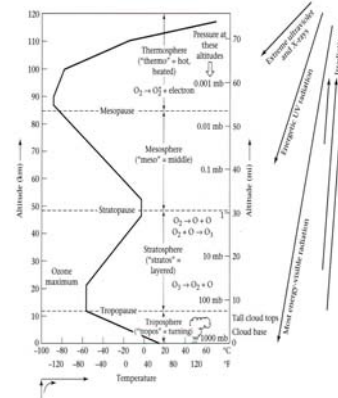


## Ozone layer and ozone depletion

- categories of ultraviolet radiation
- ozone formation
- ozone destruction
- Antarctic ozone hole
- ozone depletion prevention
- effect of ozone depletion on biological systems

## Ozone layer and ozone depletion

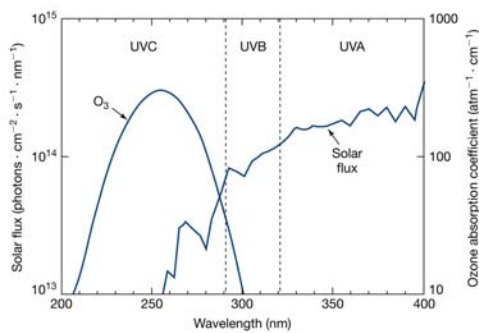


Development of the ozone screen was an important step in the evolution

### Classification of UV Radiation

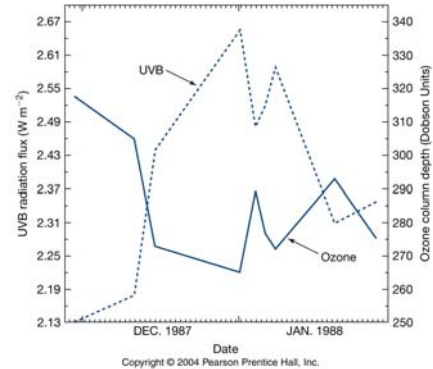
Wavelength Range (nm)	Name	Biological Effect
320-400	UVA	Relatively harmless; causes tanning but not burning
290-320	UVB	Harmful: causes sunburn, skin cancer, and other disorders
200-290	UVC	Extremely harmful but almost completely absorbed by ozone

## Ozone layer and ozone depletion



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## Ozone layer and ozone depletion

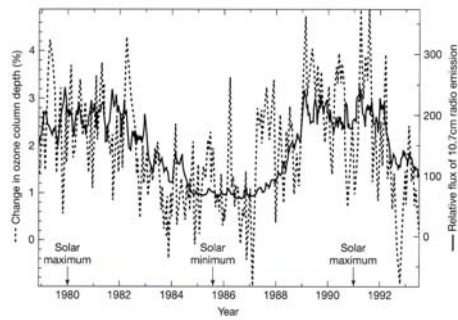


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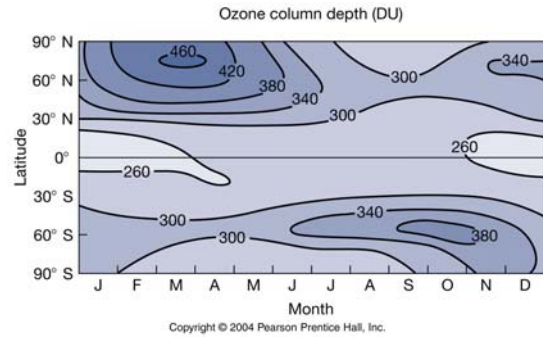
## Ozone layer and ozone depletion

Ozone column depth is strongly correlated to solar activity



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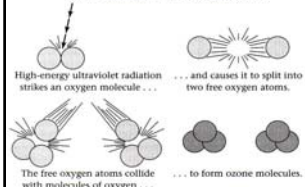
## Ozone layer and ozone depletion



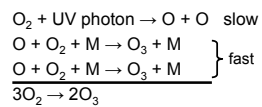
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## Ozone layer and ozone depletion

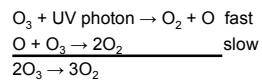
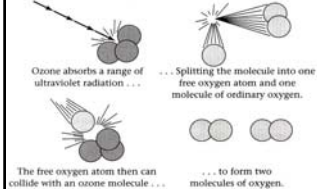
### Ozone production in the stratosphere



