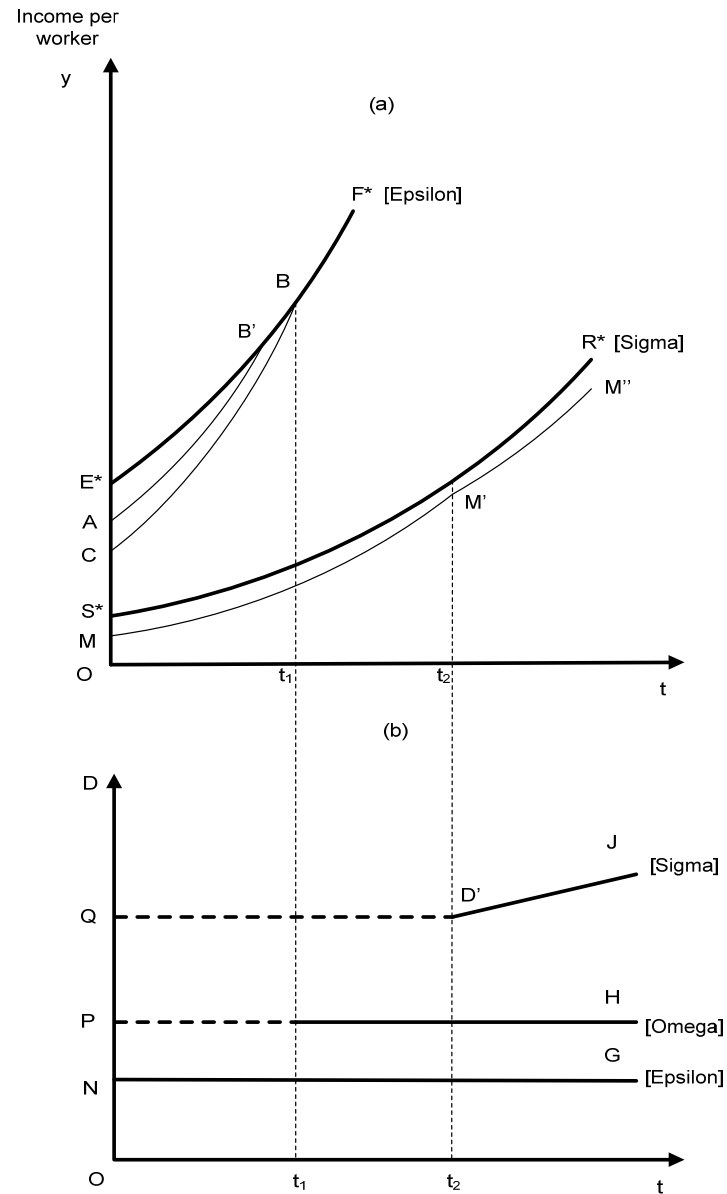


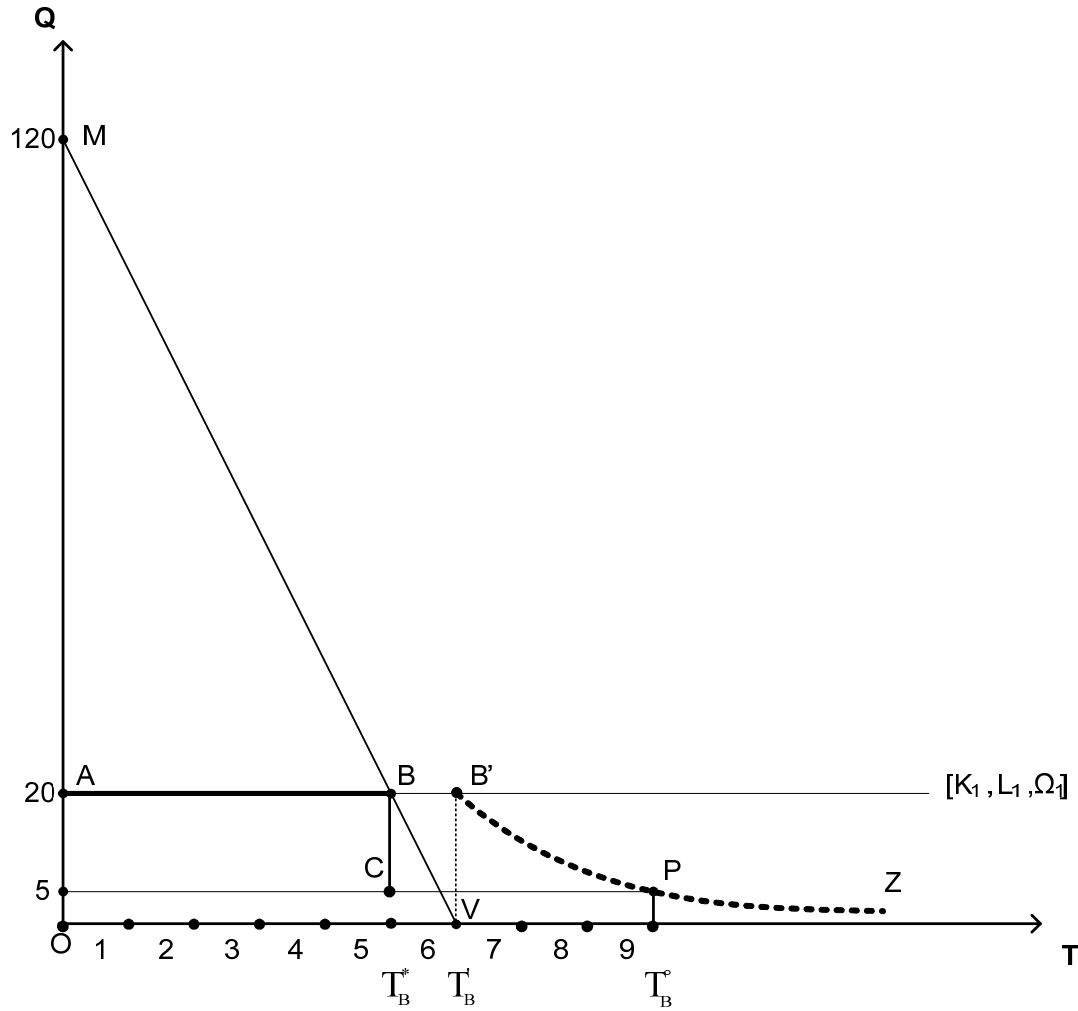
# Economic Growth and the Environment

**Adolfo Figueroa, Ph. D.**  
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**CENTRUM