
Review for Exam 1
GEOL 1147: Introduction To Meteorology Lab

Exam 1

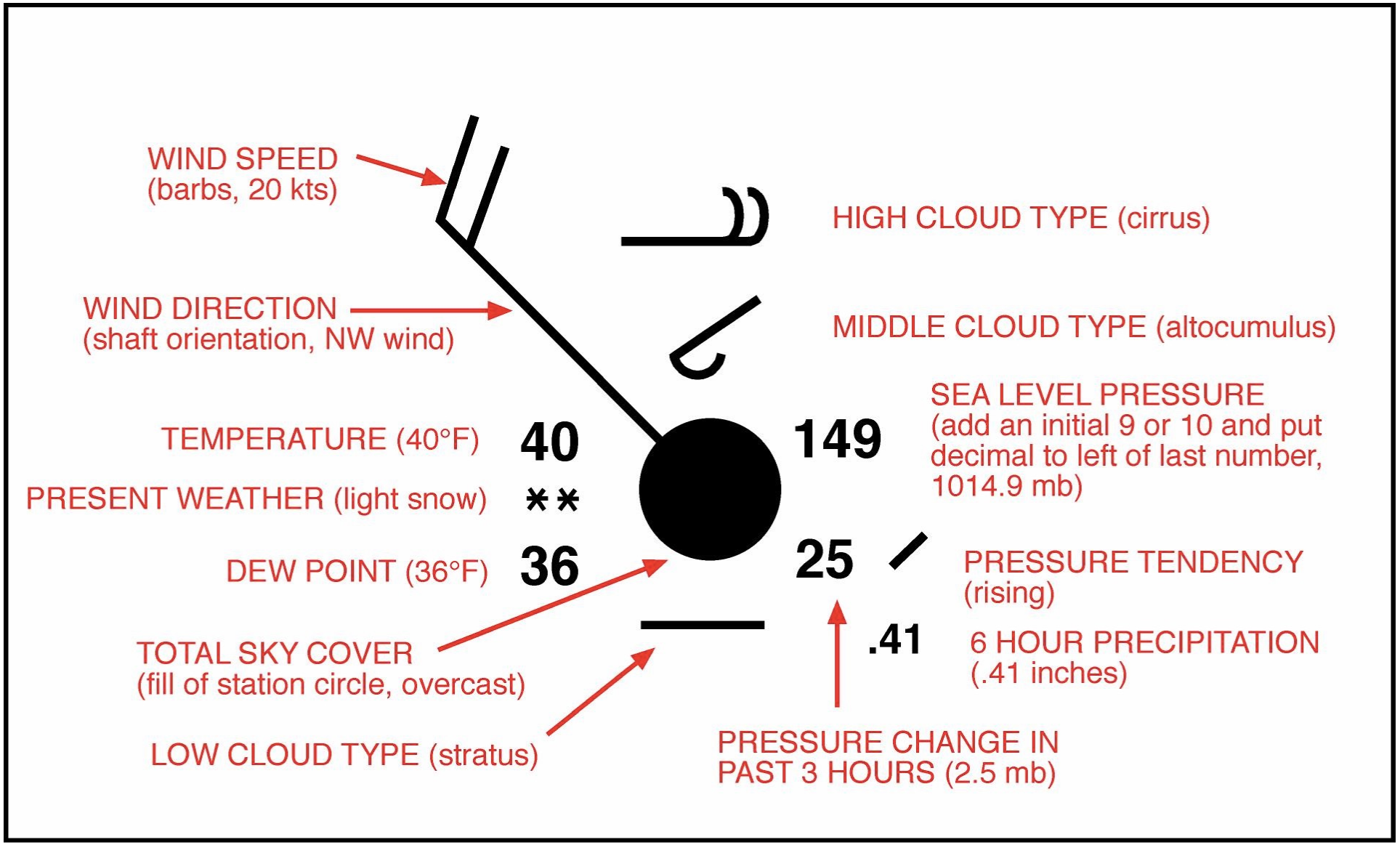
Cover: Labs 1-2

