

2

The Major Physical Characteristics of the Earth

Climate and relief are the major physical characteristics of the Earth. Relief is the variety of the physical features found on the Earth. The Earth consists of various physical features and a large number of such features are seen on the Earth. Hills, mountains, mountain ranges, plateaus and plains are examples of such features. Similarly, there is a variety of climatic conditions on the Earth.

The objective of this lesson is to study the relief, the nature of the main types of climate and their distribution on the Earth.

The landforms or physical features of the Earth differ from each other in magnitude. The largest features according to magnitude are the continents and oceans. Within these large landform features, there are a number of smaller features.

Continents

Land covers 29% of the total area of the Earth. These lands are located as either continents or islands. The large land masses which have risen from oceans are called continents. There are seven such continents in the world. Table 2.1 below includes information about the magnitude of those continents.

Table 2.1

The Magnitude of the Continents

Continent	Area km ²	Percentage of total Land mass %
Continent of Asia	43,820,000	29.5%
Continent of Africa	30,370,000	20.4%
Continent of North America	24,490,000	16.4%
Continent of South America	17,840,000	12.0%
Continent of Antarctica	13,720,000	9.2%
Continent of Europe	10,180,000	6.7%
Continent of Australia	9,085,000	5.8%

source - www.wikipedia.org



Map 2.1
Continents and Islands of the World

The shallow sea strip that stretches towards the ocean from the continental boundary is known as the continental shelf. A continental shelf is not seen at the boundary of every continent. The edge of the continental shelf slopes abruptly towards the ocean and it is called the continental slope.

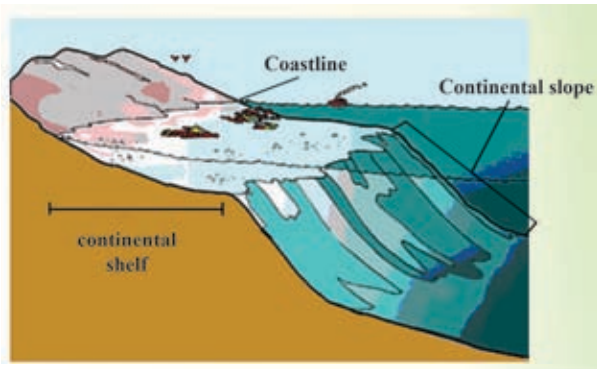


Figure 2.1

Continental shelf and the continental slope

Source - <http://www.studyblue.com/13/03/2014>

Islands

Islands are small land areas of various shapes surrounded by water. Many islands are located in the continental shelf close to continents.

For example :-

- Islands located in the continental shelf of Asia - Borneo, Java, Sumatra and Sri Lanka
- Islands located in the continental shelf of Australia - Papua New Guinea and Tasmania
- An Island located in the continental shelf of Africa - Madagascar

When observing a world map or a model globe you would be able to identify islands located in the central regions of the oceans too. The islands of Hawaii and Iceland which were created as a result of volcanic activities that occurred in the deep ocean are examples for that.

Activities

1. What is a continental shelf ? What is a continental slope? Explain with the help of a diagram.
2. Mark and name ten islands of different sizes in a world map and five islands that belong to Sri Lanka in a map of Sri Lanka.

Assignments

1. Identify the islands of the world with the help of an Atlas and prepare a list.
2. Tabulate the advantages and disadvantages of a country being an island.

Oceans

Oceans are large water bodies filled with brine (salt) water distributed on the Earth. 71% of the surface of the Earth is covered by oceans. There are five such oceans in the world (Map 2.2). Table 2.2 shows those oceans according to their magnitude. There are deep trenches located in certain oceans (Figure 2.2). Mariana trench (depth 11035 m) and Mindanao trench (10497 m) are examples. Most of the trenches are located in the Pacific Ocean.

Table 2.2

Oceans and their magnitude

Ocean	Area km ²
Pacific Ocean	155 557 000
Atlantic Ocean	76 762 000
Indian Ocean	68 556 000
Southern Ocean	20 337 000
Arctic Ocean	14 056 000

Source - www.worldatlas.com

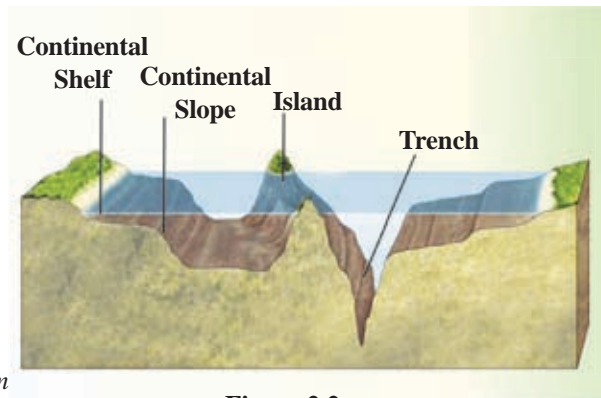


Figure 2.2

Several features in the Ocean bed

Source- <http://jwilson.wikidot.com/13/03/2014>

Seas

Seas are water bodies of brine (salt) water partly or completely surrounded by lands or connected to the oceans. For example:-