Business School**  
**Pontificia Universidad Católica del Perú**

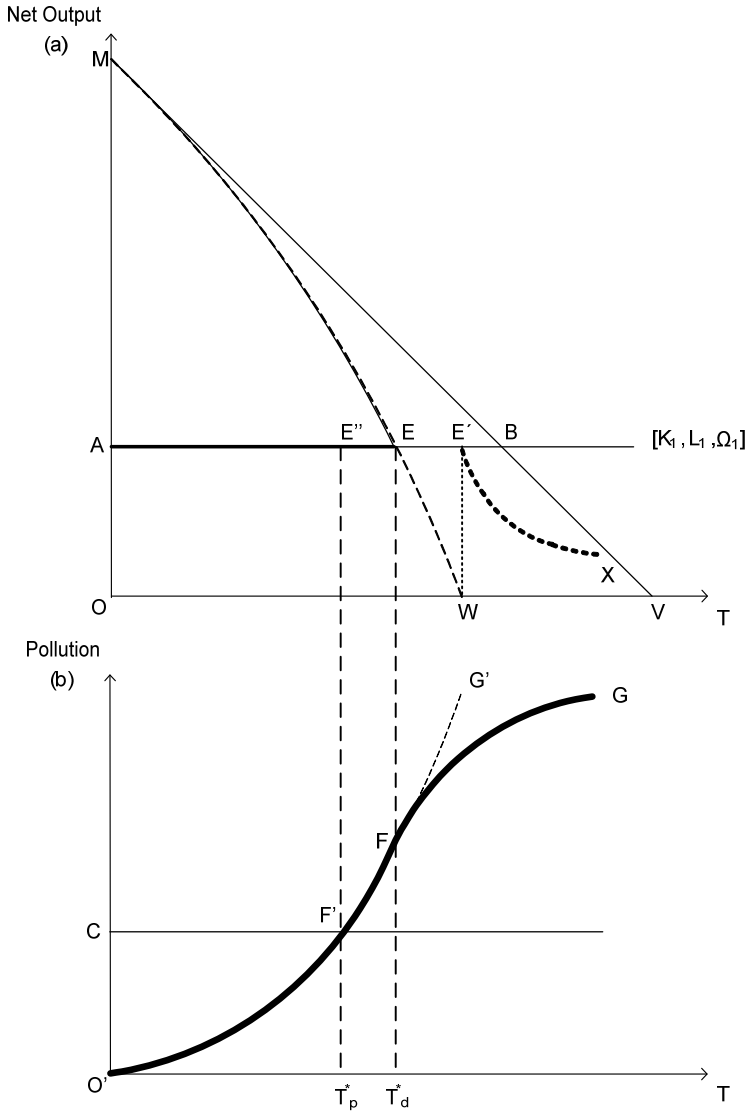
# Growth and Distribution in the Capitalist System



