

Kober's View on Mountain Building

MOUNTAIN

- A mountain is a large land form that rise above the surrounding land in a limited area, usually in the form of a peak. A mountain is generally steeper than a hill. Mountains are formed through tectonic forces or volcanism.
Or
- A natural elevation of the earth's surface, and attaining an altitude greater than that of a hill, usually greater than 2000 feet(600 meters above MSL).

CLASSIFICATION OF MOUNTAINS

On the Basis of Height

- Low Mountain: Height ranges between 700 to 1000 m.
- Rough Mountain (1000 m to 1500 m)
- Rugged Mountain (1500 m to 2000 m)
- High Mountain (above 2000 m)

On the Basis of location

- Continental mountains
 - ↳ coastal mountain
 - ↳ Inland mountains
- Oceanic mountains

On the Basis of mode of origin

- Original or tectonic mountains
 - Folded mountains
 - ↳ Young Folded Mountain
 - ↳ Mature Folded Mountain
 - ↳ Old Folded Mountain
 - Block Mountains
 - Dome mountains
 - Mountains of accumulations
 - Relict Mountain

On the basis of Period of origin

- Pre-cambrian mountains
- Caledonian mountain
- Hercynian Mountains
- Alpine mountains

History of geosyncline:

The geosynclinal concept first developed by American geologists James Hall & J D Dana in the mid of 19th century.

- Dana was 1st to use the term geosyncline.
- This concept was later developed E Haug (1900) in Europe with some modification.

Geosyncline's concept helps to understand the mountain building process especially fold mountains and the evolution of landforms.

What are Geosynclines?

Geosynclines are the area of long, wide, and shallow depressions of the water body bordered by rigid masses and get huge sedimentation deposition from surrounding areas.

Our earth's crust can be divided into two parts based on its strength:

- Rigid Masses
- Mobile zone of water

The **mobile zone of water** is called **geosynclines** where most of the mountains are built.

Geosynclinal Orogen theory of German geologist Kober

Kober explained the concept of geosynclines and mountain building based on the force of **Thermal Contraction** which is produced by the cooling of the earth.

As per Kober, there are two zones:

- **Orogen, geosyncline or mobile zone:** the place of mountain building
- **Kartogen or rigid zone:** Orogen is surrounded by Kartogen.

As per Kober, there are three stages involved in mountain building:

- Litho-genesis
- Orogenesis
- Gliptogenesis

Objective of Geosynclinal Orogen theory:

- to establish relationship between ancient rigid masses or tablelands and more mobile zones or geosynclines, which he called Orogen.

Orogenetic Force

- *Kober's geosynclinal theory is based on the forces of contraction produced by the cooling of the earth.*
- *In other words, the force of contraction generated due to cooling of the earth causes horizontal movements of the rigid masses or forelands which squeeze, buckle and fold the sediments in to mountain ranges.*

Base of the theory

- *According to Kober there were mobile zones of water in the places of present-day mountains. He called mobile zones of water as geosynclines or orogen (the place of mountain building).*
- *These mobile zones of geosynclines were surrounded by rigid masses which were termed by Kober as Kratogen.*

- *Kober has identified 6 major periods of mountain building.*
- *1) Pre-Cambrian period*
- *2) Palaeozoic era*
- *3) Caledonian period*
- *4) Silurian period*
- *5) Carboniferous period*
- *6) Tertiary epoch*

Mechanism of the theory

- *According to Kober the whole process of mountain building passes through three closely linked stages of **lithogenesis, orogenesis and gliptogenesis**.*
- *The geosynclines or orogen are long and wide mobile zones of water which are bordered by rigid masses, which have been named by Kober as **forelands** or **Kratogen**.*
- *These upstanding land masses or forelands are subjected to continuous erosion by fluvial process and eroded materials are deposited in the geosynclines . This process of sediment deposition is called sedimentation.*

Stages of Geosynclines

The geosynclinal history is divided into three stages :

1). Lithogenesis (the stage of creation of geosynclines, sedimentation and subsidence of the beds of geosynclines.

