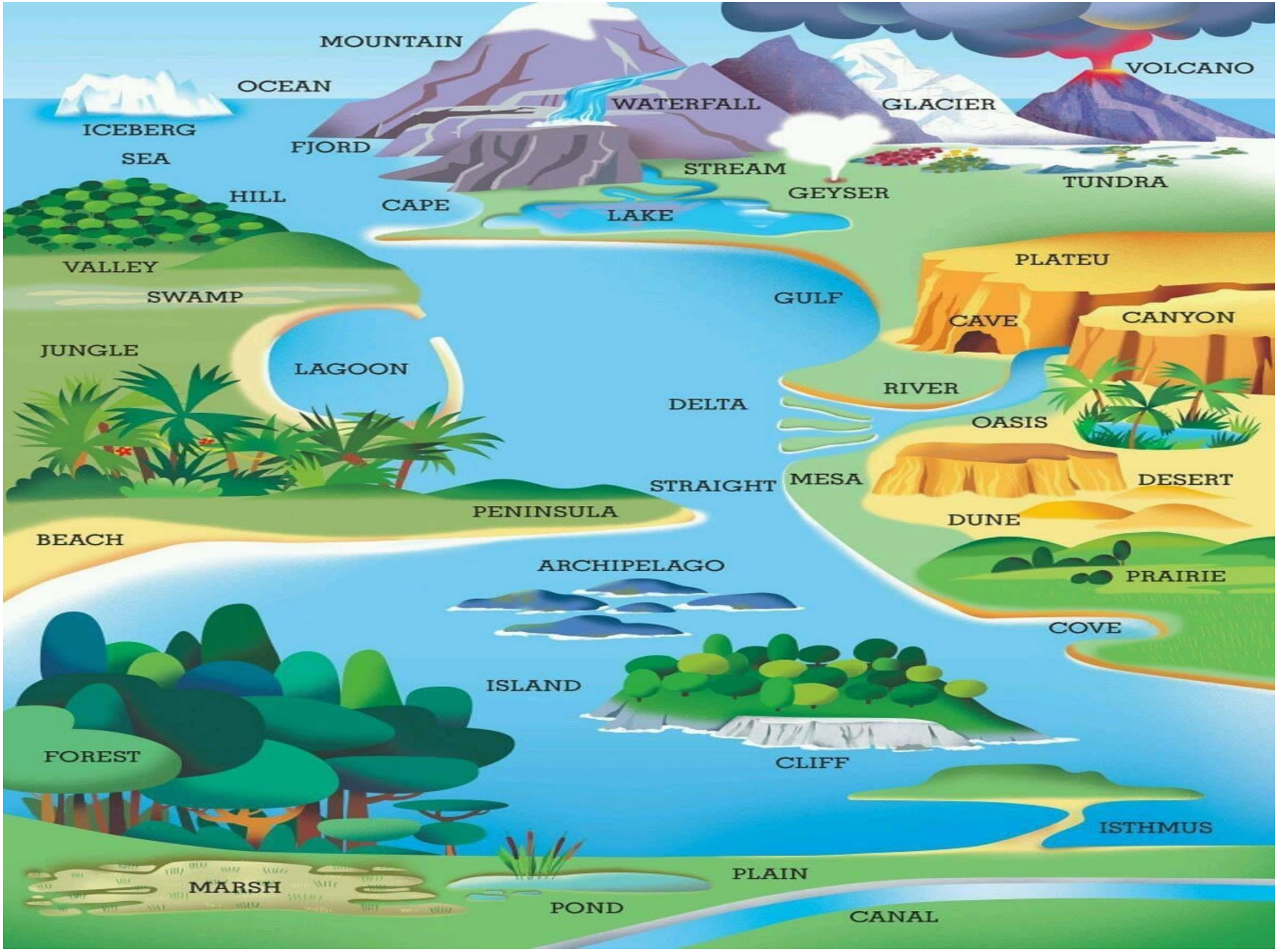
Course Name: Geomorphology
Paper Code: GGY-HC-1016

Geomorphology: Nature, Scope and Significance


MOUNTAIN
OCEAN
VOLCANO
ICEBERG
WATERFALL
GLACIER
FJORD
SEA
STREAM
TUNDRA
HILL
GEYSER
CAPE
LAKE
VALLEY
PLATEU
SWAMP
GULF
CAVE
CANYON
JUNGLE
LAGOON
RIVER
DELTA
OASIS
STRAIGHT
MESA
DESERT
PENINSULA
DUNE
BEACH
ARCHIPELAGO
PRAIRIE
COVE
ISLAND
FOREST
CLIFF
ISTHMUS
PLAIN
MARSH
POND
CANAL

