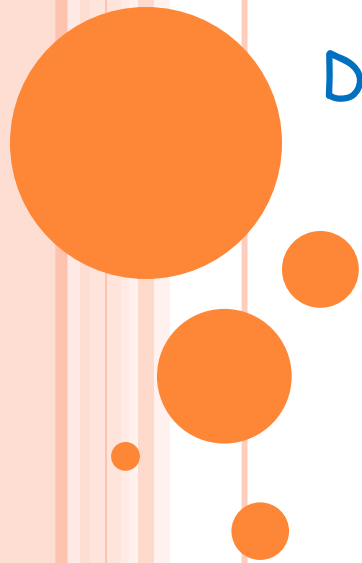




Climate Change: A Global Perspective

Govind Pant

Department of Atmospheric and Space Science
University of Pune





Climate

Climate in a narrow sense is usually defined as the average weather. In a more rigorous sense, the climate is statistical description of relevant qualities over a period long enough to have a quasi-stable description of the state of the climate system.



Climate System

The Climate System is the highly complex system consisting of five major components; the atmosphere, the hydrosphere, the cryosphere, the land surface and the biosphere, and the interactions between them. The climate system evolves in time under the influence of its own internal dynamics and because of external forcings such as volcanic eruptions, solar variations and human induced forcings such as the changing composition of the atmosphere land use change.

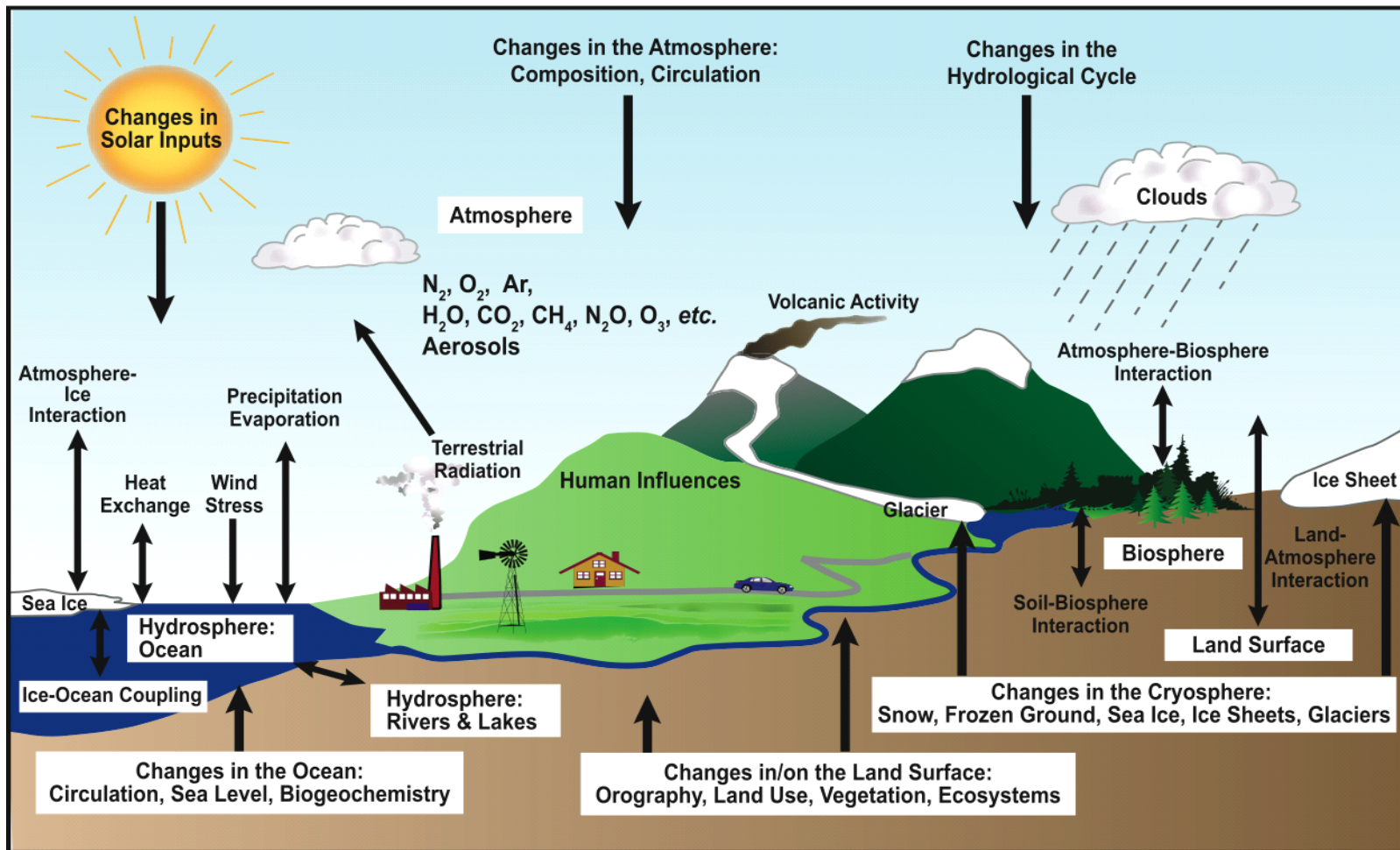




Climate Change

It refers to a change in the state of the system definable in terms of its statistical properties persisting over an extended period. Climate change may be due to natural internal processes or external forcings or to persistent anthropogenic changes in its components such as composition of the atmosphere, land use etc.

