Sandstone
Gray shale
Sandstone
Red shale
Limestone
B. Block diagram


Thank you