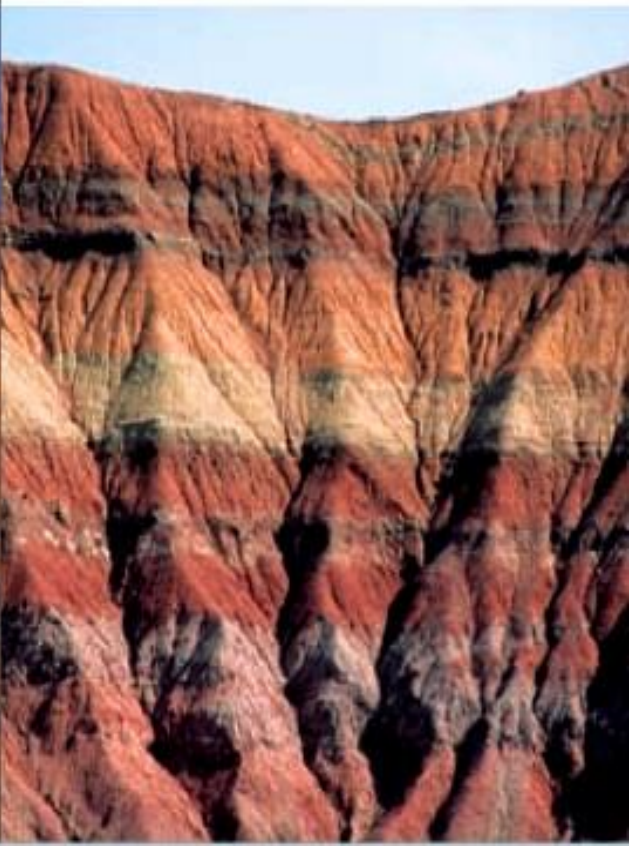

Lake
Basin
Alluvial fan
Plateau
Canyon
Hills
Harbor
Isthmus
Peninsula
Sound
Ocean
River mouth
Delta

Nature

Geomorphology: It is the scientific study of landforms/landscapes and the process that shape them. It studies form, processes and history about earth.

- Ancient period- descriptive study
- Greeks and roman philosophers named some features and only described its origin
- **Dark Age** (1st to 14th century A.D.)- no development in geographical knowledge
- **Age of catastrophism**: quick and sudden origin and evolution of all animate and inanimate objects within short period of time.
  - Concept of sudden occurance and evolution of all types of features
- **Age of uniformitarianism**: gradual cyclic nature of earth's history by James Hutton in the 18th century (1726-1797)
  - "that the same geological processes which operate today operated in the past and therefore the history of geological events repeats in cyclic manner"
  - "**present is the key to past**"- reconstruction of past earth history on the basis of the present
  - "Cyclic nature of earth's history"
  - "no vestige of a beginning: no prospect of an end"

CATASTROPHISM	GRADUALISM	UNIFORMITARIANISM
Volcanoes, floods, and earthquakes are examples of catastrophic events that were once believed responsible for mass extinctions and the formation of all landforms.	Canyons carved by rivers show gradual change. Gradualism is the idea that changes on Earth occurred by small steps over long periods of time.	Rock strata demonstrate that geologic processes, which are still occurring today, add up over long periods of time to cause great change.



- Methodology and approaches to the study of landforms and related processes has been changed.
- **Golden age**: 19th century and first two decades of 20th century are considered as "golden age" of world geomorphology.
- **First general theory of landscape development** was propounded by **W.M. Davis** and landform analysis attain its final shape
- Post 1950- undergone changes in methods and approaches in the study of landforms, conceptual framework, paradigm and thrust areas of study
  - Criticism of Davisian model of cyclic development of landforms to non-cyclic (dynamic equilibrium)
  - Descriptive to quantitative geomorphology
  - Induction method of landform analysis to deductive
  - Introduction of models and system approach
  - Process geomorphology
  - Climate geomorphology
  - Applied geogorphlogy
  - Environment geomorphology
  - Mega geomorphology to micro geomorphology

