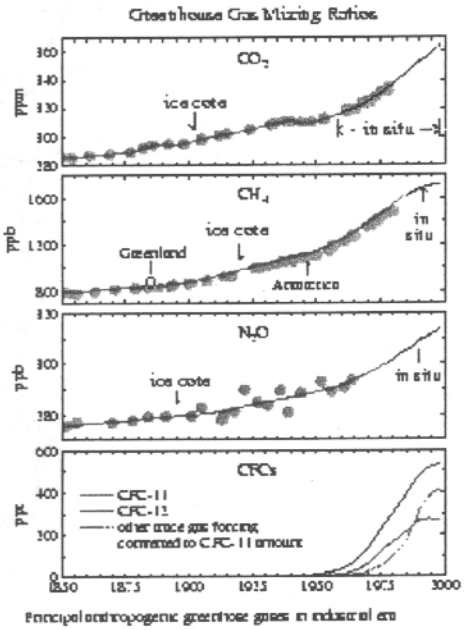
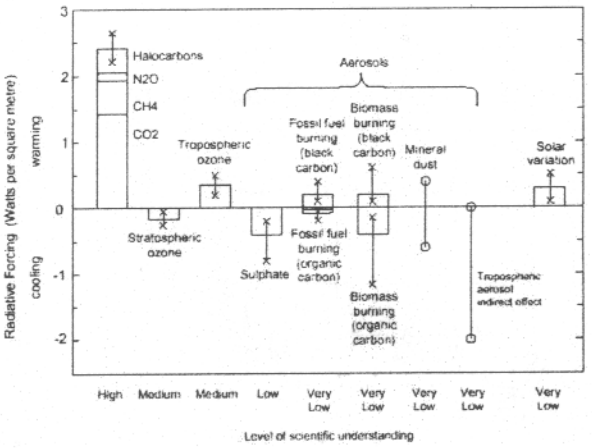
ES10 March 7, 2001 Inez Fung
Global Climate Change

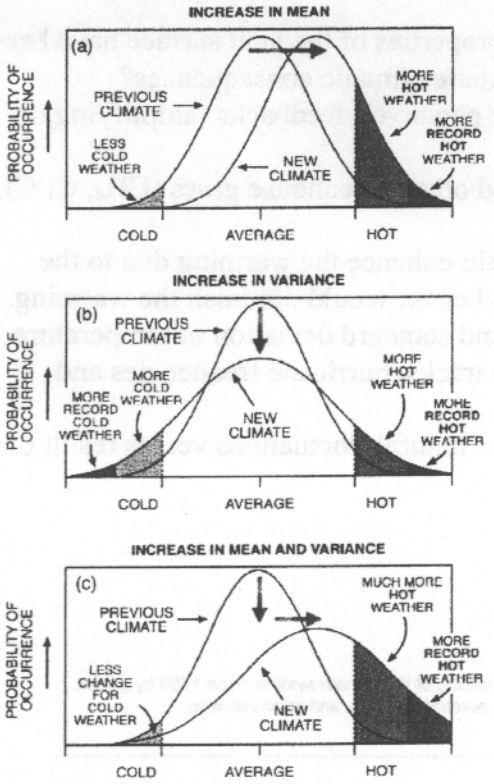
1. The composition of the atmosphere and properties of the land surface have been changing because of human action. Are there climatic consequences?
2. Concepts: Radiative forcing (positive or negative), feedbacks (amplifying or damping), and climate response.
3. Forcing: changes in atmospheric CO_2 and other greenhouse gases (CH_4, CFC), changes in aerosols, land albedo, …
4. Feedbacks: increases in water vapor would enhance the warming due to the greenhouse gas increase; increase in cloud cover would diminish the warming.
5. Climate response: changes in the mean and standard deviation of temperature, precipitation, ice cover; changes in storm tracks, hurricane frequencies and intensities; changes in growing season.
6. Climate change detection and attribution – natural fluctuations versus result of human action.



Principal anthropogenic greenhouse gases in industrial era

The radiative forcing of the climate system since 1750 by gases, aerosol particles, and solar variation





size of glaciers over time