- Seas completely surrounded by lands - Caspian Sea, Aral Sea.
- Seas partly enclosed by lands - Mediterranean sea, Red sea, Black sea, Yellow sea, Sea of Japan and Baltic sea.
- Seas within the oceans - Arabian Sea, China Sea.

The map 2.2 indicates some of the seas located in the world. Observe the map and identify them.

Activities

1. Mark and name the five oceans, ten seas, three ocean and trenches in a world map.
2. Explain the instances when man uses the oceans and seas as a resource.



Map2.2
Oceans and seas

Assignment

Prepare a document relating to the human activities that cause pollution of oceans and suggest actions that could be taken to minimize them.

Mountain ranges

The mountain ranges are landform features that stretch with a higher elevation having a variety of slopes and several peaks. When several mountains are distributed in a large region it is called a mountain range system. Himalaya, Rockies and Andes are examples of large mountain systems. Map 2.3 indicates some of the largest mountain ranges of the world.

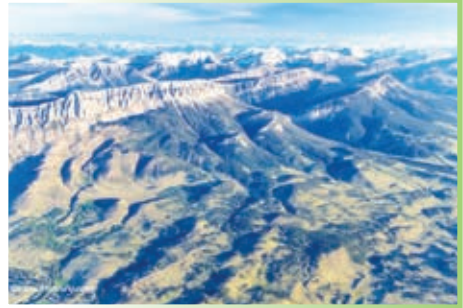


Figure 2.3
The Rockies

Source - <http://portfolios.chuckhaney.com>



Figure 2.4
Himalaya mountain range – An Aerial photograph

Source - <http://blogs.oregonstate.edu>

Plateaus

Plateaus are high flat lands located in a mountainous area. The Tibetan plateau is located in the mountain range of Himalayas at a very high elevation from sea level. Pamir, Mongolian, Deccan and Arabian plateaus are examples of other large plateaus located in the world. There are small plateaus located in Sri Lanka too. Welimada, Mahaweletenna, Koslanda and Hatton plateaus are examples for them. Map 2.3 indicates some of the plateaus located in the world.



Figure 2.5
Tibetan plateau

Source - <http://static.panoramio.com>



Map 2.3
 Few mountains, plateaus and plains in the world

Plains

The flat lands extending in a very large area at a low elevation are called plains. The Great Siberian plain, North American plain and Nullabar plain in Australia are some examples for plains. (See map 2.3). Sometimes, these plains may show a slightly undulating nature. These plains have been used for various human activities more than higher mountainous areas. These plains are called by specific names according to their formation or location. Coastal plain, glacier plain, fluvial plain and alluvial plain are examples.



Figure 2.6
Great North American Plain

Source - www.wikipedia.com



Figure 2.7
Nullabar Plain in Australia

Source - www.crikey-adventure-tours.com

Activities

1. Mark and name the three largest mountains, main plateaus and three plains in a world map.
2. What is the plateau located at the highest altitude above the sea level?
3. Write three human activities linked to each of the mountainous and low land regions of the world.

Assignment

Refer to an Atlas and identify continents (other than Antarctica). Fill in the table with three mountain ranges, three plains and three plateaus for each of the continents.

Continents	Mountain ranges	Plateaus	Plains
1	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....
2	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....
3	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....
4	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....
5	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....
6	1..... 2..... 3.....	1..... 2..... 3.....	1..... 2..... 3.....

Rivers

A river is a natural water resource flowing throughout the year along a clear cut valley into an ocean, a sea, a lake, a basin or a marsh. A river originates from a high area and flows according to the gradient of the land. A few major rivers in the world are shown in map 2.4. The source of a river may vary. Some rivers originate from mountainous areas while some other rivers may originate from a spring or a lake.