Close-book Exam

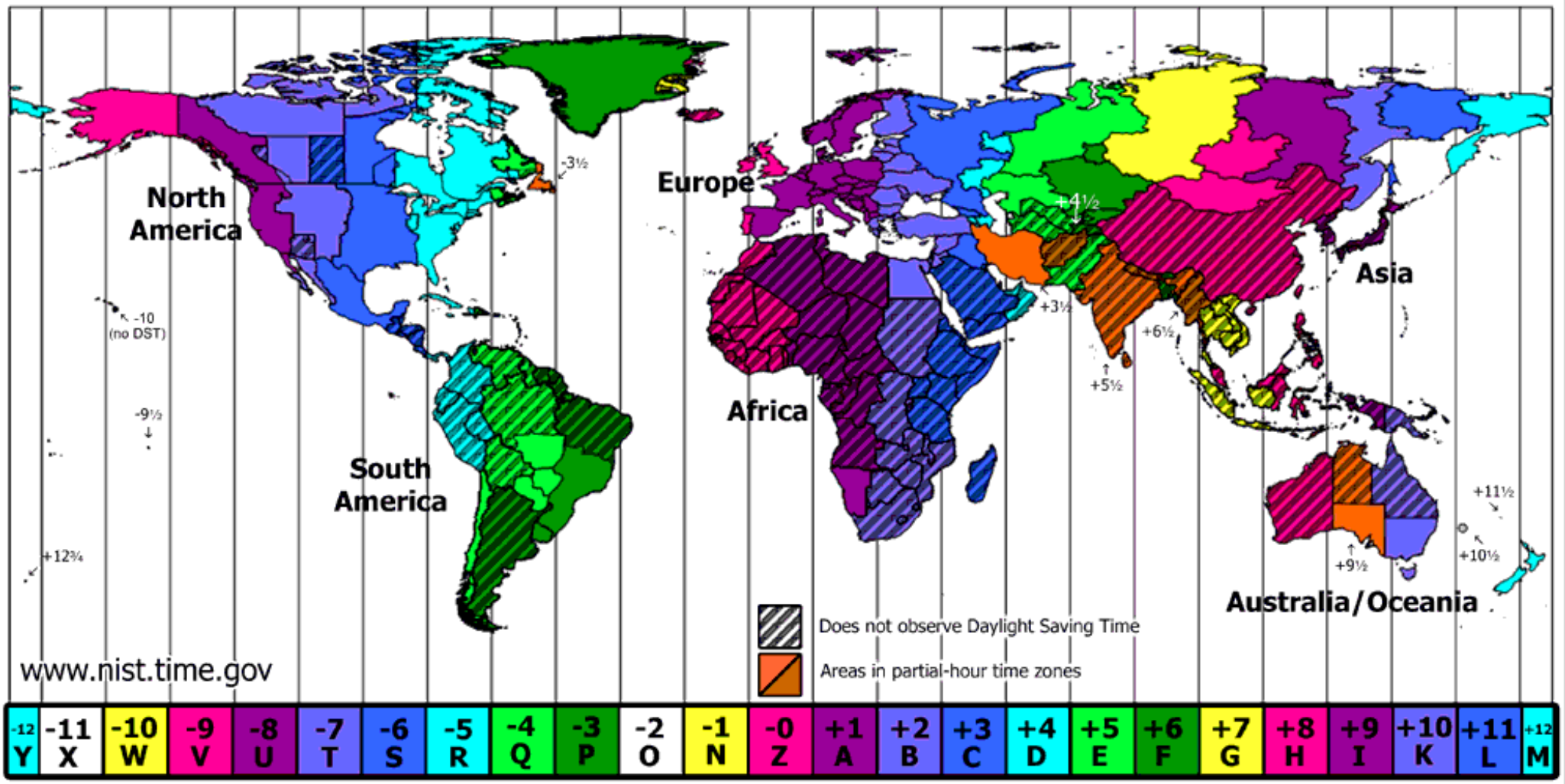
You can use a scientific calculator.

Exam counts 22.5% of the total grade.