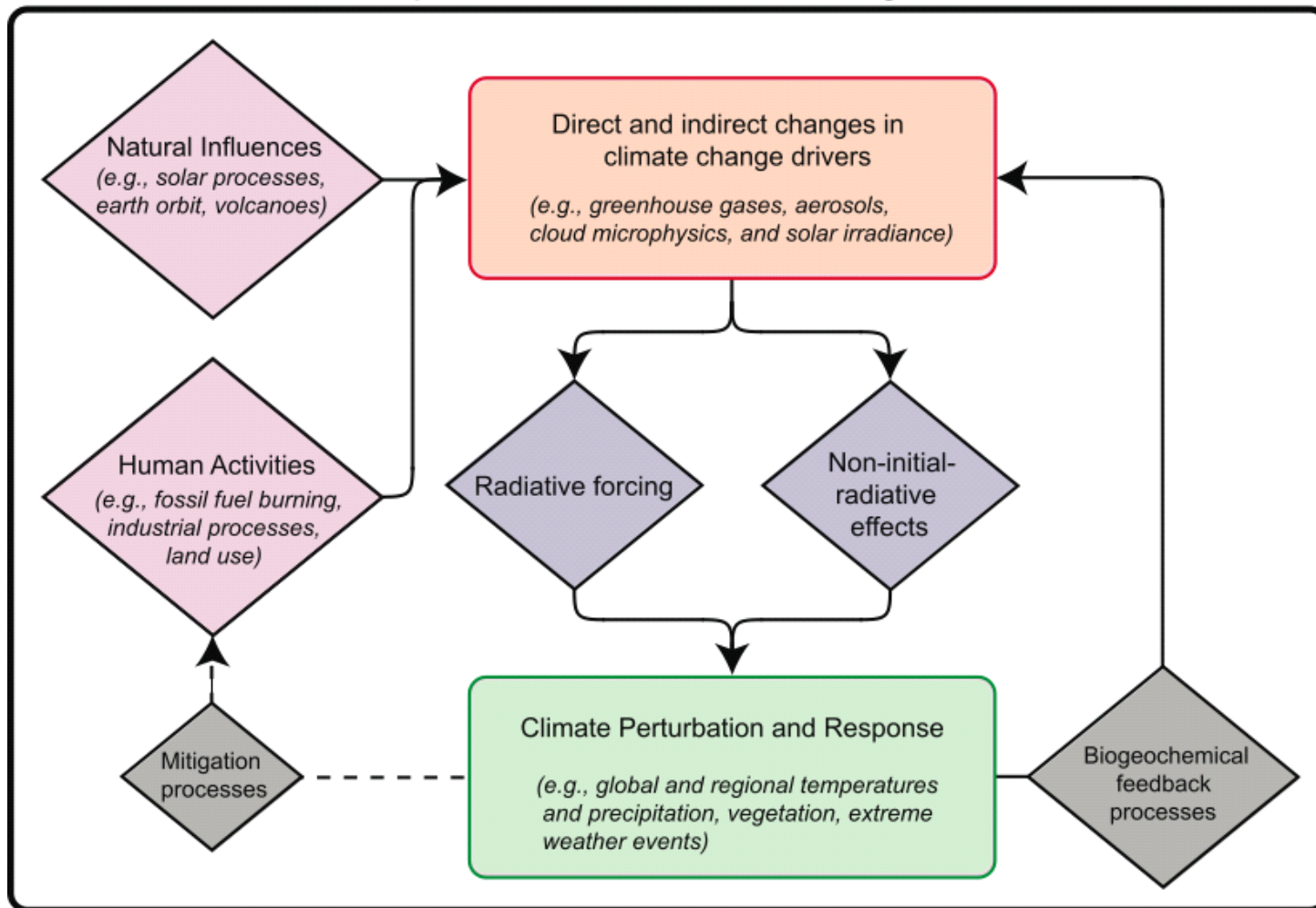


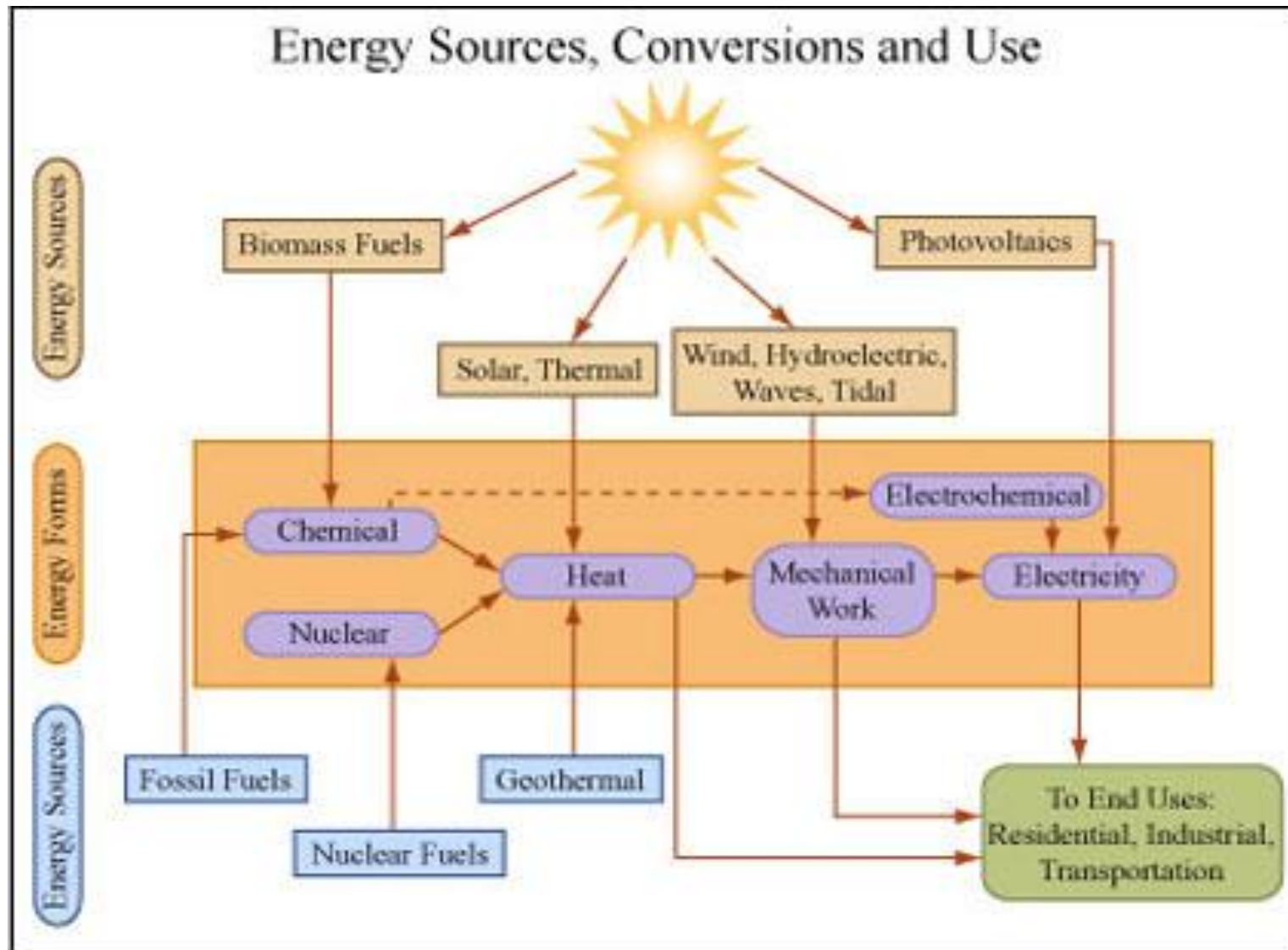


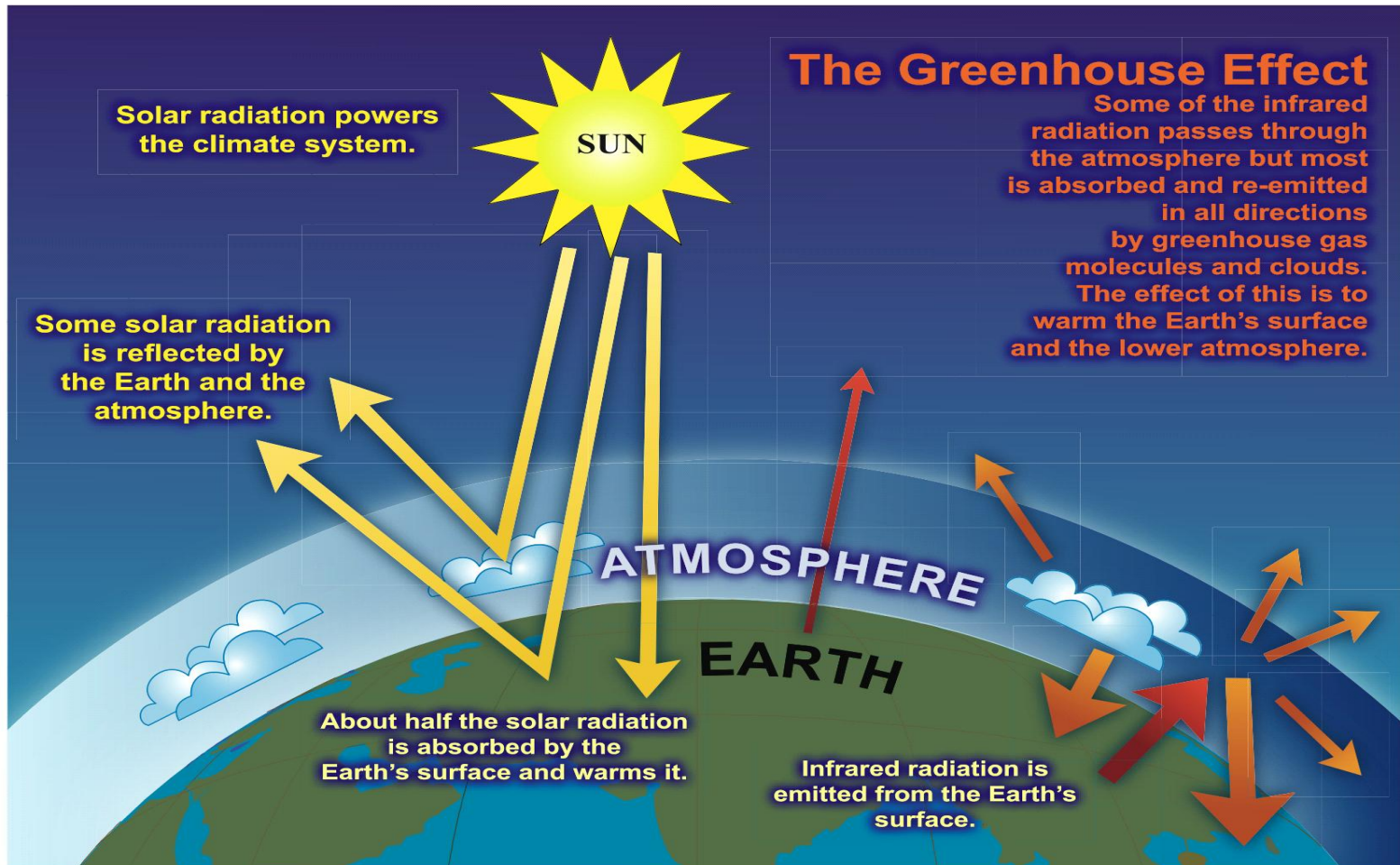
Schematic view of the components of the climate system, their processes and interactions