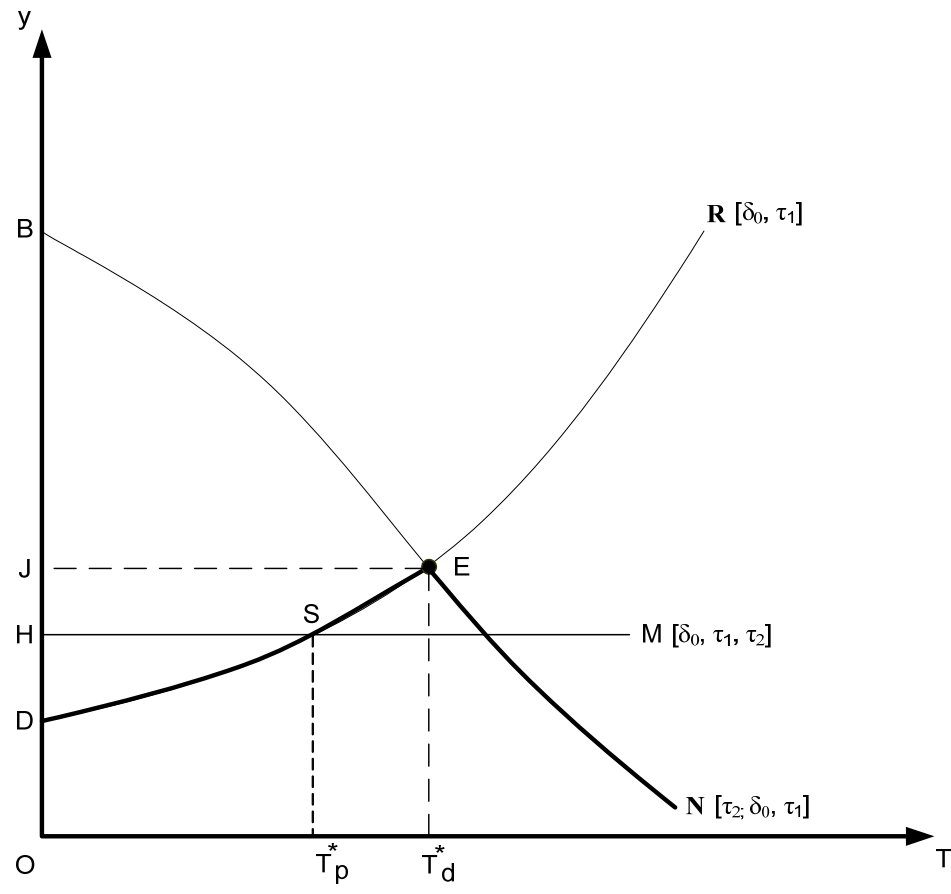
# Natural resource depletion in the economic process