Surface Station Model



Time Zones


North America
Europe
Asia
Africa
South America
Australia/Oceania
-3½
+4½
-10
(no DST)
+3½
+6½
+5½
-9½
+11½
+12¾
+10½
+9½
Does not observe Daylight Saving Time
Areas in partial-hour time zones
www.nist.time.gov
-12 Y
-11 X
-10 W
-9 V
-8 U
-7 T
-6 S
-5 R
-4 Q
-3 P
-2 O
-1 N
-0 Z
+1 A
+2 B
+3 C
+4 D
+5 E
+6 F
+7 G
+8 H
+9 I
+10 K
+11 L
+12 M

Time Zones

Different locations are located in different time zones.

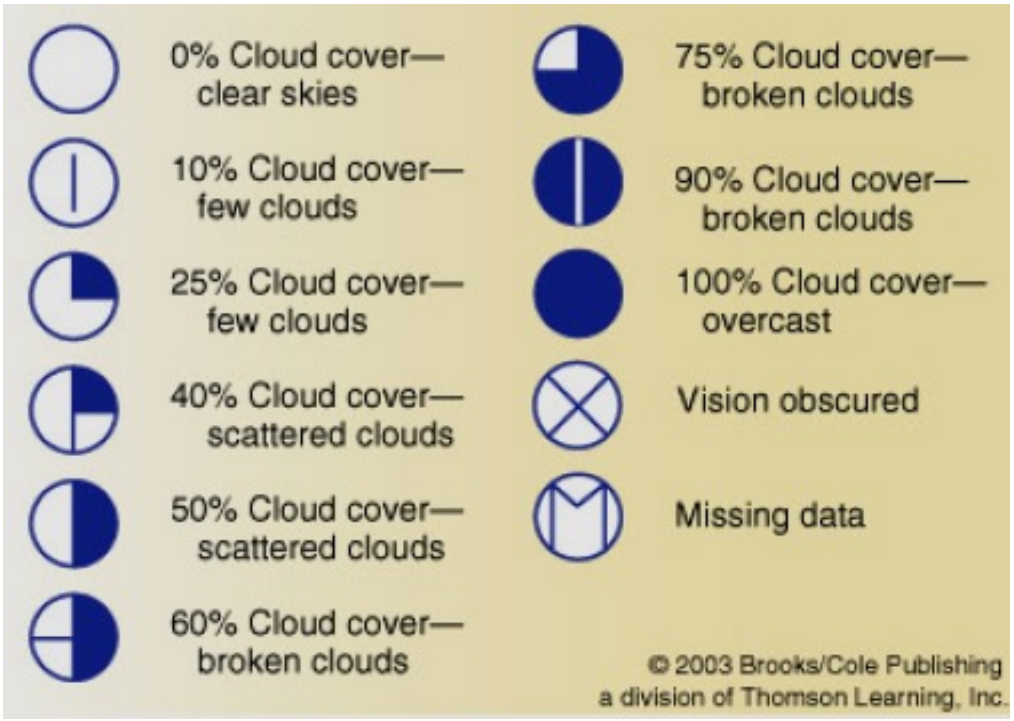
Meteorologists report weather observations with a standard time, called Universal Time Coordinates (UTC).

