

# Heat Waves and Droughts

## Heat Waves

Definition:

depends on country/state/location/organization

World Meteorological Organization:

*“daily max. temp exceeds average max. temp by 5°C (9°F) for > 5 consecutive days”*



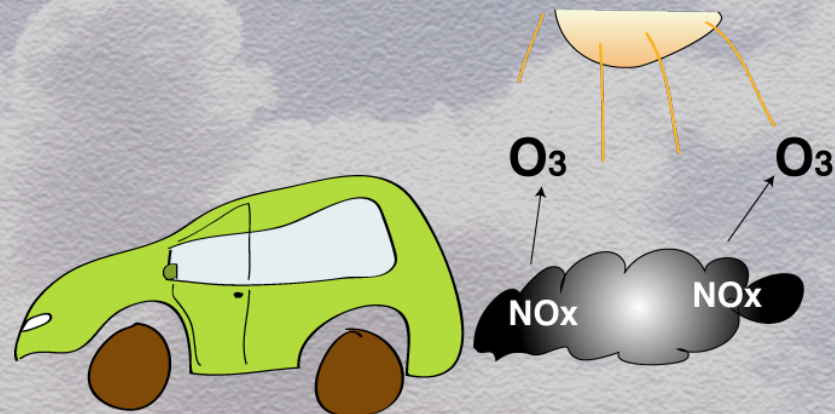
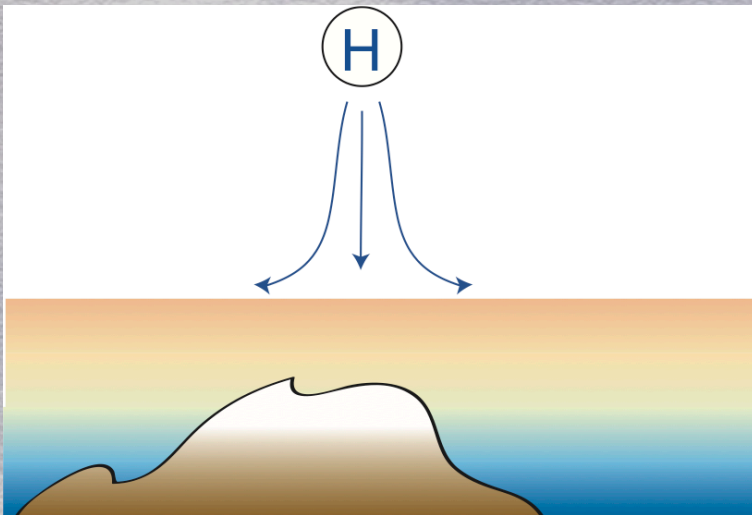
# Heat Waves and Droughts

## Heat Waves

Accompanied by:

- strong high pressure system
- locked over region over extended time
- temperature inversion/polluted air

## Temperature Inversion





# Heat Waves and Droughts





# Heat and the Human Body

Category	Apparent T [°F]	Heat Symptoms
Extreme Danger	130+	heatstroke and sunstroke imminent
Danger	110 - 130	Sunstroke, heat cramps, heat exhaustion likely
Extreme Caution	90 - 110	sunstroke, heat cramps, heat exhaustion possible
Caution	80 - 90	heat fatigue possible

- humans cope with T up to 80°F
- above that, symptoms develop
- T 130°F and above extremely hazardous
- rel. humidity in air enhances heat effect



Fig. 2.13

# Heat and Relative Humidity

- people sweat when the temperature rises
- evaporating sweat cools body
- humid air hampers evaporation
- elderly, sick, young particularly affected