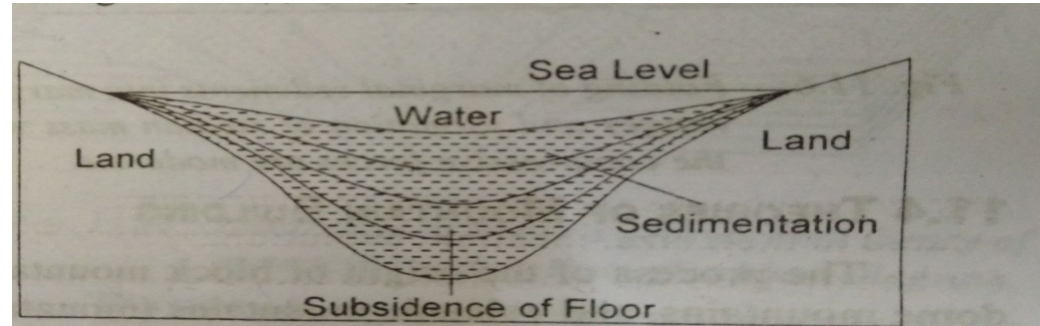


fig. 11.4: The stage of lithogenesis: creation of geosyncline followed by sedimentation and subsidence.

2). Orogenesis (the stages of squeezing and folding of geosynclinal sediments into mountain ranges).

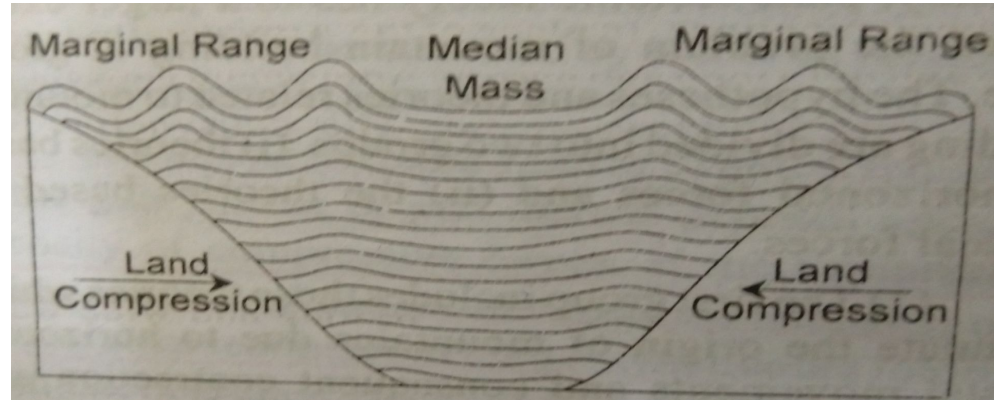
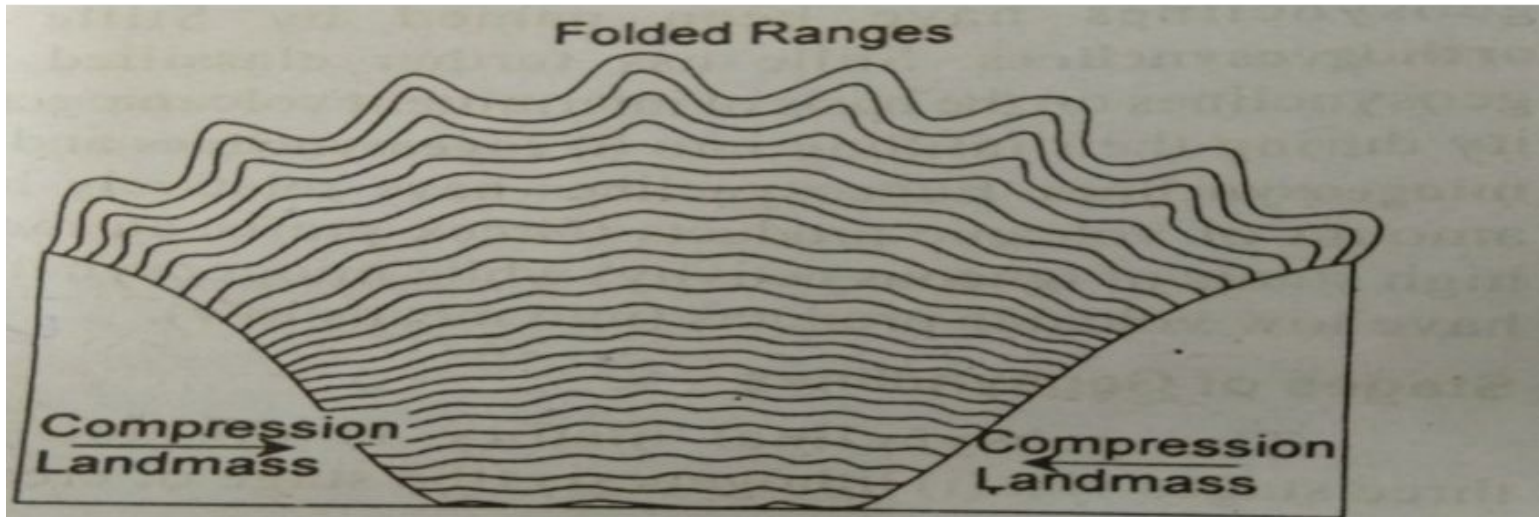