Components of the Climate Change Process





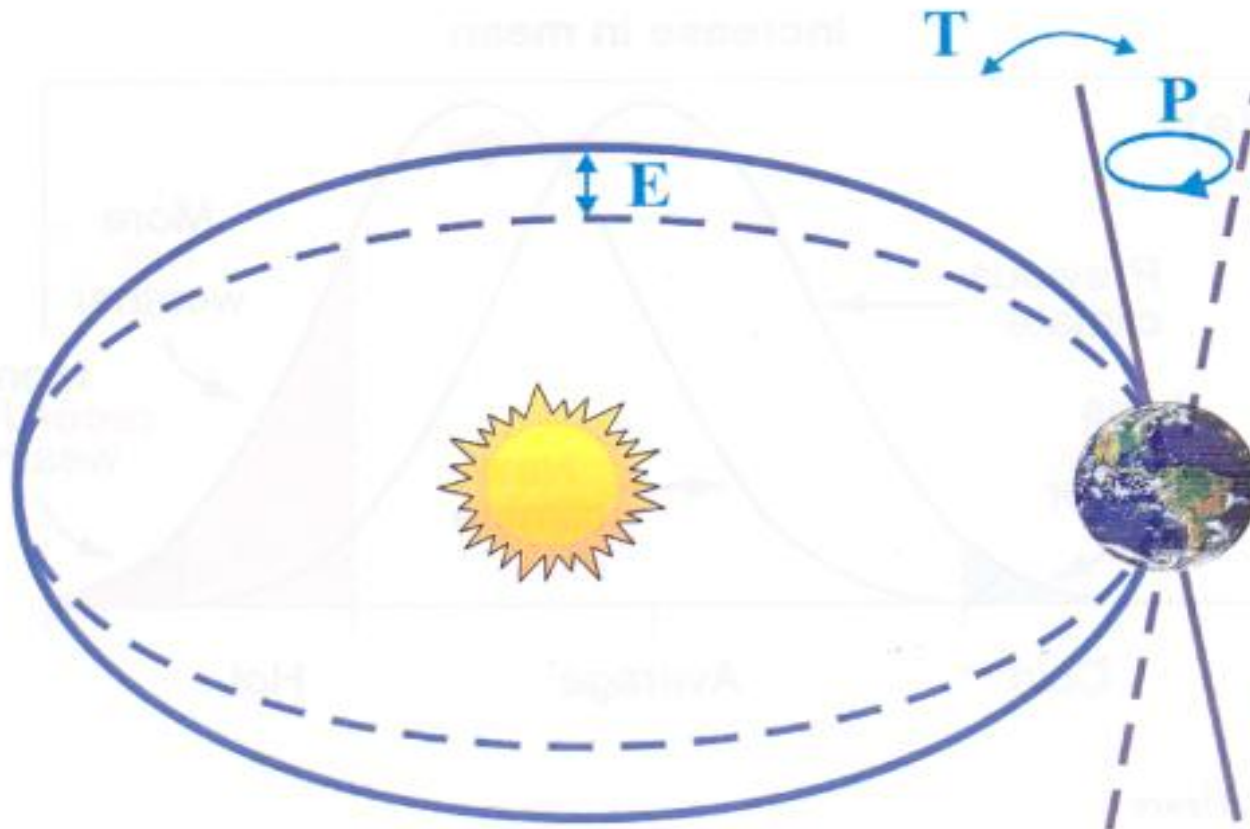


An idealised model of the natural greenhouse effect



Astronomical Forcings of Climate Change

(Approximate periodicities : 98000, 42000, 21000 Years)

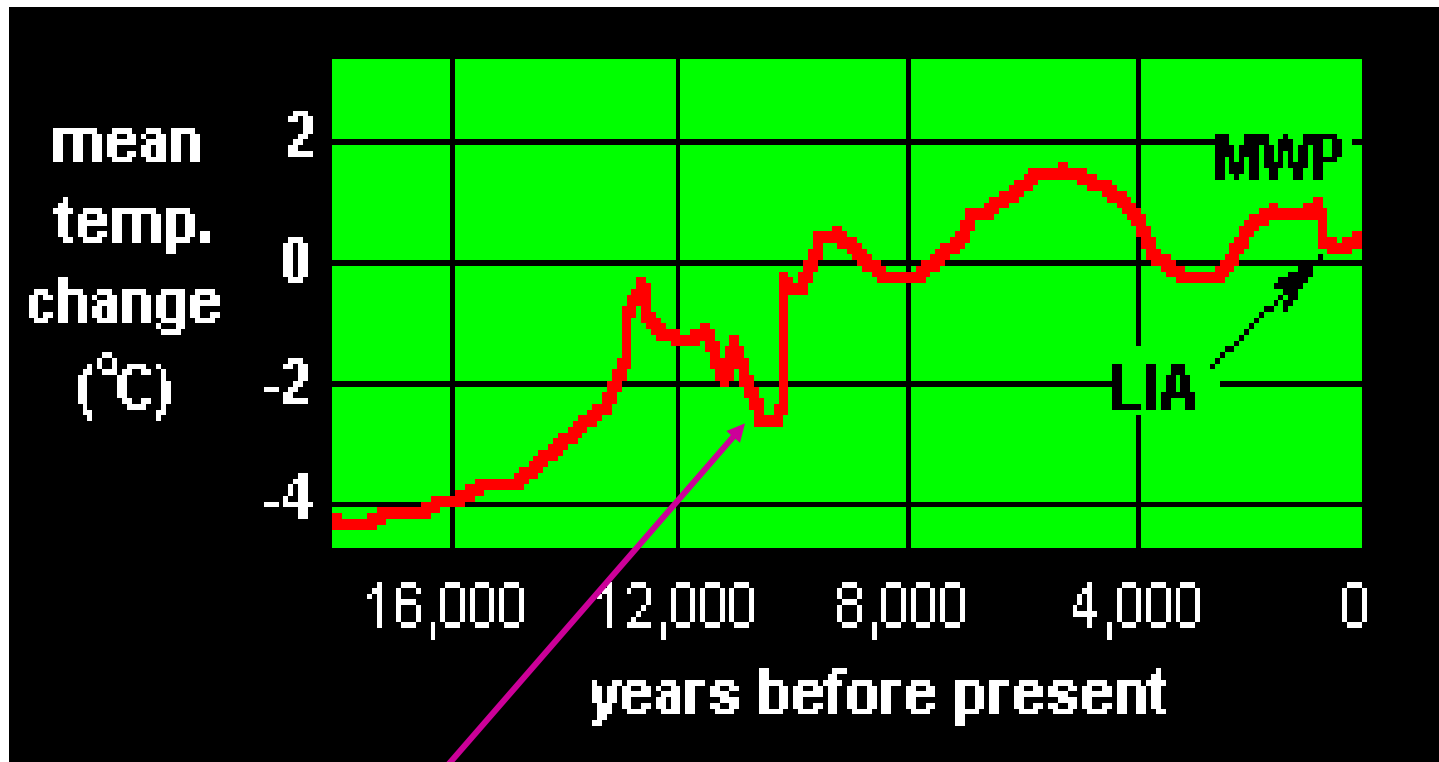


Schematic of the Earth's orbital changes (Milankovitch cycles) that drive the ice age cycles. "T" denotes changes in the tilt (or obliquity) of the Earth axis, "E" denotes changes in the eccentricity of the orbit, and "P" denotes precession, i.e., changes in the direction of the axis tilt at a given point of the orbit.