Source: clipart-library.com

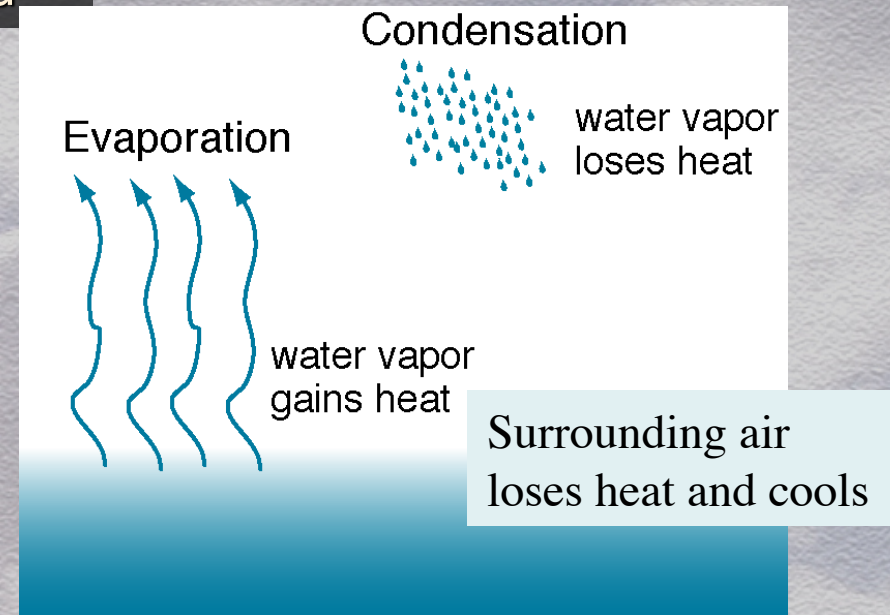
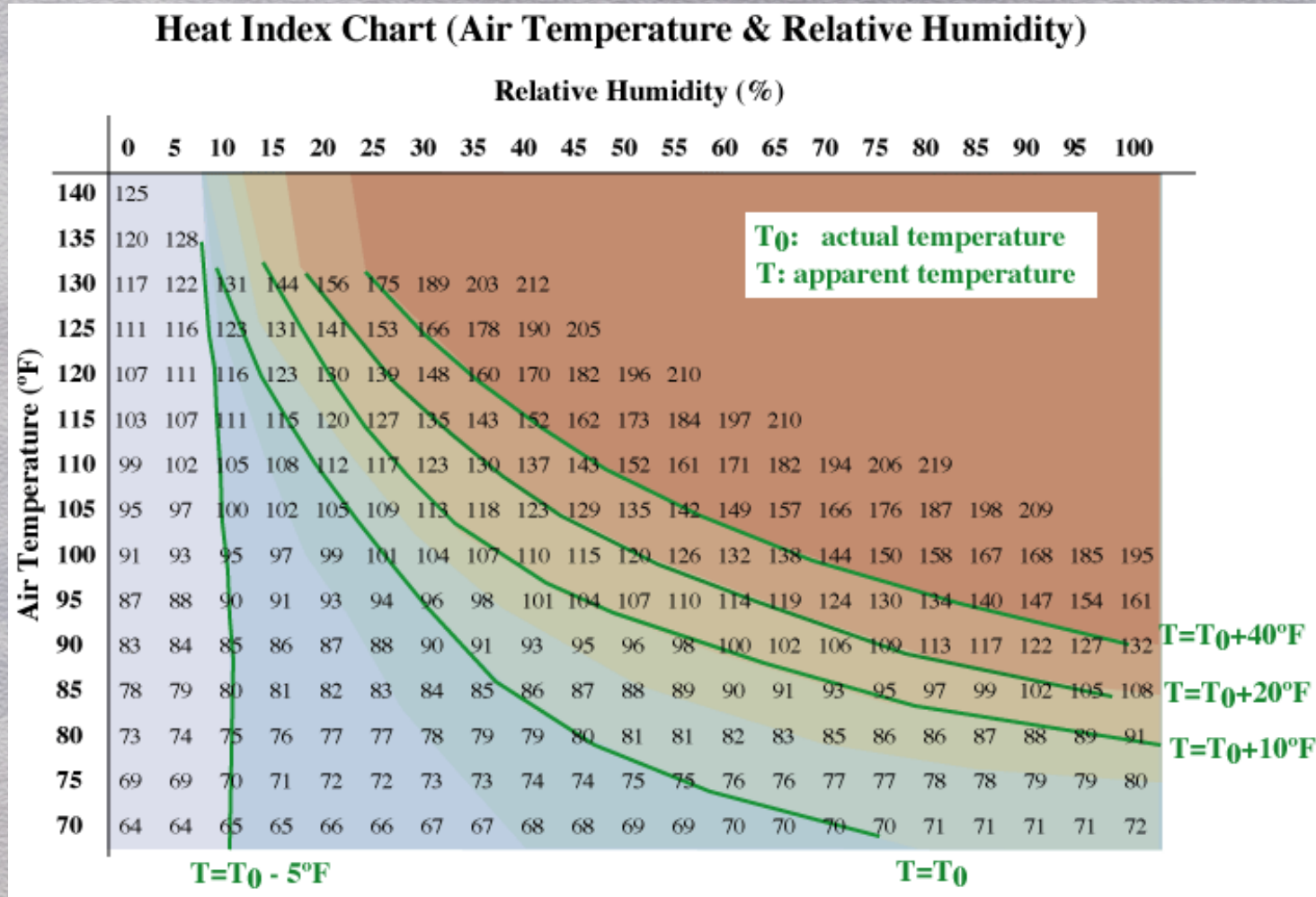