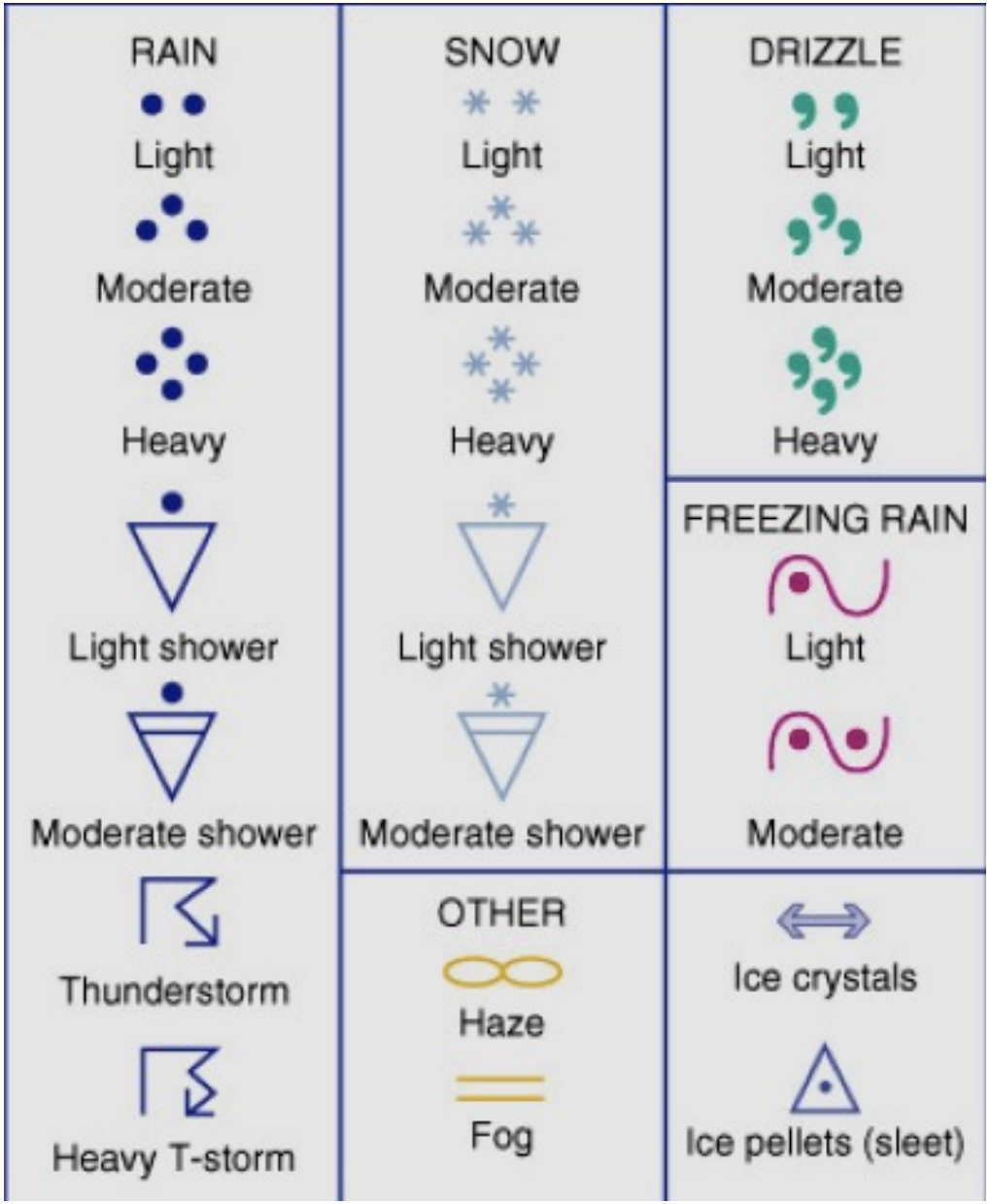
UTC is also denoted by Greenwich Meridian Time (GMT) or Z time. This standard time corresponds to the time at Greenwich, England, located at 0° longitude.

To convert between local time and Z time, we need know how many hours difference between our location and Greenwich, England.

In winter, Houston is 6 hours behind Greenwich, England. In the Summer months (daylight saving time), the difference will be 5 hours.