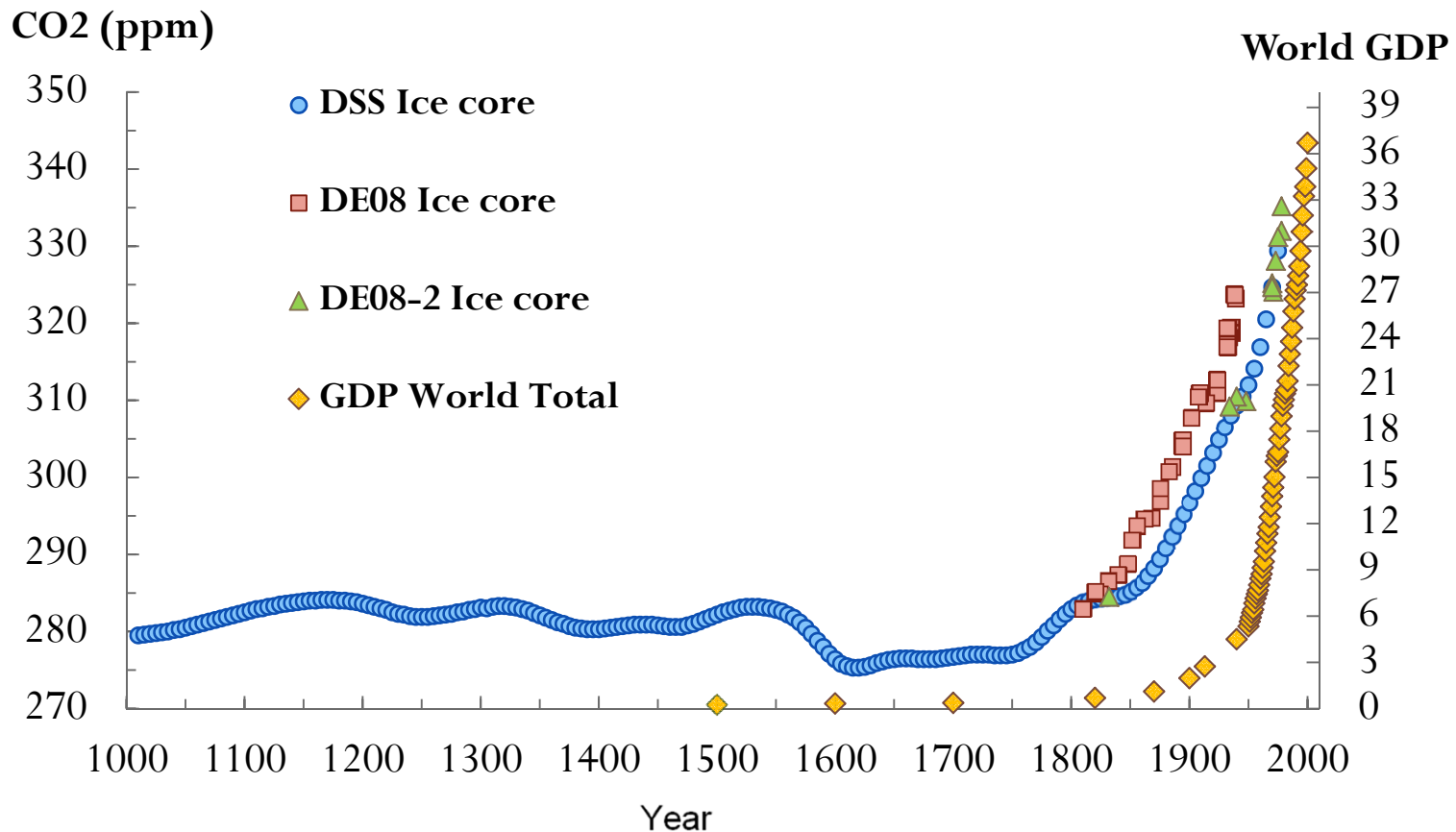
# Depletion and Pollution in the Economic Process



# Limits to Growth under Evolutionary Dynamics



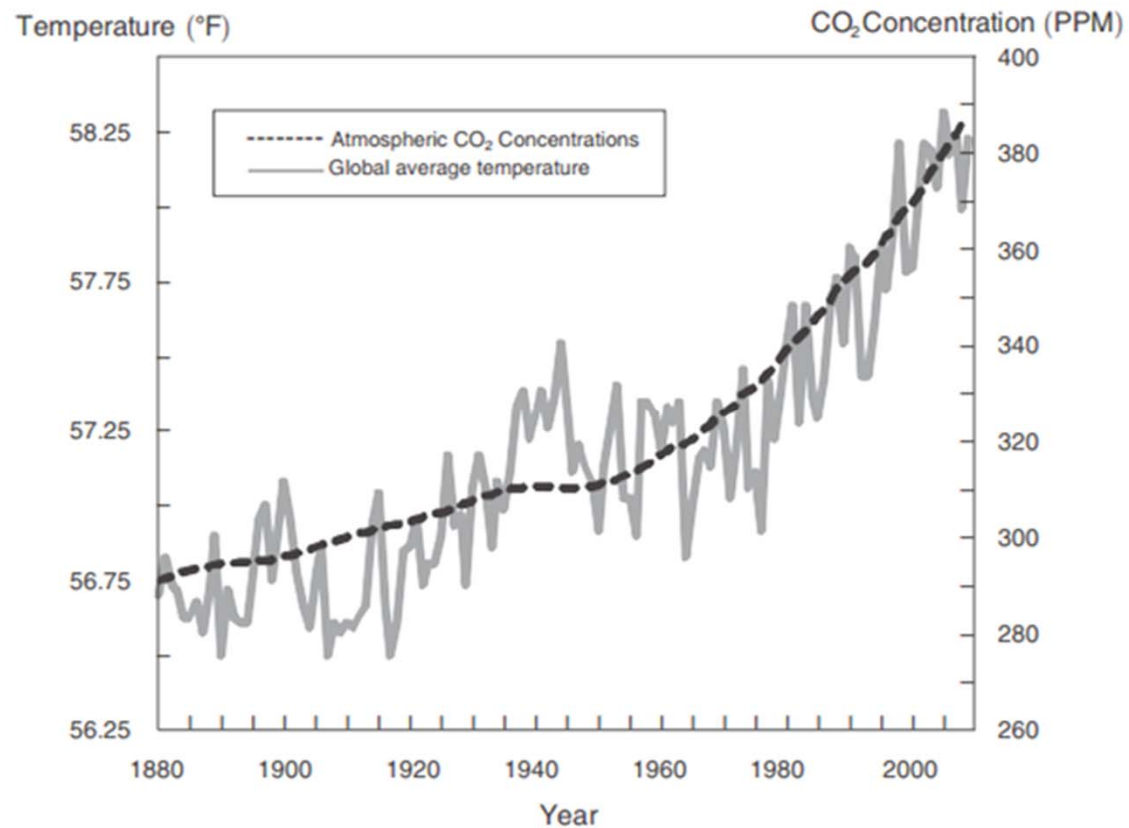
# CO<sub>2</sub> Concentration levels and World Total GDP , 1000 – 2001 AD