Fig 13.10

# Heat Index

- heat index: how hot air feels
  - rel. humidity increases apparent T
  - relevant at  $T > 80^{\circ}\text{F}$





# Fatalities and Losses in the U.S.

## Cumulative Billion \$ Losses in U.S. (1980-2003)

heat waves/droughts:	144
hurricanes (B.K.):	102
floods:	55
cold-weather storms:	28
wildfires:	13
tornadoes:	7

\*B.K. – before Katrina

source: Munich Re



# Fatalities and Losses in the U.S.

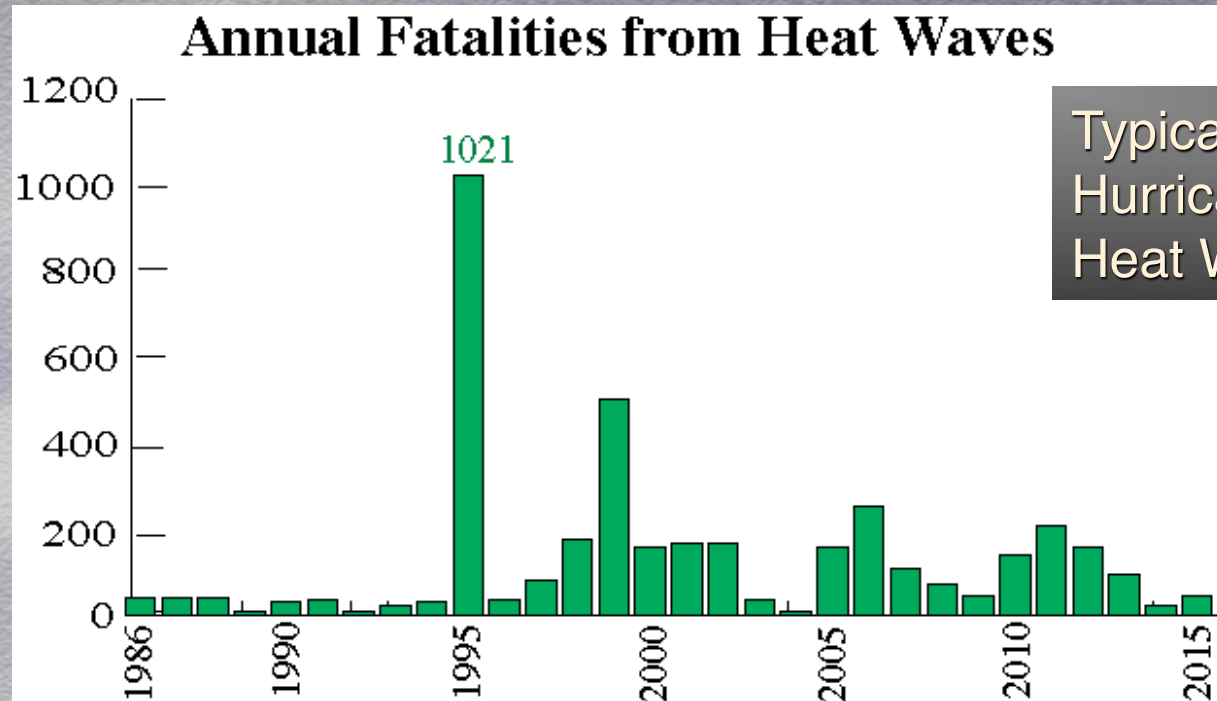
Average Annual Death Rate  
in U.S. (1996-2015)

heat waves:	119
hurricanes:	114
tornadoes:	108
floods:	78
wind:	45
lightning:	37
rip currents:	46

source: NOAA



# Fatalities from Heat Waves in the U.S.



Typical Year - Last 20 Years  
Hurricanes: 30  
Heat Waves: > 100

30 yr average: 130  
10 yr average: 113

**Heat waves are currently  
#1 killer and costs most!**