Subject matter of Geomorphology

1. Dimension and scale of relief features (landforms):

The subject matter of geomorphic study can be grouped into three categories:-

a. Relief features of the first order- Continents and Oceans

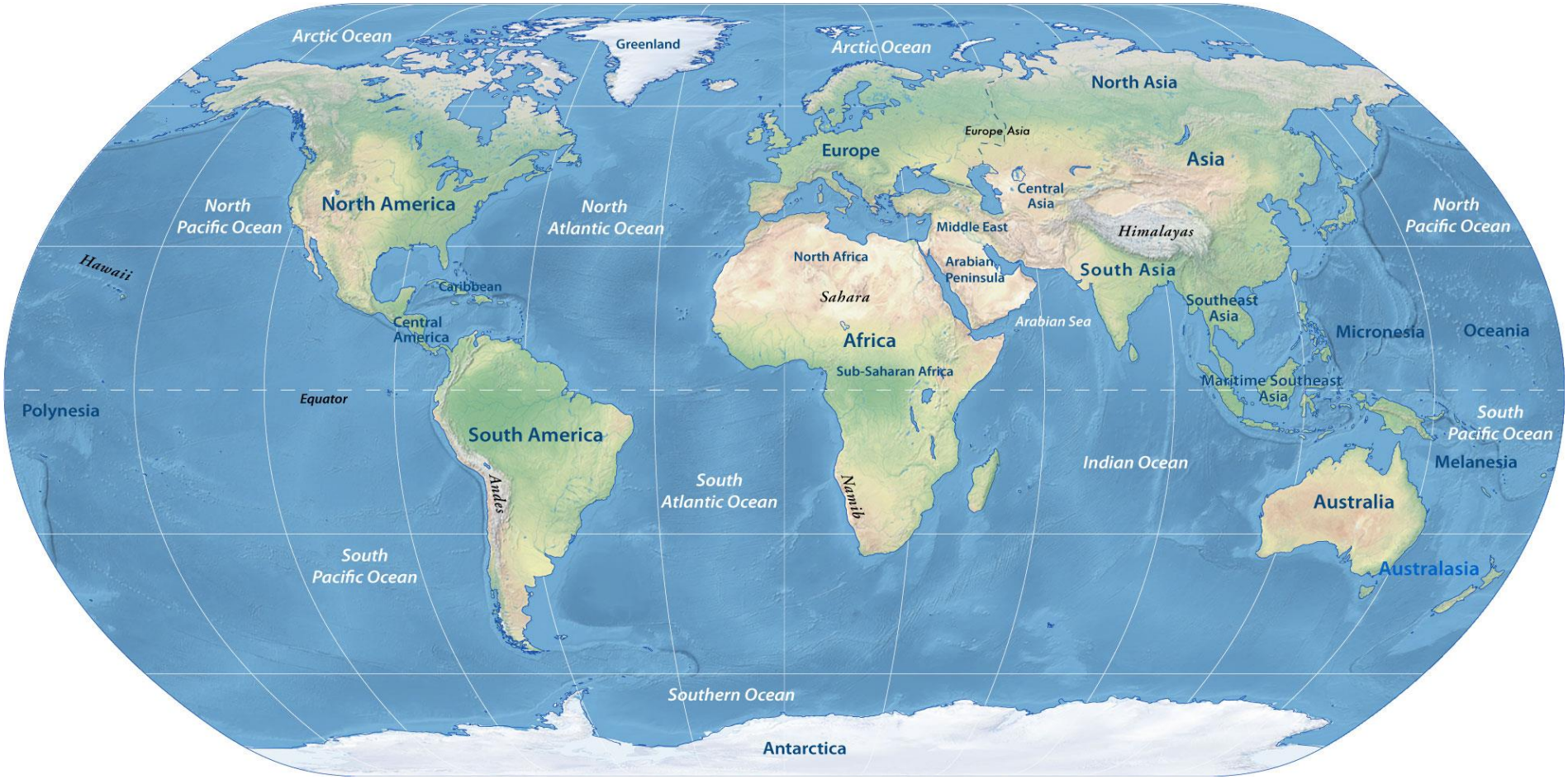
- Smallest scale covering large area
- Plate Techtonics help in understanding the origin of continents and ocean basins.

b. Relief features of the second order- Mountains, Plateaus, lakes, faults, rift valleys etc.