Notes: World Total GDP yearly estimated from [http://www.ggd.net/maddison/historical\\_statistics/horizontal-file\\_03-2007.xls](http://www.ggd.net/maddison/historical_statistics/horizontal-file_03-2007.xls), measured in 10<sup>12</sup> 1990 International Geary- Khamis dollars. CO<sub>2</sub> measured from air extracted from three Antarctic ice cores: DE08 to provide a high resolution record of atmospheric methane over the industrial period; DE08-2, to find the effects of diffusion on the composition and age of the enclosed air and to better establish the link between it and the atmosphere; DSS, the new Australian deep ice core, extends the CO<sub>2</sub> record back into the late Holocene. ppm = parts per million

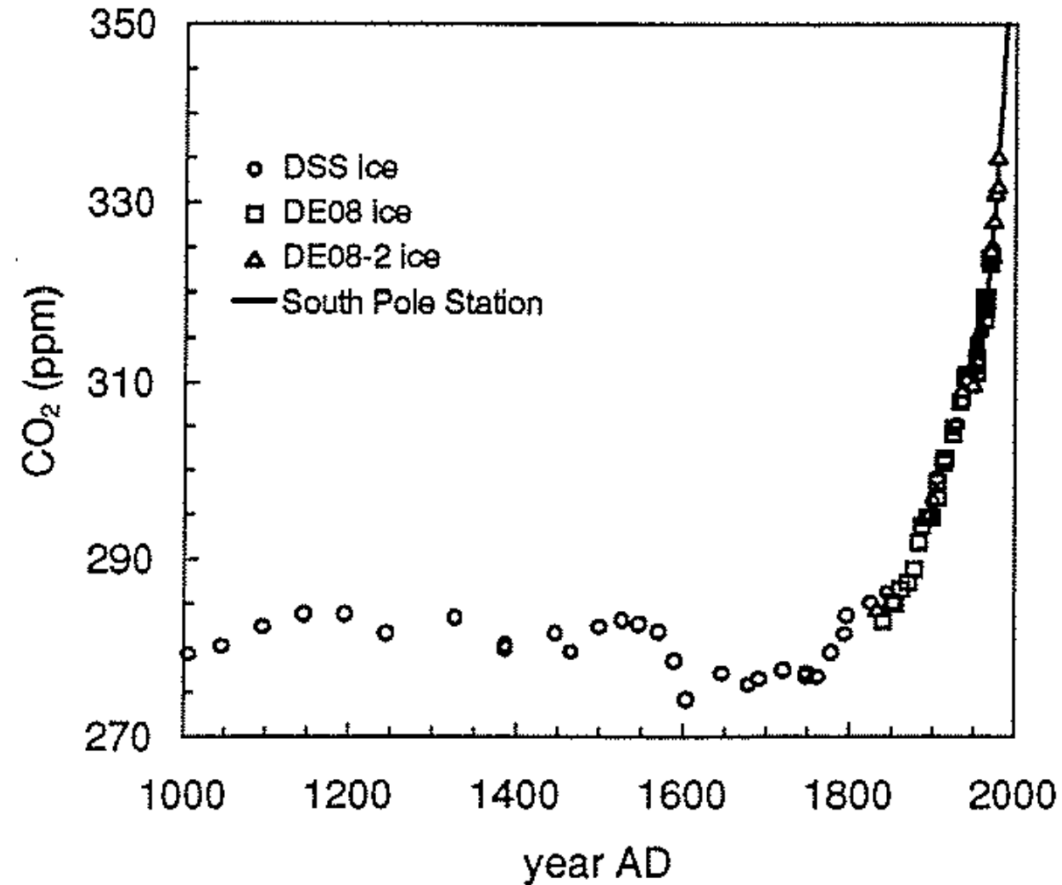
Source: Maddison (2003) and Etheridge (1998).

