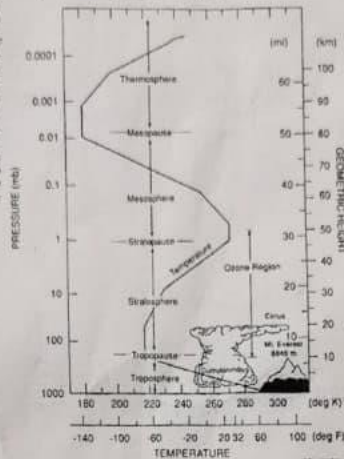


Vertical Structure of the Atmosphere

كيمياء الغلاف الجوي
د. نادية محمد
أستاذة المادة

Atmospheric Chemistry and Global Change

Figure 1.5. Vertical profile of the temperature between the surface and 100 km altitude as defined in the U.S. Standard Atmosphere (1976) and related atmosphere layers. Note that the tropopause level is represented for midlatitude conditions. Cumulonimbus clouds in the tropics extend to the tropical tropopause located near 18 km altitude.



Reasons for the temperature profile:

- adiabatic vertical transport
- radiative cooling by water vapour
- absorption in the ozone layer
- oxygen absorption in the thermosphere

Consequences of the temperature profile:

- strong mixing in the troposphere
- low vertical mixing in the stratosphere
- very low humidity in the stratosphere (tropopause acts as a cooling trap)

Why should we care about Atmospheric Chemistry?

- scientific interest
- atmosphere is created / needed by life on earth
- humans breath air
- humans change the atmosphere by
 - air pollution
 - changes in land use
 - tropospheric oxidants
 - acid rain
 - climate changes
 - ozone depletion
 - ...
- atmospheric chemistry has an impact on atmospheric dynamics, meteorology, climate

The aim is

1. to understand the past and current atmospheric constitution
2. to predict future atmospheric constitution
3. to provide input for political decisions affecting atmospheric constitution