Fig. 11.5: The stage of orogenesis: squeezing and folding of geosynclinal sediments due to compressive forces; the whole of geosynclinal sediments are folded when the compressive forces coming from the sides of geosyncline is enormous and acute.

Gliptogenesis

- 3). **Gliptogenesis** (the stage of gradual rise of mountains).



11.6: *Folding of marginal sediments into marginal ranges and formation of median mass when the compressive forces are moderate.*

- According to Kober folding of entire sediments of the geosynclines or part thereof depends upon the intensity of compressive forces.
- If the compressive forces are normal and of the moderate intensity, only the marginal sediments of the geosynclines are folded to form two marginal **randketten** (marginal ranges) and middle portion of the geosynclines remain unaffected by folding activity.
- This unfolded middle portion is called **Zwischengebirge** (median mass).

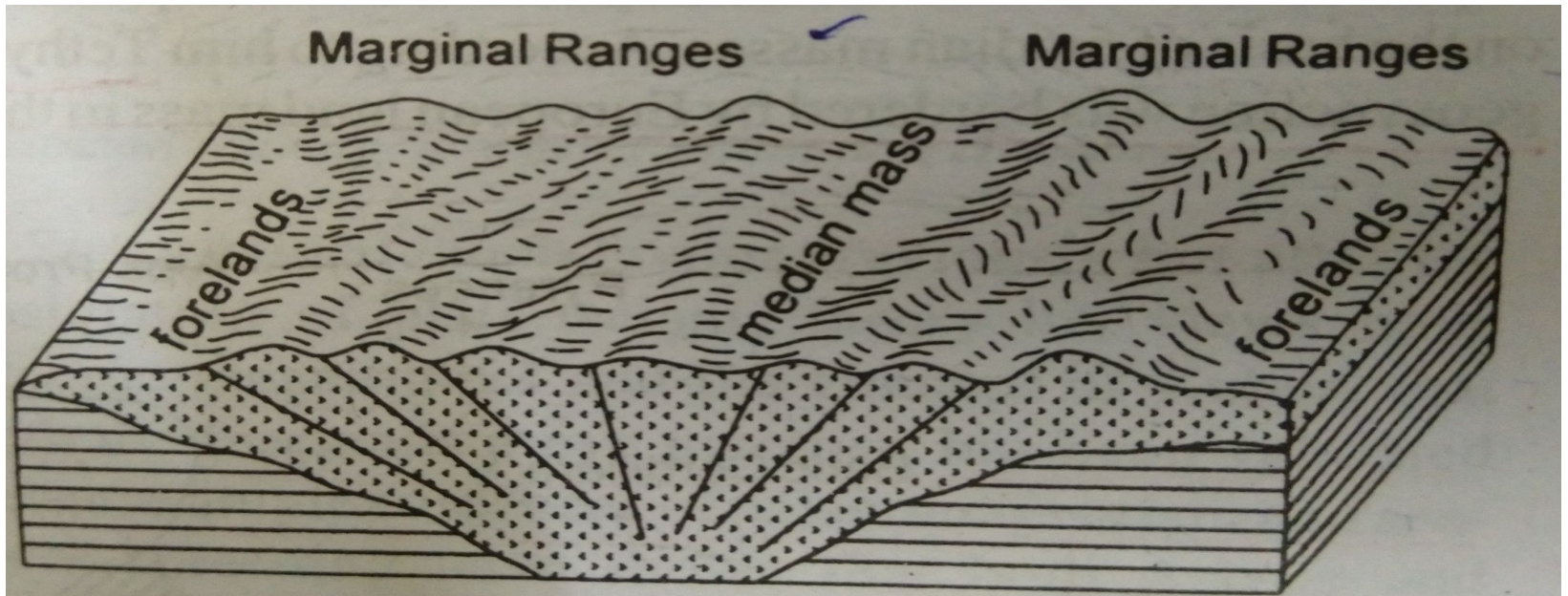


Fig. 11.7: *Illustration of Kober's geosynclinal theory of mountain building through a block diagram*