# Global Temperature and Carbon Dioxide Concentrations, 1880-2010



Notes: Global annual average temperature measured over land and oceans. The dark dashed line shows atmospheric CO<sub>2</sub> concentrations in parts per million (PPM).  
Source: Stavins (2011) p.170. Figure 4.

# CO<sub>2</sub> Concentration Levels (part per million) from 1000 AD to 1995 AD



Source : Etheridge (1996) p.4123



## World Total GDP, 1 – 2001 AD (1990 Geary- Khami Million Dollars)



Notes: The graphic was built according to historic data in the text which are presented in the next slide.

Source: Maddison (2003) p.259.

## World Total GDP, 1000 – 2001 AD ( In 1990 Geary-Khami Million Dollars)

YEAR	WORLD GDP
1	102,619
1000	116,787
1500	248,308
1600	330,982
1700	371,269
1820	695,346
1870	1,112,655
1913	2,732,131
1950	5,329,719
1973	16,023,529
2001	37,193,868

Notes: The Geary-Khamis dollar, also known as the international dollar, is a hypothetical unit of currency that has the same purchasing power that the US dollar (\$) had in the United States at a given point in time. The year of 1990 is often used as a benchmark year for comparisons that run through time.

Source: Maddison (2003) p.259.

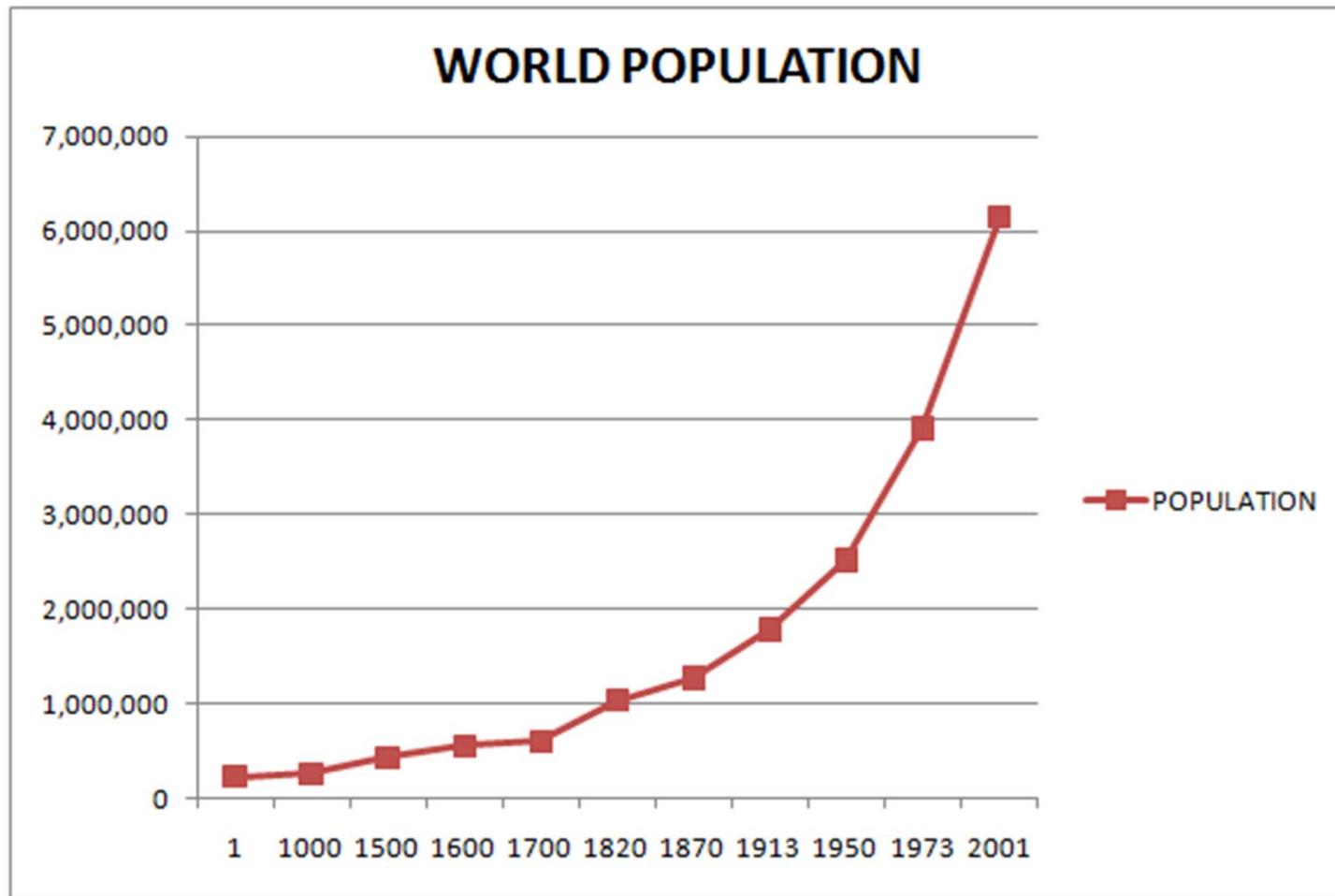
## Rate of Growth of World Total GDP, 1 – 2001 AD