Examples for such rivers

River Thames	-	From a spring
River Nile	-	From a lake
River Rhine	-	From melted glaciers
River Mahaweli	-	From a spring in a mountainous area



Figure 2.8
River Mahaweli
Source - <http://upload.wikimedia.org>

Lakes

A depression (a crater) located on land which is filled with fresh water is known as a lake. Lakes are located in almost all the continents in the world. Lake Baikal in Asia, The Five Great Lakes in North America, Lake Ayre in Australia, Lake Ladoga in Europe, Lake Titicaca in South America and Lake Victoria in Africa are examples. Certain lakes are large water bodies filled with salt water and they are considered as inland seas. Lake Superior is the largest lake in the world while Lake Titicaca is located at the highest elevation. Map 2.4 shows several lakes in the world.

Activities

1. Mark and name ten rivers and five lakes on a world map. (Select lakes and rivers from all the continents except Antarctica).
2. Explain with examples how rivers and lakes become important in human activities.

Assignment

Study map 2.4 and prepare a list of rivers and lakes according to their location in each continent.



Map 2.4
Main rivers and lakes of the world

Distribution of the climatic types and their basic features

Climate is the general condition of the atmosphere that prevails within a long period of time. Data on weather conditions for a period of at least 30-35 years should be studied to get a clear idea about this generalized condition.

Various types of climates in the world have been identified according to different climatic conditions that prevail in different geographical regions within a long period of time. A particular type of climate is determined by some important factors such as temperature, the rainfall, means of rainfall and the duration of rainfall.

The first idea about distribution of climates in the world was originally put forward by a Greek philosopher, Aristotle around 384 BC. He divided the world into three broad climatic zones. He used the distribution of temperature that changes according to the latitudinal location of the world as the basis for this division. Later, persons like Austin Miller, Thornthwaite and Keppen have presented wide climatic classifications at global level. Sub-climatic types have been identified according to the specific features within the main climatic zones.

The three main climatic zones which are based on the distribution of the latitudinal temperature in the world are emphasized here.

The main climatic zones

1. The Tropical zone
2. The Temperate zone
3. The Frigid or Polar zone (See Figure 2.9 and Map 2.5)

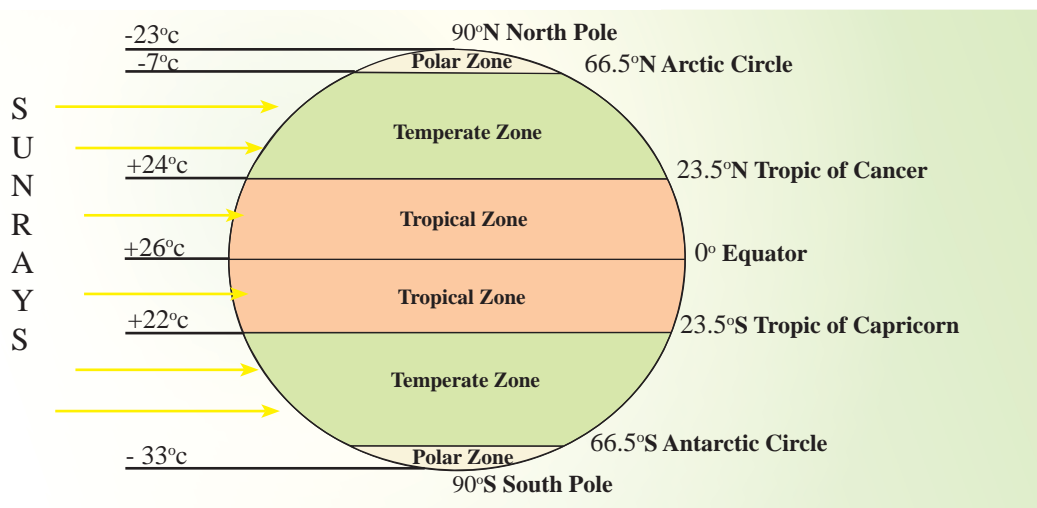
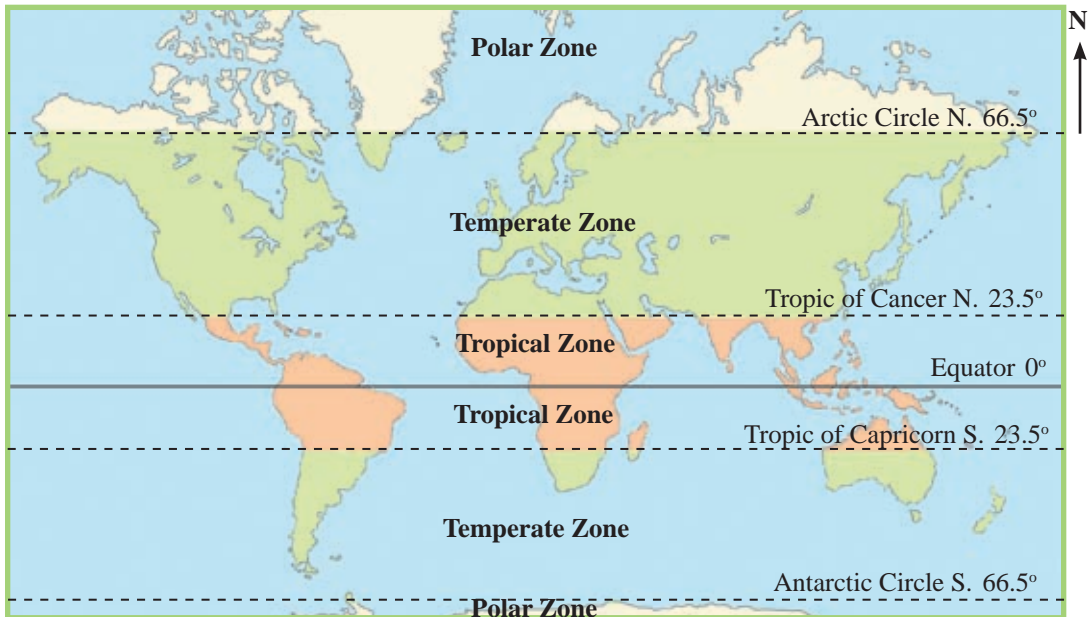


