Introduction to climatology course contents

1. Basic Concepts In Weather And Climate

1.1. The Concepts Of Weather, Climate, Meteorology And Climatology

1.2. Elements and measurement of weather and climate

1.3. Controls of weather and climate

1.4. Weather and climate data

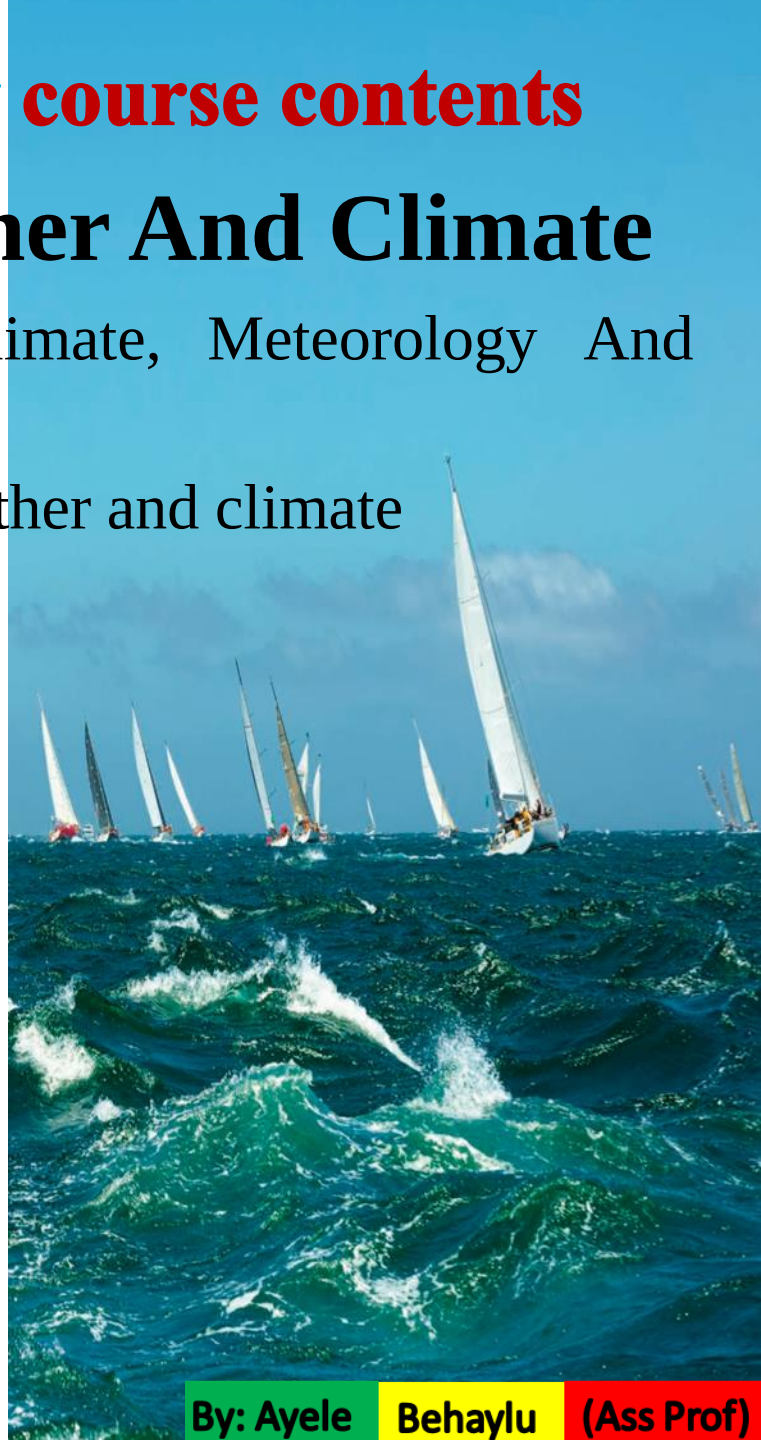
2. Basic Concepts Of Atmosphere

2.1. Origin and Nature of the Atmosphere

2.2. Composition and vertical structure of the Atmosphere

2.3. Atmospheric Variation with Altitude, Latitude and Season

2.4. Significance of the Atmosphere



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3. Solar Radiation And Temperature

3.1. The nature and characteristics of Solar Radiation

3.2. sources of earth‘s energy and energy transfer processes

3.3. Reflection and scattering of solar radiation

3.4. Solar radiation/Isolation

- 3.4.1. The global and surface radiation budget
- 3.4.2. Variability and distribution of isolation
- 3.4.3. Measures of sunshine and radiation

3.5. Temperature

- 3.5.1. Spatial and Temporal Variation of Temperature
- 3.5.2. Factors for variation of temperature
- 3.5.3. Measures of temperature
- 3.5.4. Heating and cooling of Atmosphere, Land mass, and Water body

4. Air pressure & Atmospheric Circulations

4.1. The concept of air pressure

4.2. Air pressure

- 4.2.1. vertical and horizontal variation of air pressure
- 4.2.2. Global pressure belts
- 4.2.3. Factors for variation of air pressure
- 4.2.4. Measures of air pressure

4.3. Wind

4.3.1. Causes of wind (air movement)/laws of horizontal movement

4.3.2. Forces affecting Winds

4.3.3. Types of winds – global/Planetary, regional and local

4.3.4. Upper air circulation – jet stream (concept, origin and effects)

4.3.5. Wind measurement

4.4. Climate and Weather Phenomena

4.4.1. Air Mass and fronts: Typology, origin, characteristics

4.4.2. Cyclones and Anti-cyclones

4.4.3. Hurricanes, Thunderstorms and Tornadoes

4.4.4. El Nino and La Nina

5. Atmospheric Humidity And Precipitation

5.1. Atmospheric Moisture

5.2. Evapo-transpiration

- 5.2.1. Factors that affect Evapo-transpiration rate
- 5.2.2. Measures of Evapo-transpiration
- 5.3. Atmospheric humidity
- 5.3..1. Types of Humidity - absolute, relative and specific
- 5.3..2. Factors of atmospheric humidity
- 5.3..3. Temporal and spatial variation of humidity
- 5.3..4. Atmospheric Equilibrium: Stability and instability
- 5.3..5. Measures of humidity

5.4. Cloud formation, type and characteristics

5.5. Condensation Process and forms

5.6. Precipitation and its types

- 5.6.1. Processes of precipitation formation (Bergeron-Findeisen theory, collision and coalescence)
- 5.6.2. Forms of Precipitation
- 5.6.3. Precipitation types
- 5.6.4. Precipitation measurement
- 5.6.5. Global distribution of precipitation

6. Climate Classification

6.1. Climatic classification: General Considerations

6.2. History and philosophical base of climate classification

6.3. significance of climate classification

6.4. Approaches to Climatic Classification

- 6.4.1. Genetic classifications (based on the geographic determinants of climate, surface energy budget, and derived from air mass analysis).
  - 6.4.2. Empirical classifications
  - 6.4.2.1. koppen climate classification
  - 6.4.2.2. Thornthwaite classification
  - 6.4.2.3. Oliver classification

6.5. An over view of World Climatic regions: Tropical, Temperate, cold, Deserts