<b>PERIOD</b>	<b>RATE OF GROWTH</b>
1-1000	0.01
1000-1500	0.15
1500-1820	0.32
1820-1870	0.93
1870-1913	2.11
1913-1950	1.82
1950-1973	4.9
1973-2001	3.05

Notes: Annual Average Compound Rates of Growth.

Source: Maddison (2003) p.257.

## World Total Population ( in Thousands) , 1- 2001 AD



Notes: The graphic was built according to historic data in the text which are presented in the next slide.

Source: Maddison (2003) p.256.

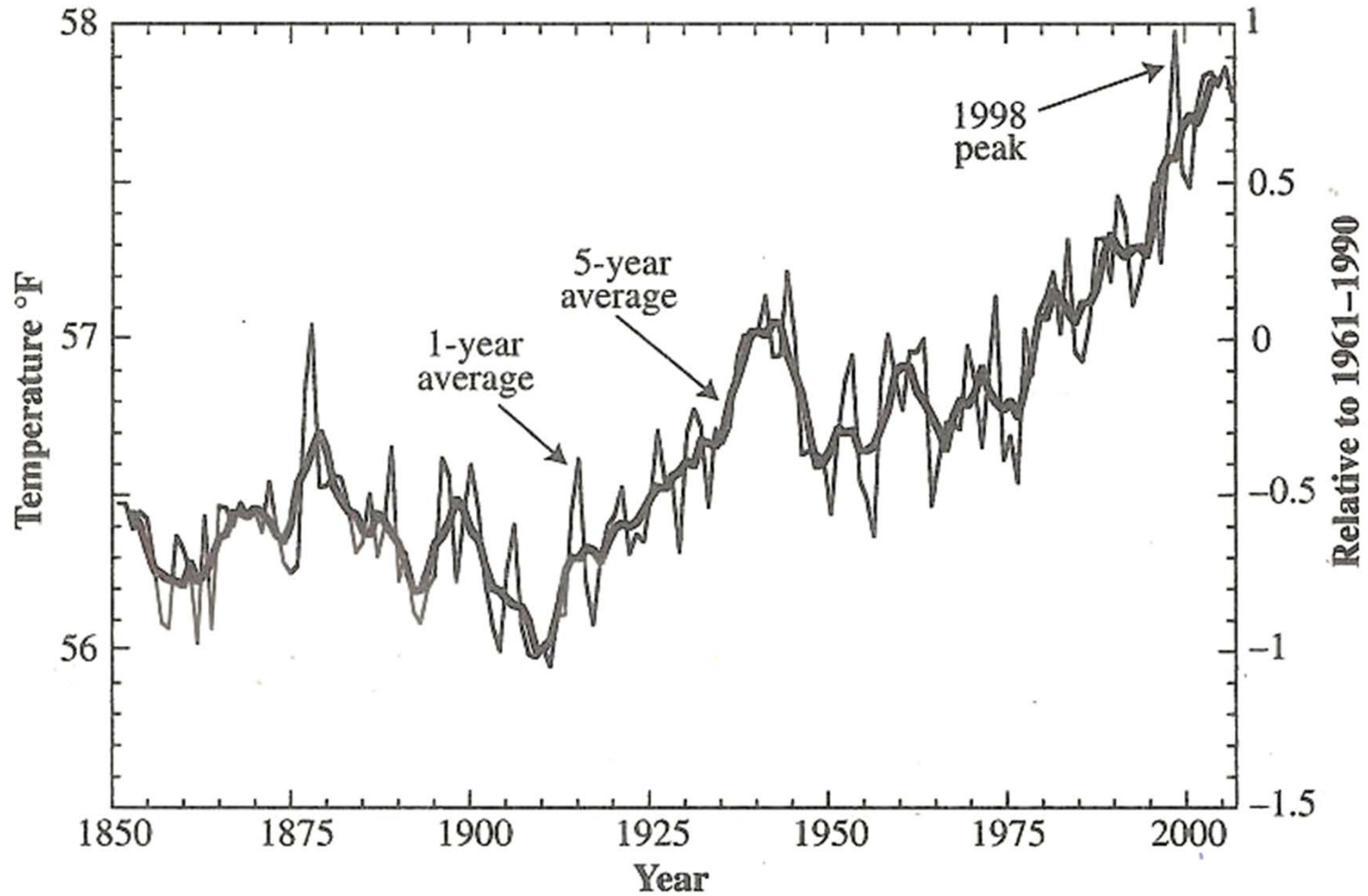
# World Total Population, 1 -2001 AD

YEAR	POPULATION
1	230,820
1000	267,573
1500	438,428
1600	556,148
1700	603,490
1820	1,041,834
1870	1,271,915
1913	1,791,091
1950	2,524,324
1973	3,916,489
2001	6,149,006