Surface Station Model

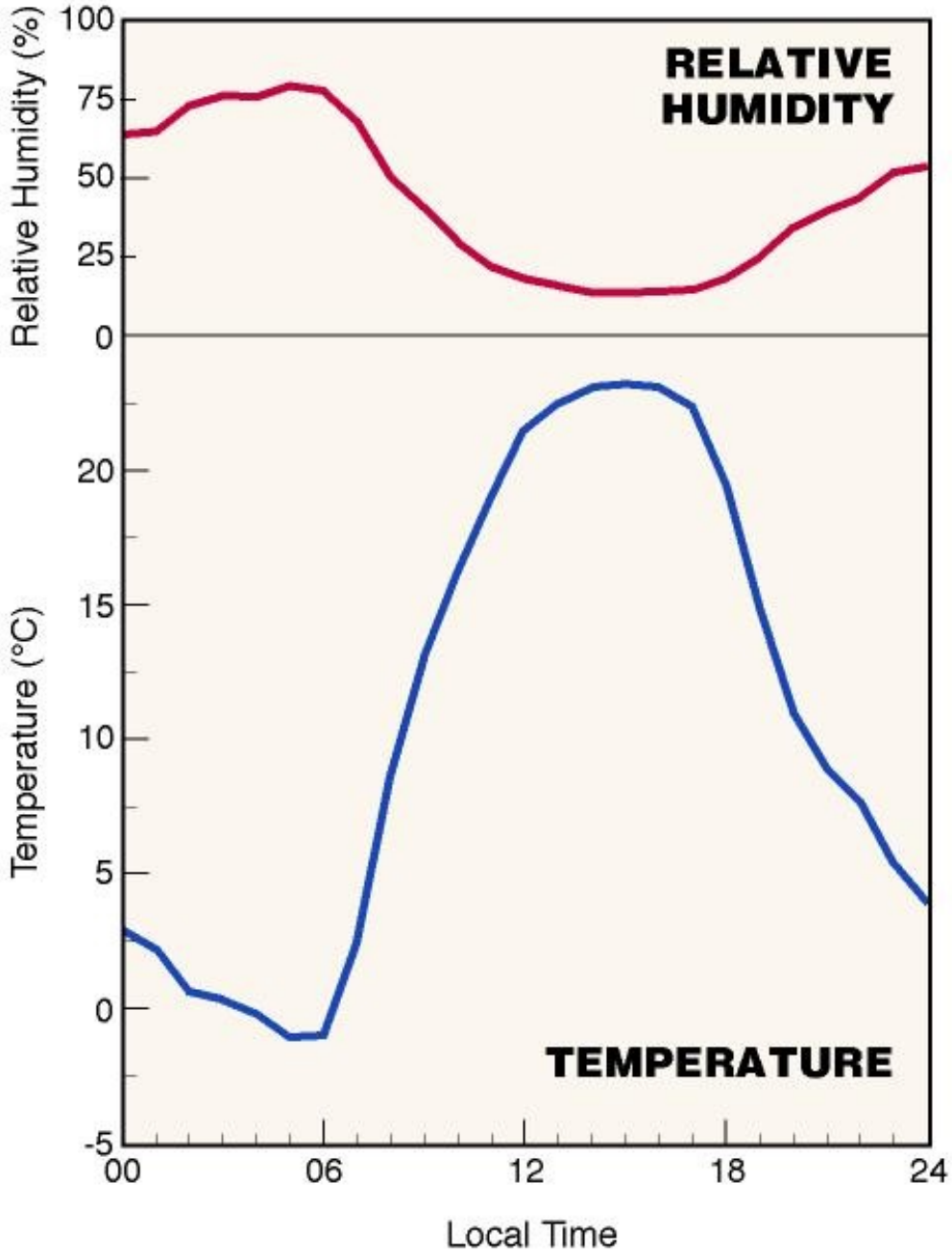




Change of relative humidity in a day

What time of the day when relative humidity is usually high ?

