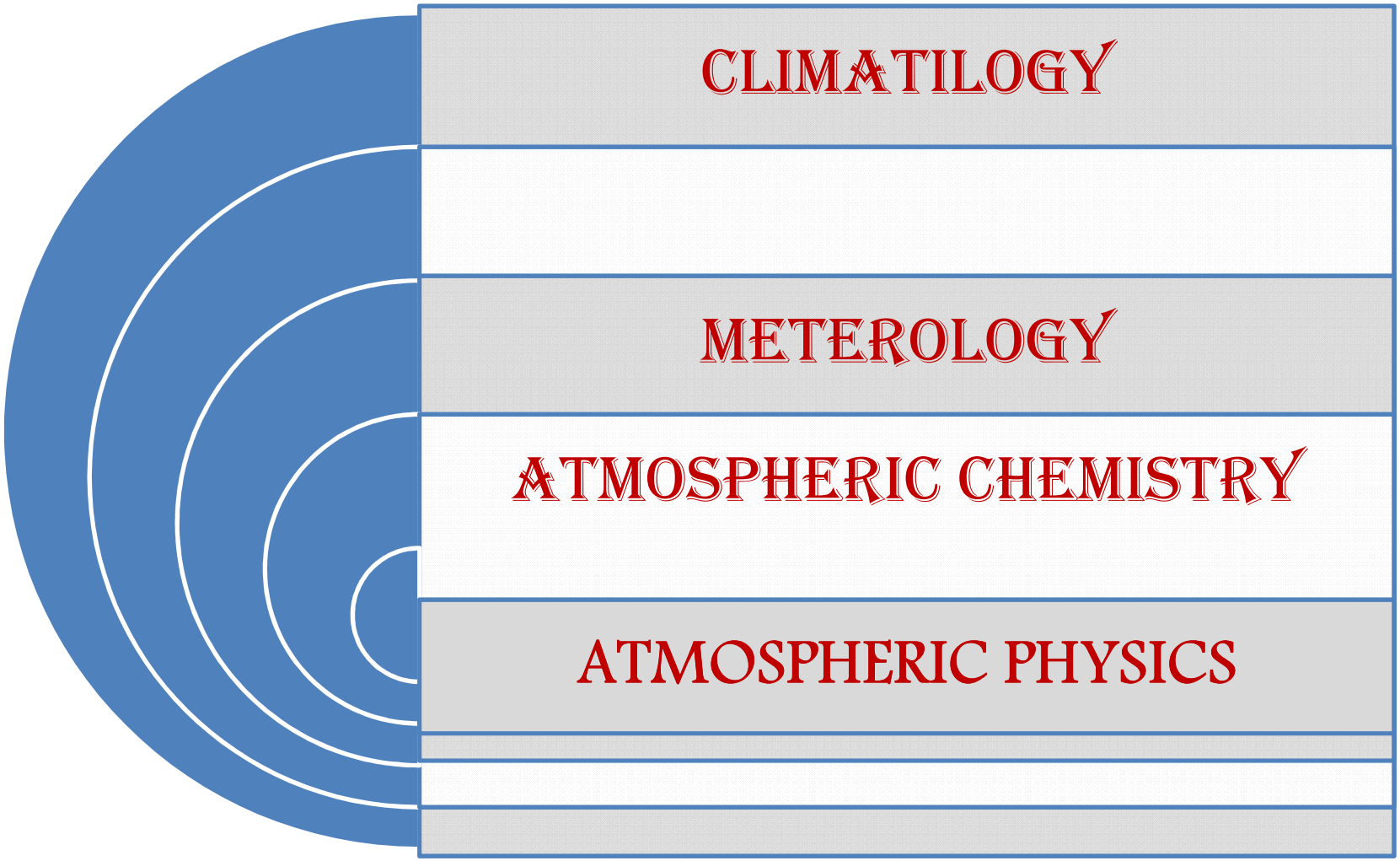
# ATMOSPHERIC SCIENCE

Dr. Vivek Kumar Pandey
Department of Environmental Science
VBS Purvanchal University Jaunpur

# MAIN THEMES OF ATMOSPHERIC SCIENCE



## ATMOSPHERIC SCIENCE-

Atmospheric science is an umbrella term superset or grouping of related concept for the study of Atmosphere.

Atmosphere is the envelop of gas that surrounds the earth .50 Km layer of the atmosphere ha many functions.

50 Km layer act as–

1. Filter
2. Removing DNA –destroying high energy UV Ray Traps infra red radiation that is given out by the earth and transfer in to thermal motion

Effect – Warming the surface of earth

- Atmospheric Sciences and Meteorology are basically quite interchangeable
- Atmospheric science includes climatology, air quality, and meteorology

# CLIMATOLOGY&METEOROLOGY-

CLIMATOLOGY- study of climate (the atmosphere over an extended period of time.)