TEMPERATURE CHANGES DURING LAST 18,000 YEARS

RAPID DROP IN TEMPERATURE AROUND 11,000 YEARS AGO (YOUNGER DRYAS), MEDIEVAL WARM PERIOD AND LITTLE ICE AGE

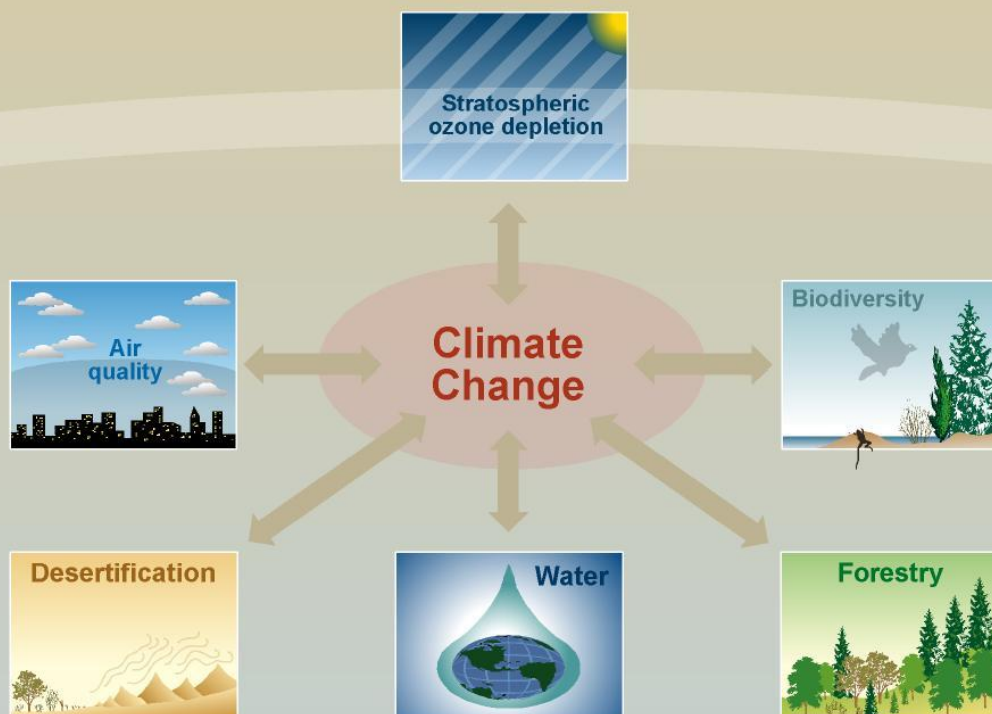


Younger
Dryas





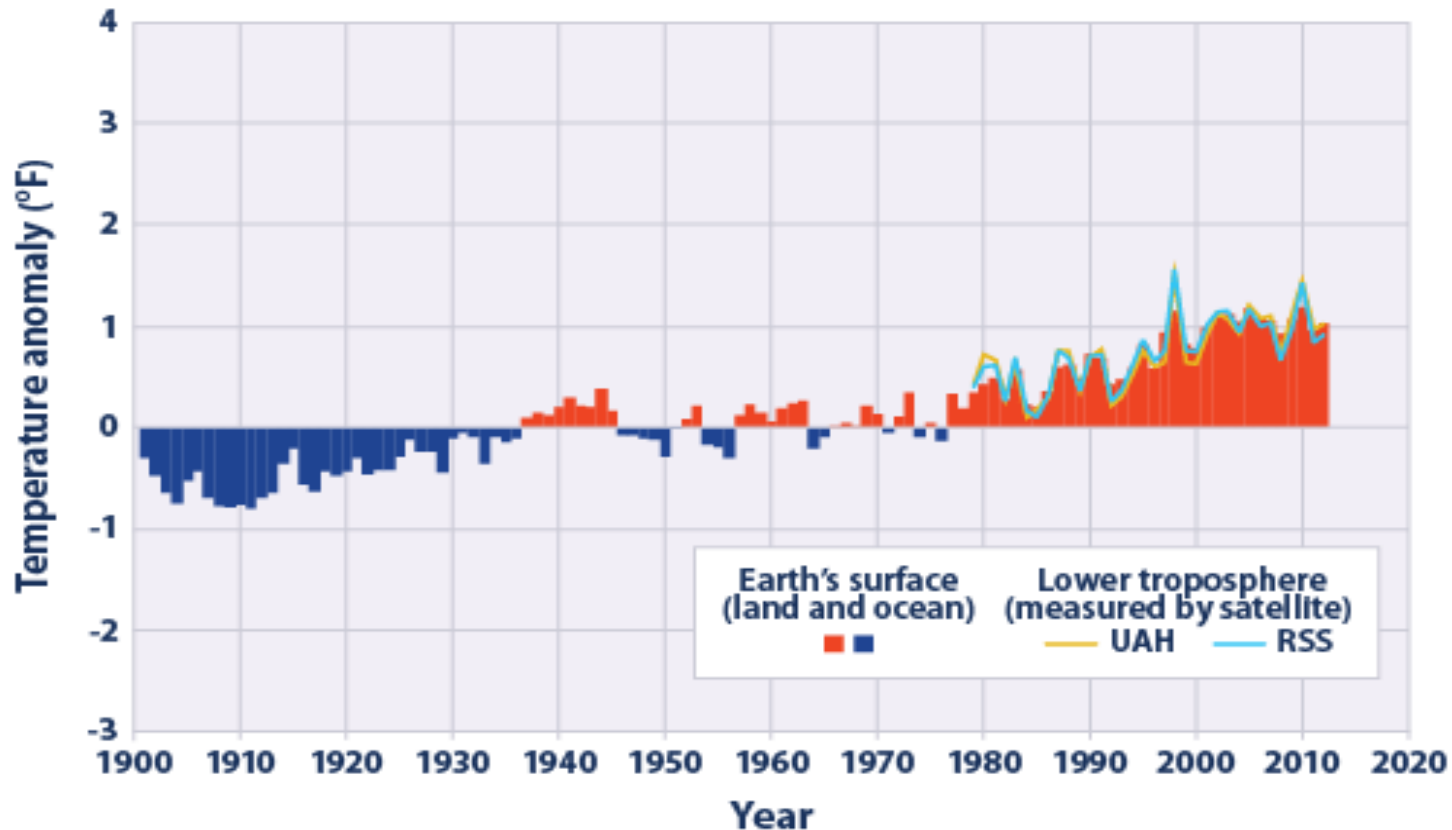
Linkages between climate change and other environmental issues