Figure 2.9
The major climatic zones in the world



Map 2.5
The main climatic zones in the world

Tropical climate

The zone located between the Tropic of Cancer ($23\frac{1}{2}^{\circ}$ North latitude) and Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ South latitude) is known as the Tropical Zone. Generally, the highest temperature is reported in this zone and a very high temperature prevails throughout the year (over 18° C). There is no winter. Therefore, warm climatic conditions can be seen. Most of the areas located in this zone receive a very high rainfall throughout the year. Various types of climates in the world have been identified according to different climatic conditions that prevail in different geographical regions within a long period of time. A particular type of climate is determined by some important factors such as temperature the rainfall, means of rainfall and the duration of rainfall.



Figure 2.10
A Tropical Grassland

Source - <http://www.south-africa-tours-and-travel.com>



Figure 2.11
A Tropical Forest (Amazon)

Source - <http://static.panoramio.com>



Figure 2.12 - A Tropical Desert Region (Sahara)

Source- <http://toptravellists.net>

Temperate climate

The Temperate Zone stretches between the Tropic of Cancer ($23\frac{1}{2}^{\circ}$ North latitude) and the Arctic Circle ($66\frac{1}{2}^{\circ}$ North latitude) and also between the Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ South latitude) and the Antarctic Circle ($66\frac{1}{2}^{\circ}$ South latitude). The normal temperature in the temperate zone is lower than in the tropical zone. The temperature in this zone changes according to seasonal differences. A hot season and a cold season with rainfall could be clearly seen in this zone. Prevalence of the Mediterranean climate is a specific feature of this zone.

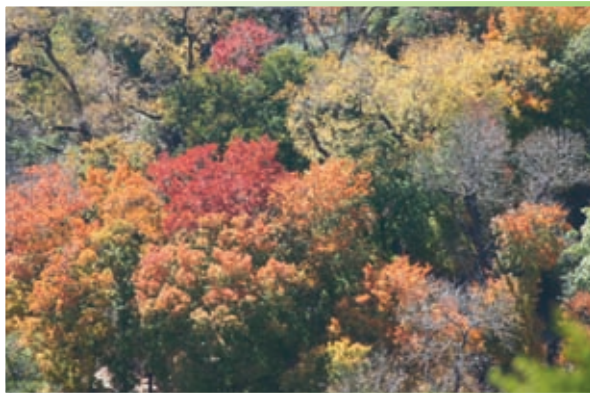


Figure 2.13

Natural vegetation in the temperate zone

Source - <http://upload.wikimedia.org>

Polar climate

The Polar climate is distributed in the Polar regions extending from the Arctic Circle ($66\frac{1}{2}^{\circ}$ North latitude) to the North Pole, and between the Antarctic Circle ($66\frac{1}{2}^{\circ}$ South latitudes) to the South Pole. The annual rainfall is between 250-300 mm and it remains at a very low level. Snowfall and fog are the main features of this zone. Tundra climate is a specific climate that prevails here.



Figure 2.14

Polar climatic environment

Source - <http://hdw.backgroundswallpapers.info>



Figure 2.15

Natural vegetation in a polar climatic environment

Source - <http://cityoftongues.files.wordpress.com>

Activities

1. Define "climate".
2. Name three persons who presented world climatic classifications.
3. State the three main climatic zones of the world based on the latitudes with a diagram and write two features of each zone.
4. Explain how climate affects human activities in your area giving examples.