Climatology study of atmospheric changes due to

1. Natural Climate Variability
2. Anthropogenic

Physical climatology studies drive climate, reconstruction, or prediction, aerosols , oceanography, are very relevant in climatology.

# METEOROLOGY

Meteorology includes atmospheric chemistry, Atmospheric physics with the major focus of weather forecasting.

- Meteorology is the study of weather, forecasting via television, forensic meteorology, produce forecasts etc. Meteorologists often study improvements to atmospheric models, or other aspects to forecasting, mechanisms behind certain weather phenomena includes (atmospheric processes including temperature, air pressure, and chemical composition, atmospheric chemistry, turbulence, etc.)

## CLIMATOLOGICAL INTEREST INCLUDES-

Atmospheric boundary layer Circulation pattern and Heat transfer (radioactive, convective, Latent) Interaction between Atmosphere and Ocean Land Surface Chemical and Physical composition of Atmosphere.

# How Weather is Studied

- The main tools used by meteorologists such as barometers and thermometers. Beginning in the 18th century, ships were also used to study weather.
- More recently, meteorologists have made use of complex computer programs to model atmospheric phenomena.

# Similarities between Climatology and Meteorology

- Meteorology and climatology are both branches of atmospheric science. They both involve the study of atmospheric processes such as air temperature, air pressure, and atmospheric composition.

# DIFFERENCES BETWEEN CLIMATOLOGY AND METEOROLOGY

| | |
|---|---|
| Climatology | Meteorology |
| Climatology deals with atmospheric behavior over a significant period time | Meteorology deals with amospheric phenomena at any time and over short time intervals lasting no more than a few days. |
| Studies processes that are also related to fields such geology and astronomy in addition to atmospheric science | Meteorology deals principally with the atmosphere. |
| | |
| Climatology primarily deals with the past | Meteorology deals with the present moment and short-term changes lasting hours to day |
| Focus on past | Focus on future |

# STRUCTURE & COMPOSITION OF ATMOSPHERE

- Primitive atmosohere is the evolution of life
- Atmosphere is dominated by –

  $N_2$, $H_2O$, $Co_2$

  $NH_3$, $CH_4$ are in lower concentration
- Irradiation of this pre-biotic atmosphere with UV Light from sun facilitated following photochemical reaction
- H2O+ hv (<240nm)= $H_{(g)}$ + $OH_{(g)}$

  Free radicals highly reactive unpaired electrons

$Co_2$+ hv (<240nm)= $Co_{(g)}$ +$O_{(g)}$

O2+ hv (<240nm)= 2O

O+$O_2$=$O_3$

V= n **λ**
n = frequency
V = Velocity of light
**λ=** Wave length

**E = h r**
**h= flanks constant**
**R=frequency of EM of radiation**

**Electromagnetic radiation**

In Antarctic region (low temp) sped up the conversion of CFCs in to chlorine

In the stratosphere Cl, Br atoms are librated from the parent compound

# ATMOSPHERIC CHEMISTRY-

- Atmospheric chemistry is the branch of atmospheric science composition and chemistry is important for several reasons.
- **COMPOSITION OF EARTH'S ATMOSPHERE**

  has been changed by human activity and some of the changes are harmful to Human health Crops and Ecosystems.
- **PROBLEMS-**
- Which has been addressed by atmospheric chemistry as like – Acid rain, Photochemical smog and Global warming. Atmospheric chemistry seeks to understand the cause of these problems.

# ATMOSPHERIC PHYSICS

- Application of physics to the study of atmosphere using fluid flow equation, chemical model balancing and energy transfer in the atmosphere and underlying oceans.

# LAPSE RATE-DRY ADIABATIC

- The decreases of an Atmospheric variable with height, the variable being temperature unless otherwise specified Lapse rate dry adiabatic-rate of decrease of temperature at the rate of 0.0098 $^{0}$C degree/ Metre it is the rate at which parcel of unsaturated air will cool if lifted adiabatically, also called natural lapse rate.

# SUPERADIABATIC LAPSE RATE-

- Atmospheric lapse rate in which the decrease in air tempt. with elevation is greater than the normal adiabatic lapse rate under this condition, vertical motion are accelerated and that most fear is said to be under stable.

# MIST-

- A suspension or dispersion of liquid droplets in a gas. Usually applied to water droplets in air where visibility has a value of 1 kilometre or more. Natural mist maybe aggravated by air pollutants.


WE NEED EVERYONE'S HELP TO STOP POLLUTION
IT'S YOUR WORLD... HELP KEEP IT CLEAN!


THANK YOU