SYR - FIGURE 8-1



Figure 2. Temperatures Worldwide, 1901–2012



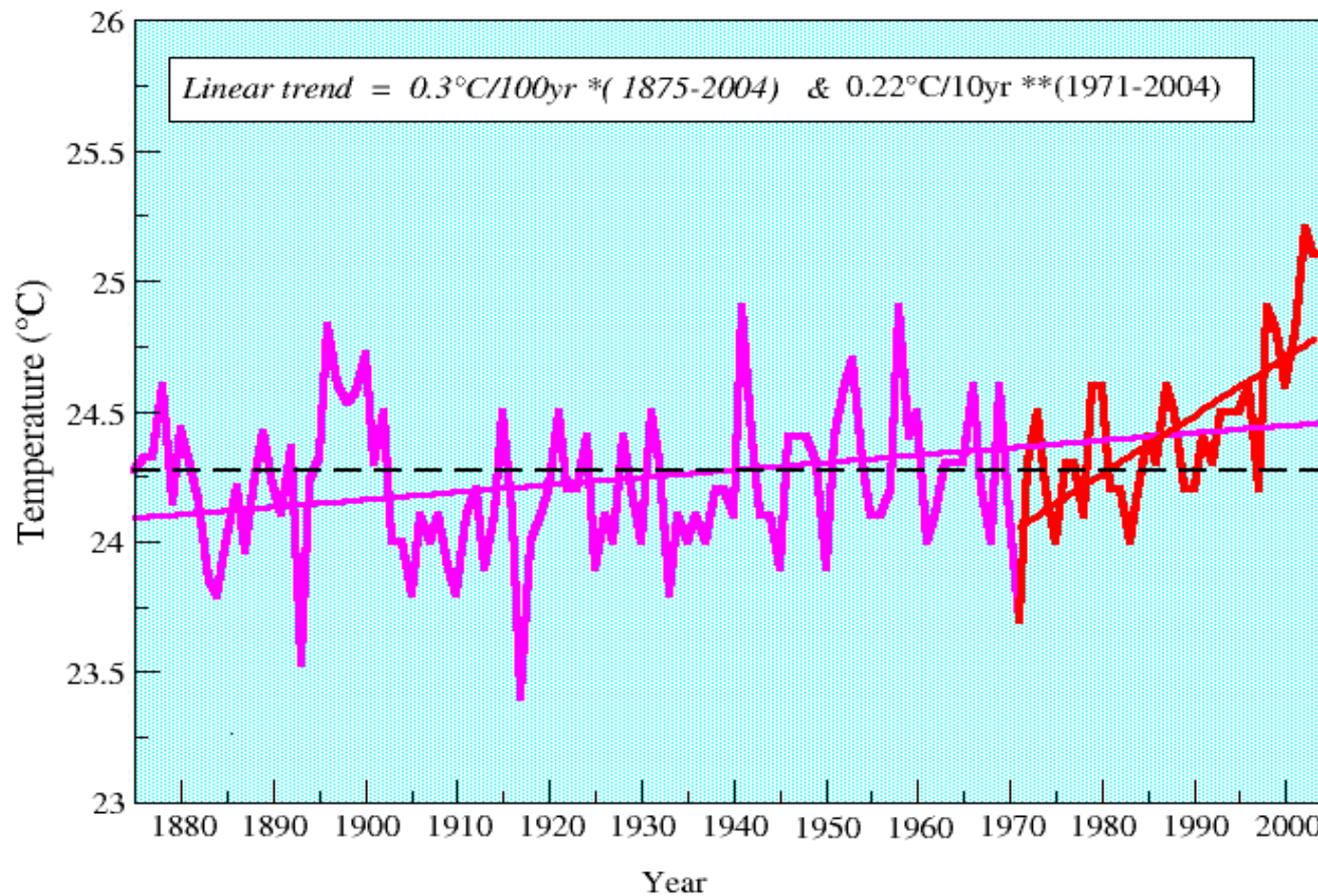
Surface data is from a combined set of land-based weather stations and sea surface temperature measurements. Satellite measurements cover the lower troposphere.

