ESCI 241 – Meteorology
Lesson 5 – Surface Temperature

References: ***Meteorology Today*, Ahrens**

Reading: MT, Chapter 3

TEMPERATURE MEASUREMENT

- **Temperature should be measured in the shade, so that solar radiation does not heat thermometer and give exaggerated readings**
- **Temperature should not be measured close to a building, or hot pavement.**
- **Ideally, an instrument shelter should be used**
- **Thermometer types**
  - **Liquid-in-glass**
    - **min/max thermometers record min and max temp**
  - **Bimetal strip**
  - **Thermograph**
  - **Thermistor**

CONTROLS OF TEMPERATURE

- **Latitude**
- **Differential heating of land and water**
- **Ocean currents**
  - **East coast of continents have warm currents**
  - **West coast of continents have cold currents**
- **Altitude**
- **Geographic position**
  - **Windward vs. leeward coast**
  - **Desert vs. humid area**
  - **Urban vs. rural – The *heat island***
- **Cloud cover and Albedo**
  - **During day, clouds lead to cooler temperatures**
  - **At night, clouds lead to warmer temperatures**

- **Snow absorbs less radiation than bare ground, and results in cooler temperatures. Dirty snow absorbs more radiation than fresh snow.**

GLOBAL TEMPERATURE DISTRIBUTION

- **Temperature decreases from the tropics to the poles**
- **Spacing of the isotherms (*temperature gradient*) is not uniform with longitude. This is due to:**
  - **Ocean currents**
  - **Land-sea contrasts**
- **Band of maximum temperature migrates with the seasons**
- **Hottest and coldest temperatures are over land**
- **Annual temperature range increases with increasing latitude.**

TEMPERATURE CYCLES

- **Daily**
  - **Time of daily temperature maximum does not coincide with time of maximum solar radiation.**
  - **Maximum temperature usually in afternoon**
  - **Minimum usually just before sunrise**
- **Annual**
  - **Month of annual temperature maximum does not coincide with month of maximum solar radiation July and August are usually hottest months in U.S., but max solar radiation is in June).**
  - **Month of annual temperature minimum does not coincide with month of minimum solar radiation.**
- **Effect of wind on max and min temp**
  - **Wind decreases max and increases min temp**

WIND CHILL AND HEAT INDEX

- **Wind-chill factors in the effects of wind and evaporation on the human sensation of temperature to give a wind-chill equivalent temperature.**

- ***A thermometer reads air temperature, NOT the wind-chill equivalent temperature!***
- **Wind chill calculation changed in 2001. Old charts (including one in book) are obsolete.**
- **Heat index factors in the effect of humidity on the human sensation of temperature.**