
Why We Use Strahler's Physical Geography for UPSC

The UPSC examination has evolved far beyond the intermediate-level Geography found in NCERT textbooks. Unfortunately, most Physical Geography books by Indian authors fall short in both academic rigor and conceptual clarity.

To bridge this gap, we rely on *Physical Geography: Science and Systems of the Human Environment* by Strahler & Strahler—a globally acclaimed reference known for its scientific precision and pedagogical clarity. However, this book poses practical challenges:

- It is highly voluminous and expensive (approximately ₹20,000),
- And it is not readily available in the Indian market.

What we offer

Our document provides chapter-wise summaries of Strahler's Physical Geography, written by the authors themselves, not by ChatGPT or our team. These summaries are concise yet intellectually rich, offering a solid foundation in:

- Geomorphology
- Climatology
- Oceanography
- Biogeography

Together, they offer sufficient conceptual depth for both UPSC Prelims and Mains.

How It Integrates with ChatGPT

- ChatGPT can elaborate any paragraph from the summaries with crystal-clear explanations and illustrative diagrams, based on our prompts.
- It can generate high-quality MCQs (factual, conceptual, and analytical) using the document as reference, based on our prompts.
- The dynamic and current dimensions of Geography—such as environment and climate change —are fully covered by ChatGPT with our specially designed prompts.

This fusion of authoritative content and AI-driven customization provides a powerful, modern approach to mastering Geography for the Civil Services Examination.

This document lists total chapter titles and samples of two chapters

Chapter-1 The Earth as a Rotating Planet

Chapter- 2 The Global Energy System

Chapter-3 Air Temperature and Air Temperature Cycles

Chapter-4 Atmospheric Moisture and Precipitation

Chapter-5 Winds and the Global Circulation System

Chapter-6 Weather Systems

Chapter-7 The Global Scope of Climate

Chapter-8 Low Latitudes Climates

Chapter-9 Midlatitude and High Latitude Climates

Chapter-10 Earth Materials and the cycle of rock change

Chapter-11 The Lithosphere and the Tectonic System

Chapter-12 Volcanic and tectonic landforms

Chapter-13 Weathering and Mass Wasting

Chapter-14 The Cycling of Water on the Continents

Chapter-15 Fluvial Processes and Landforms

Chapter-16 Landforms and Rock Structure

Chapter-17 The Work of Waves and Wind

Chapter-18 Glacial Systems and the Ice Age

Chapter-19 Soil Systems

Chapter-20 Systems and Cycles of the Biosphere

Chapter-21 Biogeographic Processes

Chapter-22 Global Ecosystems

Chapter-9 Midlatitude and High Latitude Climates

- Midlatitude climates are quite varied, since they lie in a broad zone of intense interaction between tropical and polar air masses.
- The dry subtropical climate is dominated by subtropical high pressure and resembles the dry tropical climate, but it has a larger annual temperature range and a distinct cool season. The Mojave and Sonoran deserts, which occur in this climate type, are distinguished by a cover of specialized plants, such as the Joshua tree and saguaro cactus.
- Abundant rainfall with a summer maximum is a characteristic of the moist subtropical climate (China type). The temperature cycle of this type includes cool winters with spells of subfreezing weather and warm, humid summers. The natural vegetation cover is forest – broadleaved deciduous in most regions, with southern pine forest in regions of sandy soils. However, agriculture has largely replaced natural forests throughout this climate type. In Asia, rice culture is dominant, while in North America, sugar cane, peanuts, tobacco and cotton are more typical.
- The Mediterranean is unique because its annual precipitation cycle has a wet winter and a dry summer. The temperature range is moderate, with warm to hot summers and mild winters. The vegetation of the Mediterranean climate environment includes many evergreen sclerophylls, such as the cork oak, olive tree and eucalyptus. Oak woodlands are also typical. Steep slopes are clothed with the drought-resistant shrubs of the chaparral. Due to a long history of human habitation, little natural vegetation remains in the Mediterranean climate environment of Europe.
- The marine west-coast climate, like the Mediterranean climate, has a winter precipitation maximum. The marine influence keeps temperature mild with a narrow daily and annual range. Forest is the native vegetation of the marine west-coast environment – dense needleleaf forest on the northern Pacific coast and broadleaf deciduous forest on the coast of western Europe. In Europe, lands of this climate have been under intensive cultivation for many centuries, and little forest remains. In North America, this climate zone is a source of many diverse forest products.
- The dry midlatitude climate has both arid and semiarid subtypes. Both types have warm to hot summers and cold to very cold winters. The semiarid subtype typically has fertile soils with a sparse cover of grasses, which is termed short-grass prairie in North America and steppe in Eurasia. Wheat is a dominant crop, with cattle grazing an important commercial activity. Because rainfall is highly variable, drought is a recurring event. When combined with overgrazing, drought can create dust bowl conditions.
- The moist continental climate has ample precipitation with a summer maximum. Summers are warm and winters cold. In its northern regions, the moist continental environment sustains a cover of evergreen needleleaf forest, while farther south, the

forest is broadleaf deciduous. In North America, a region of this climate in the Middle west once supported tall-grass prairie. This region is now the corn belt.