Data source: NOAA, 2013





Variation of all-India annual mean temperature during 1875-2004

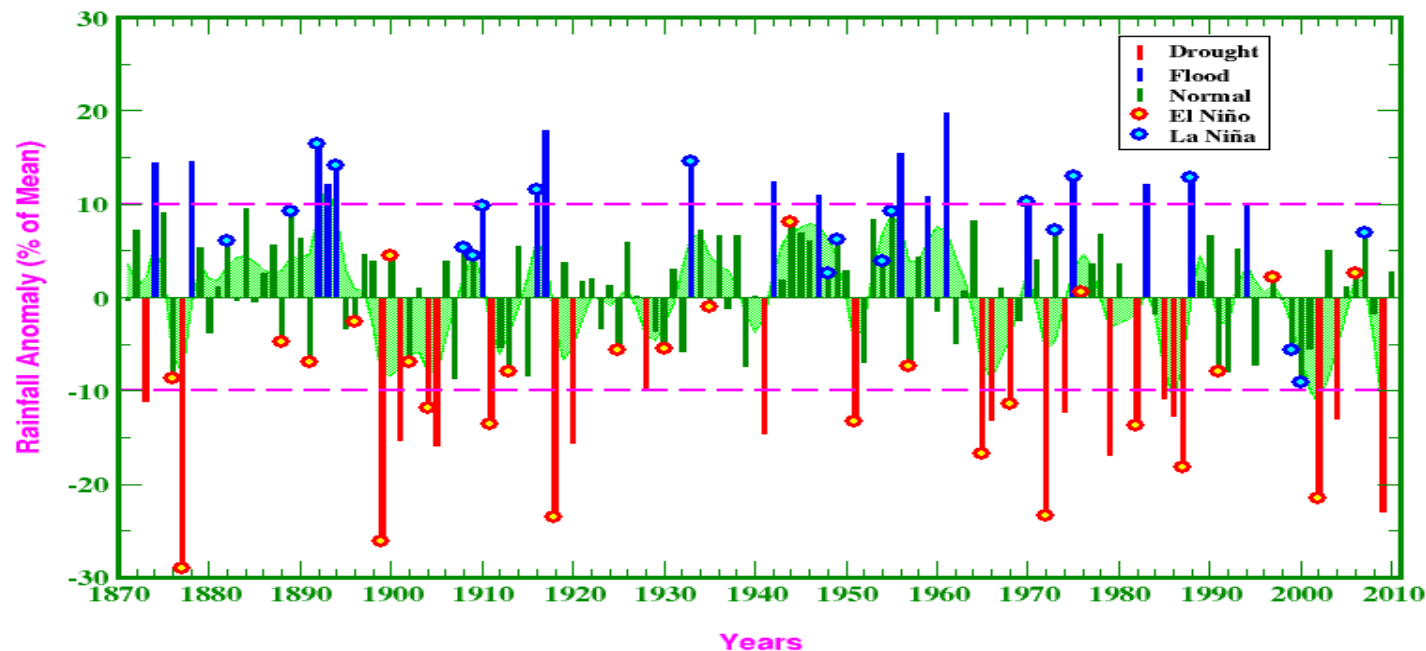


Courtesy IITM Pune



ALL-INDIA SUMMER MONSOON RAINFALL (1871-2010)

All-India Summer Monsoon Rainfall, 1871-2010



(Based on IITM Homogeneous Monthly Rainfall Data Set)





**THANK
YOU**

A photograph of a human hand, palm up, holding a glowing, translucent sphere. The sphere is centered in the upper half of the frame and contains the words "THANK YOU" in a bold, black, sans-serif font. The background is a solid, dark gray. The lighting is soft, highlighting the contours of the hand and the glow of the sphere.