

# SIO 15 LECTURE 21: LONG- AND SHORT-TERM CLIMATE CHANGES

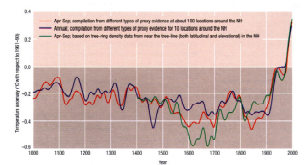
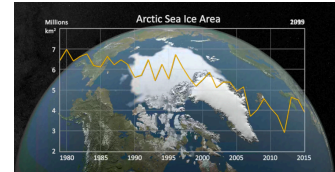
Leftovers from Lecture 20

Miscellaneous

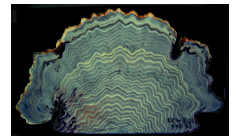
## Past Climate Changes - Why should We Care?



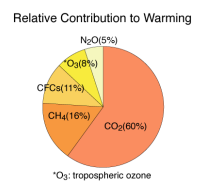
## Recent Temperature Observations (Global Warming)



## Proxies



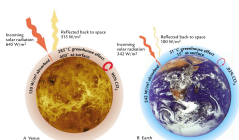
## Greenhouse Gases



## Radiative Forcing

## Feedback Mechanisms

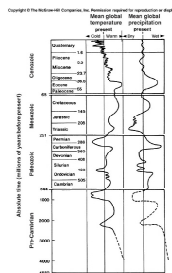
## Climate on Early Earth



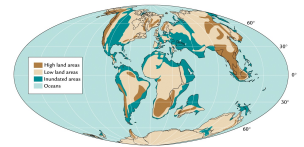
## Long-term Changes - Millions of Years

### The Role of Plate Tectonics

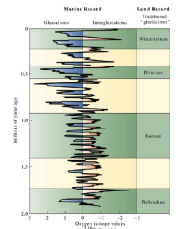
## Long-Term Climate (T and Precipitation)



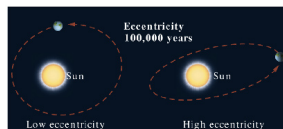
## Sea Level Changes



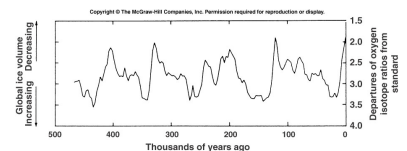
## Short-Term Changes: scale of 1000s of years



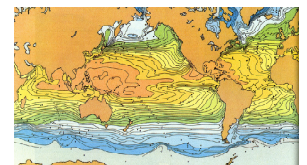
## Ice Ages and the Milankovitch Cycles



## Feedback and the Sawtooth

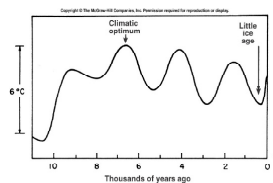


## Last Glaciation, Sea level Change and Glacial Advance

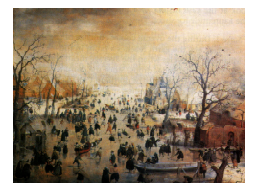


## Episodes after the Last Ice Age

### Fertile Crescent



### The Little Ice Age



## Short-Term Changes: a few to 10s of years

### The Sun Spot Cycle

### Volcanic Eruptions

## watch short Video 21

### El Nino