Assignment

Prepare a report including pictures about human activities and the main features of the major climatic zones of the world.

Bibliography and Sources

- Gabler E Robert, James, F Petersen, Trapsso L Michael (2006), Essentials of Physical Geography, 3rd Edition, USA.
- The Oxford School Atlas (1984), Oxford University Press, London.
- Waugh, David (2000), Geography-An Integrated Approach 3rd edition Scotprint London.
- උපාලි විරක්කොඩි (1993), භූගෝල විද්‍යා ශබ්දකෝෂය, කර්තෘ ප්‍රකාශන.
- ගුරු මාර්ගෝපදේශ සංග්‍රහය, භූගෝල විද්‍යාව, 10 ශ්‍රේණිය (2007), ජාතික අධ්‍යාපන ආයතනය, මහරගම.
- ගුරු මාර්ගෝපදේශ සංග්‍රහය, භූගෝල විද්‍යාව, 12 ශ්‍රේණිය (2009), ජාතික අධ්‍යාපන ආයතනය, මහරගම.
- තම්බයියාපිල්ලේ ජී.ජී.ආර්. සිල්වා එම්.සී.ද (2009), භෞතික භූගෝල විද්‍යාව, 6 වන මුද්‍රණය, අධ්‍යාපන ප්‍රකාශන දෙපාර්තමේන්තුව.
- පාරිසරික භූගෝල විද්‍යාව (1996), අධ්‍යාපන ප්‍රකාශන දෙපාර්තමේන්තුව, කොළඹ.
- භූගෝල විද්‍යා තොරතුරු, 9 වන කලාපය (1996 ජනවාරි), ශ්‍රී ලංකා භූගෝල විද්‍යාඥයින්ගේ සංගමය, කොළඹ.
- භූගෝල විද්‍යාව, 10 ශ්‍රේණිය (2011), අධ්‍යාපන ප්‍රකාශන දෙපාර්තමේන්තුව, කොළඹ.
- භෞතික භූගෝල විද්‍යාව 1 කොටස (2013), අධ්‍යාපන ප්‍රකාශන දෙපාර්තමේන්තුව, කොළඹ.
- www.worldatlas.com
- <http://www.studyblue.com/notes/note/n/ch-4-ocean-basins/deck/6167301>
- <http://jwilson.wikidot.com/weekly-lesson-for-april-16>
- www.travelphotogallery.net
- www.crikey-adventure-tours.com
- http://portfolios.chuckhaney.com/data/photos/973_1rocky_mtn_front_aerial_002_copy.jpg
- http://blogs.oregonstate.edu/irisgodfrey/files/2013/04/press_2007_large.jpg
- <http://upload.wikimedia.org/wikipedia/commons/c/c8/River-nile.JPG>
- <http://toptravellists.net/wp-content/uploads/2012/05/Oasis-Dakhla-Sahara-Desert-Nature-Egypt.jpg>
- <http://static.panoramio.com/photos/large/4978777.jpg>
- <http://www.south-africa-tours-and-travel.com/images/south-african-savannah-marakelenationalparkinsouthafrica.jpg>
- http://upload.wikimedia.org/wikipedia/commons/2/2d/Aerial_View_of_Autumn_Forest_Colors.jpg

- http://hdw.backgroundswallpapers.info/0002/nature-landscapes_hdwallpaper_cabin-in-the-tundra_13431.jpg
- <http://cityoftongues.files.wordpress.com/2012/12/polar-bear.jpg>

Glossary

• Relief	- ஐ விசுவாலை	- தரைத்தோற்றம்
• Climate	- டேயுளுய	- காலநிலை
• Continents	- மலாடிபீப	- கண்டங்கள்
• Oceans	- ஂயாடு	- கண்ட மேடை
• Continental shelf	- மலாடிபீபிக னடுகய	- கண்ட சாய்வு
• Continental slope	- மலாடிபீபிக னடுவூம	- அகழிகள்
• Trench	- ஂயாடு அயாடி	- மலைத்தொடர்
• Mountain range	- கரு படிமகிய	- பீடபூமி
• Plateau	- ஂயாடு	- சமவெளி
• Plain	- னுகினலாடு	- அயன வலயம்
• Tropical zone	- திவர்தன கலாபய	- இடைவெப்ப வலயம்
• Temperate zone	- ஂயால கலாபய	- முனைவு வலயம்
• Polar zone	- டுரல/கீத கலாபய	- கடகக்கோடு
• Tropic of Cancer	- கர்கடுத திவர்தனய	- மகரக்கோடு
• Tropic of Capricorn	- மகர திவர்தனய	- கண்டங்கள்