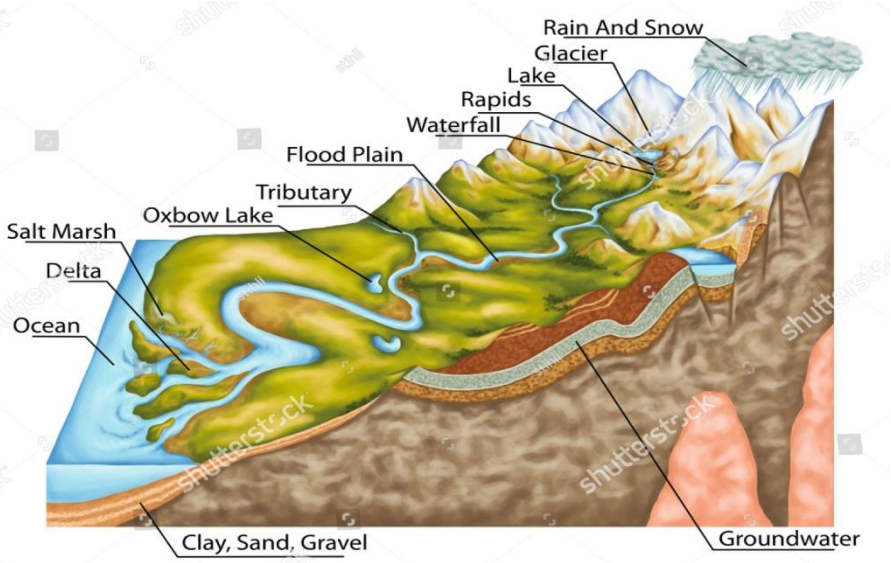
- Owe their genesis mainly to endogenetic forces particular diastrophic forces
- Nature, mode and rate of operation must be studied so that characteristics, nature and mode of origin is known
- Including at spatial and temporal scales

c. Relief features of third order- Micro-level landforms

- By exogenetic denudational process originating from the atmosphere are included in this category
- These landforms are erosional, depositional and residual
- 3rd oder landfoms are given more importance in geomorphic studies (core subject matter of geomorphology)


Arctic Ocean
Greenland
Arctic Ocean
North Asia
Europe Asia
Europe
Asia
Central Asia
North Pacific Ocean
North America
North Atlantic Ocean
Middle East
Himalayas
North Pacific Ocean
Hawaii
North Africa
Arabian Peninsula
South Asia
Caribbean
Sahara
Southeast Asia
Central America
Arabian Sea
Africa
Micronesia
Oceania
Sub-Saharan Africa
Maritime Southeast Asia
Equator
Polynesia
South America
South Pacific Ocean
Indian Ocean
Melanesia
Andes
South Atlantic Ocean
Namib
Australia
South Pacific Ocean
Australasia
Southern Ocean
Antarctica


are those found on the continents and ocean basins.
Volcanoes
Plains
Mountains
© Jamaica Olazo


Rain And Snow
Glacier
Lake
Rapids
Waterfall
Flood Plain
Tributary
Oxbow Lake
Salt Marsh
Delta
Ocean
Clay, Sand, Gravel
Groundwater


Mushroom rocks
Zeugen
Demoiselles
Yardang


Land and Water Features
Mountain Range
Glacier
Volcano
Plateau
Basin
Canyon
Valley
Desert
Lake
River
Inlet
Delta
Strait
Peninsula
Archipelago
Island
Most detailed order of relief.

Agents of Change...

2. The subject matter of geomorphology may also be organized on the basis of geomorphic processes (both endogenous and exgeneous) that shape the landforms and approaches to the study of landforms
3. Two approches:-
   a. Historical studies: time dependant (historical evolution of landforms)
   b. Functional studies: time dependant (association between landform characteristics and existing environments conditions)

Scope of Geomorphology

The scope of geomorphology is in dilemma that many earth scientists of the world have difference perspective:

- It must study about physical configuration, process and history of the earth only
- It studies about the forms and shape of the earth as well as other earth like planets like Mars and Venus
- Traditionally the scope of geomorphology was limited to “terrestrial environment” due to its strong man-terrestrial environment relationship
- Due to the advancement in technology in mans recent life history the discipline has begun to study the “aquatic environments”

Scope of Geomorphology

There are three major aspects of the study of geomorphology:

- It is the study of the relations between landforms and the underlying rocks i.e. Geological Geomorphology.

  Thus, geomorphology is concerned with the interactions between denudation processes and the rock strength.

  The precise investigation of the resistance of rocks to denudation, detailed experimental work on rocks must be carried out.

- Geomorphology is the study of the evolution of landscapes. Such studies have been termed denudation chronology. Such studies

  Attempts to reconstruct succession of pictures of the relief at different times. Alterations of relief are usually believed to have been caused by changes of base level and climate.

- It is the study of the actual process of erosion which give rise to landforms. Unlike the first two aspects of Geomorphology, which are essentially regional in approach, this third aspect is systematic.

  It aims to understand the action of waste movement of water movement, ice, and wind as well as the processes of weathering.

Importance of Geomorphology

- To understand geomorphological processes of various environment
- To detect natural and environmental hazards effectively, e.g. earthquake, landslide, tsunami, floods, vulcanism etc.
- To identify various landform features and landscapes
- Coastal and river research
- Vulnerability analysis