- High-latitude climates have low precipitation since air temperatures are low. The precipitation generally occurs during the short warm period.
- The boreal forest climate has long, bitterly cold winters. The boreal forest consists of needleleaf trees of pine, spruce, fir and larch. Patches of deciduous aspen, poplar, willow and birch also occur. Dairying, limited crop farming and timber harvesting for pulp and lumber are economic activities of the boreal forest environment.
- The tundra climate occupies arctic coastal fringes. Because of the marine influence, winter temperatures are not as bitterly cold as those of the boreal forest climate. The tundra is a vegetation cover of scattered grasses, sedges, lichens and dwarf shrubs, with patches of rock fragments devoid of plants. Although the environment is harsh, wildlife is abundant, especially in the warm months. Permafrost underlies much of the tundra.
- The ice sheet climate is the coldest of all climates, with no monthly mean temperature above freezing. The severity of the climate prohibits nearly all human habitation.

Chapter-11 The Lithosphere and the Tectonic System

- At the centre of the Earth lies the **core** – a dense mass of liquid iron and nickel that is solid at the very centre. Enclosing the metallic core is the **mantle**, composed of ultramafic rock. The outermost layer is the **crust**. Continental crust consists of two zones- a lighter zone of felsic rocks atop a denser zone of mafic rocks. Oceanic crust consists only of denser, mafic rocks.
- The **lithosphere**, the outermost shell of rigid brittle rock, includes the crust and an upper layer of the mantle. Below the **lithosphere** is the **asthenosphere**, a region of the mantle in which mantle rock is soft or plastic.
- Geologists trace the history of the Earth through the geological time scale. *Precambrian* time includes the Earth's earliest history. It is followed by three major divisions – the *Palaeozoic, Mesozoic*, and *Cenozoic* eras.
- Continental masses consist of active belts of mountain making and inactive regions of old, stable rock. Mountain-building occurs by volcanic and tectonic activity. Alpine chains include **mountain arcs** and **island arcs**. They occur in two principal mountain belts- the circum-Pacific and Eurasian-Indonesian belts.

- **Continental shields** are the regions of low-lying igneous and metamorphic rocks. They may be expose or covered by layers of sedimentary rocks. Ancient mountain roots lie within some shield regions.

- The ocean basins are marked by **mid-oceanic ridge** with the central **axial rift**. This ridge occurs at the site of crustal spreading. Most of the ocean basin floor is **abyssal plain**, covered by fine sediment. As passive continental margins are approached, the **continental rise, slope** and **shelf** are encountered. At active margins, deep oceanic **trenches** lie offshore.

- The two basic tectonic processes are **extension** and **compression**. Both processes can lead to the formation of mountains. Extension occurs in the splitting of plates, when the crust thins, gets fractured and then pushed upward to produce **block mountains**. When lithospheric plates collide, compression occurs, shaping rock layers into **folds** that then break and move atop one another along the overthrust faults.

- **Continental lithosphere** includes the thicker, lighter continental crust and a rigid layer of mantle rock beneath. **Oceanic lithosphere** is composed of the thinner, denser oceanic crust and rigid mantle below. The lithosphere is fractured and broken into a set of **lithospheric plates**, large and small, that move with respect to each other. The major lithospheric plates include Pacific, Eurasian, African, Austral-Indian, Antarctic. The lesser lithospheric plates include Nazca, Cocos, Philippine, Bismark, Caribbean, Arabian, Persian, Somalian, Juan de Fuca, Caroline, Scotia. (Locate them on map)

- When plates move apart, a **spreading boundary** occurs. At the **converging boundaries**, plate collide. At **transform boundaries**, plates move past one another on a transform fault.

- When oceanic lithosphere and continental lithosphere collide, the denser lithosphere plunges beneath the continental lithospheric plate, a process called **subduction**. A trench marks the site of down-plunging. Some subducted oceanic crust melts in the zone of hot mantle and rises to the surface, producing volcanoes. Under the severe compression that occurs with continent-continent **collision**, the two continental plates are welded together in a zone of metamorphic rock named a **continental suture**.

- In **continental rupture**, extensional tectonic forces move a continental plate in opposite directions, creating a rift valley. Eventually, the **rift valley** widens and opens to the ocean and new oceanic crust forms as spreading continues. (Sea floor spreading will be discussed in an exclusive section below)

- Continental rupture marks the first stage and continental suture marks the last stage of a **tectonic cycle**, which passes through some stages. Stage 1- Embryonic basin formation (Red Sea), stage 2 – Young basin formation (Labrador basic), stage 3- Old Ocean basin formation (Atlantic Ocean), stage 4- The ocean basin begins to close as continental plates collide with it. New subduction boundaries begin to form and

island arcs rise and grow into volcanic mountain chains (circum-Pacific activity) stage 5- Arc-continent collision (Japanese islands) stage 6- Ocean basin fully disappears, making two opposite continental plates closest. Continent-continent collision takes place (Eurasian and Austral-Indian, African collision – Alps, Himalayas etc.). the cycle ends in a completely new supercontinent. There could have been some 6 to 10 tectonic cycles in the geological history. During the Permian period, the continents were joined in a single, large supercontinent – **Pangea** – that broke apart, leading eventually to the present arrangement of continents and ocean basins.

- Plate movements are thought to be powered by **convection current** generated due to continuous **radioactivity** in the mantle.