➤ *Alternatively, if the compressive forces are acute, the whole of geosynclinal sediments are compressed, squeezed, and ultimately folded and both the forelands are closed.*

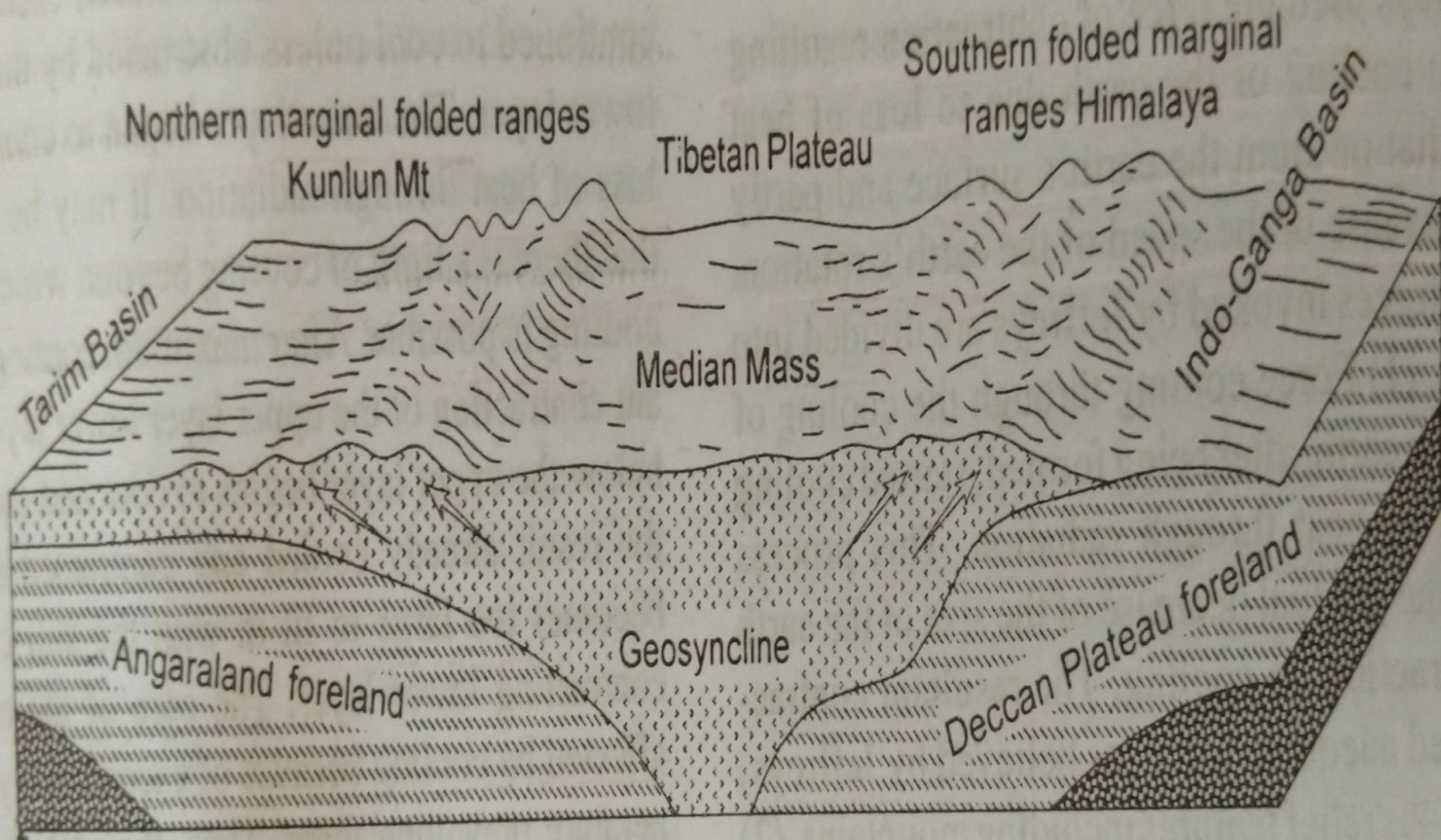


Fig. 11.9 : Illustration of Kober's median mass through Tibetan plateau between Kunlun and Himalaya.

