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## NET, IAS, State-SET (KSET, WBSET, MPSET, etc.), GATE, CUET, Olympiads etc.: Air Masses (AM)

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### Meaning and Characteristics

“An air mass may be defined as a large body of air whose physical properties, especially temperature, moisture content, and lapse rate, are more or less uniform horizontally for hundreds of kilometres.” According to A N Strahler and A. H. Strahler: “a body of air in which the upward gradients of temperature and moisture are fairly uniform over a large area is known as an air mass.” An air mass may be so extensive that it may cover a large portion of a continent and it may be so thick in vertical dimension that it may vertically extend through the troposphere.

- An air mass is designated as cold air mass when its temperature is lower than the underlying surface while an air mass is termed warm air mass when its temperature is higher than the underlying surface.
- The boundary between two different air masses is called front.

### Source Regions

- The extensive areas over which air masses originate or form are called surface regions whose nature and properties largely determine the temperature and moisture characteristics of air masses.
- An ideal source region of air mass must possess the following essential conditions:
- There must be extensive and homogenous earth's surface so that it may possess uniform temperature and moisture conditions;
- There should not be convergence of air; rather there should be divergence of air flow so that the air may attain the physical properties of the region.
- Atmospheric conditions should be stable for considerably long period of time so that the air may attain the characteristics of the surface.

### Regions of Air Masses

There are six major source regions of air masses on the earth's surface:

1. Polar oceanic areas (North Atlantic Ocean between Eurasia and North America, and Arctic region during winter season) ,
2. Tropical oceanic areas (anticyclonic areas throughout the year) ,
3. Tropical continental areas (North Africa Sahara, Asia, Mississippi Valley zone of the USA most developed in summers) ,
4. Equatorial regions (zone located between trade winds active throughout the year) , and
5. Monsoon lands of SE Asia

### **Classification of AM**

There are two approaches to the classification of air masses, e. g. ,

1. Geographical Classification
2. Thermodynamic classification.

### **Geographical Classification**

[Know more on Drainage of India \[https://www.youtube.com/watch?v=DMgPamV3TuY\]](https://www.youtube.com/watch?v=DMgPamV3TuY)

- The geographical classification of air masses is based on the characteristic features of the source regions.
  - Trewartha has classified air masses on the basis of their geographical locations into two broad categories, viz. ,
  - Polar air mass (P) , which originate in the polar areas. Arctic air masses are also included in this category;
  - Tropical air mass (T) , which originate in tropical areas. Equatorial air masses are also included in this category.
  - These two air masses have been further divided into two types on the basis of the nature of the surface of the source regions:
  - Continental air masses (indicated by small letter V) and
  - maritime air masses ( 'm' )
- #### **Thermodynamic Modifications and Classification of Air Masses**
- Thermodynamic modifications of an air mass involves its heating from below while passing through different surfaces away from the source region.
  - The modification of air masses depend on 4 factors:
  - Initial characteristics of air mass in terms of temperature and moisture content:
  - Nature of land or water surface over which a particular air mass moves,
  - Path followed by the air mass from the source region to the affected area, and
  - Time taken by the air mass to reach a particular destination.
  - A warm air mass (w) is that whose temperature is greater than the surface temperature of the region visited while if the air mass is colder than the surface temperature it is called cold air mass (k) .

- Such mechanical modifications are introduced due to cyclonic and anticyclonic conditions, Based on the thermodynamic and mechanical (dynamic) modifications air masses are divided into: cold air mass and warm air mass.