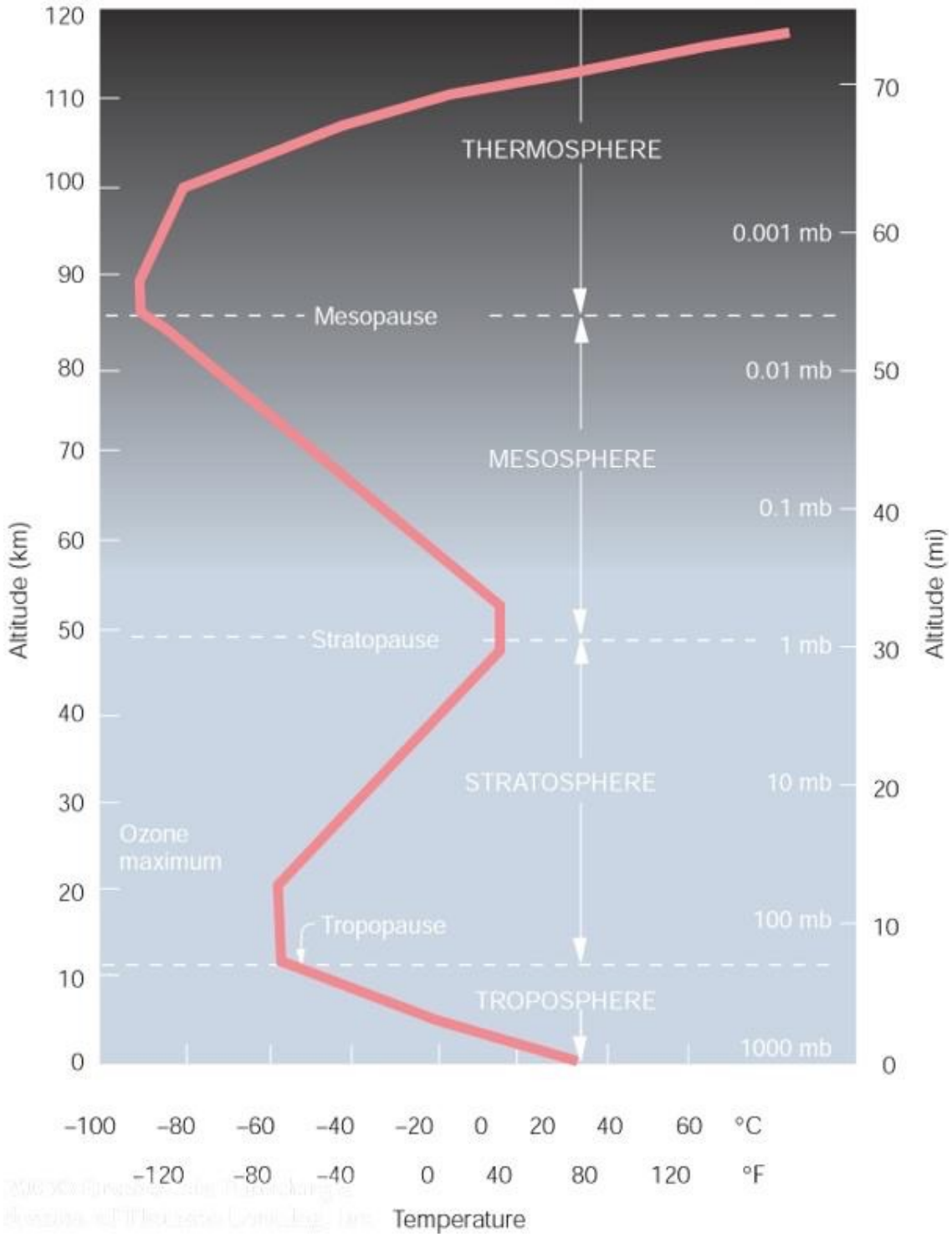
As the air cools during the night, the relative humidity increases. The highest relative humidity occurs in the early morning, during the coolest part of the day.



Dew Point Temperature - T_d

- Temperature to which air must be cooled (at constant pressure and constant water vapor content) to become saturated.
- When $T=T_d$, $e_s(T_d) = e$, $q_s(T_d) = q$, $r_s(T_d) = r$
- $T_d \leq T$
- Unlike relative humidity which is a measure of how near the air is to being saturated, dew point temperature is a measure of its actual moisture content. *The higher the dew point, the more water vapor in the air.*

- Dew point depression: $T - T_d$
- The larger the dew point depression is, the drier the air is, or the air is farther away from saturation



Thermosphere (85-500km): T increases with height. Absorption of highly energetic solar radiation by the small amount of residual oxygen.

Mesosphere (50-85 km): T decreases with height. No O_3 heating.

Stratosphere (11-50km); T increases with height as results of absorption of solar UV by stratospheric ozone.

Troposphere (0-11 km): T decreases with height at a rate of 6.5 K/km. Driven by surface heating.

Rate of cooling with increasing height (the 'lapse rate' or LR, expressed in ° C per km)

$$LR = \frac{-1000 * (T_{upper} - T_{lower})}{Z_{upper} - Z_{lower}}$$

T is temperature and *Z* is height.