### Chapman mechanism



### The Chapman process of ozone destruction

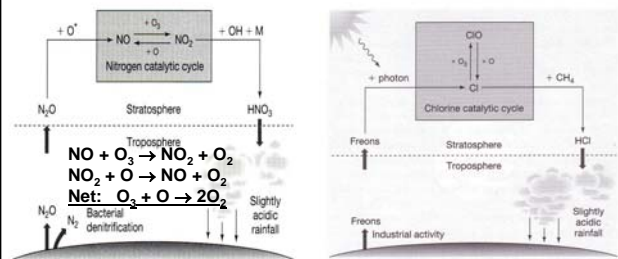


Production = Destruction

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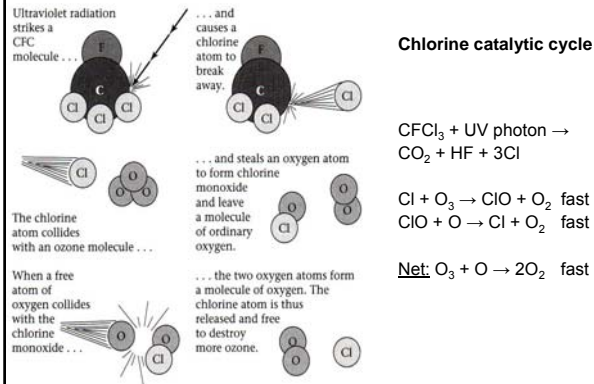
## Ozone layer and ozone depletion

Ozone sinks: nitrogen, chlorine and bromine catalytic cycles



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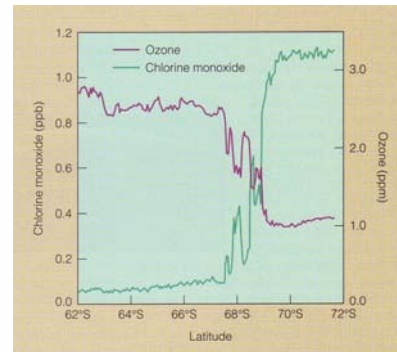
## Ozone layer and ozone depletion



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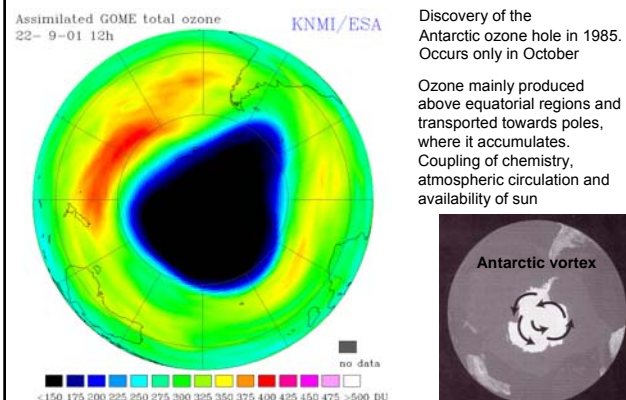
## Ozone layer and ozone depletion

Discovery of the link between CFSs and ozone depletion



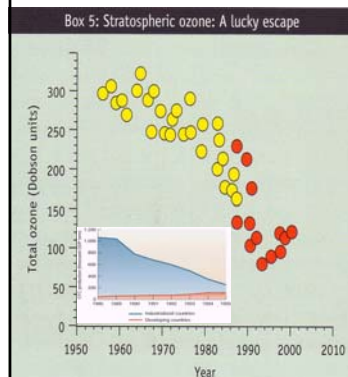
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## Ozone layer and ozone depletion



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## Ozone layer and ozone depletion

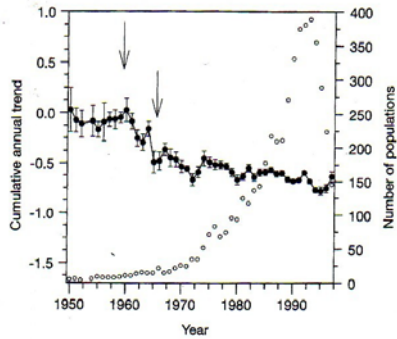


### Effects of ozone depletion

- harmful effect to human and animals and plants
- loss in primary productivity in both terrestrial and oceanic realms (up to 20% of pelagic PP)
- loss in biodiversity (amphibians...)
- adverse effect on outside materials
- ??

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### Ozone layer and ozone depletion



Amphibian population decline could be the result of combined warming trend and increase in UV radiation

Temperature rise → more evaporation → shallower ponds → more harmful UV radiation penetrates amphibian immune systems are weakened → increased mortality

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### Ozone layer and ozone depletion

#### Summary

- UV radiation between 200 nm and 320 nm poses danger
- Amount of UV radiation reaching the Earth correlates with the ozone column depth
- Ozone destruction is accelerated by anthropogenic chlorine and bromine emissions
- Ozone hole is a 'Anthropocene' phenomenon
- Control should be imposed on future chlorine and bromine emissions