Notes: Population measured in thousands

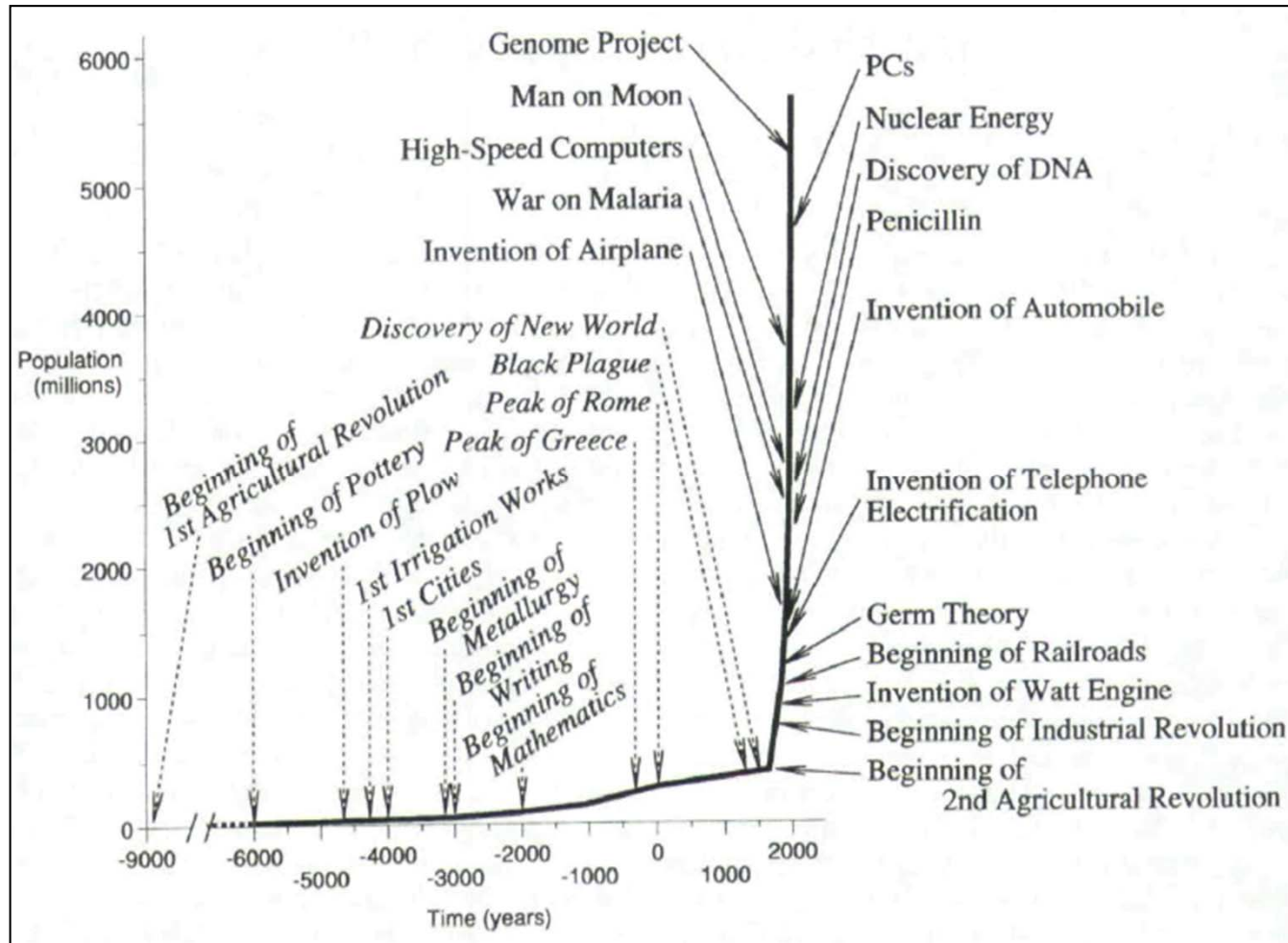
Source: Maddison (2003) p. 256.

# Global Warming, 1850 - 2006



Source: Muller (2008) p. 252.

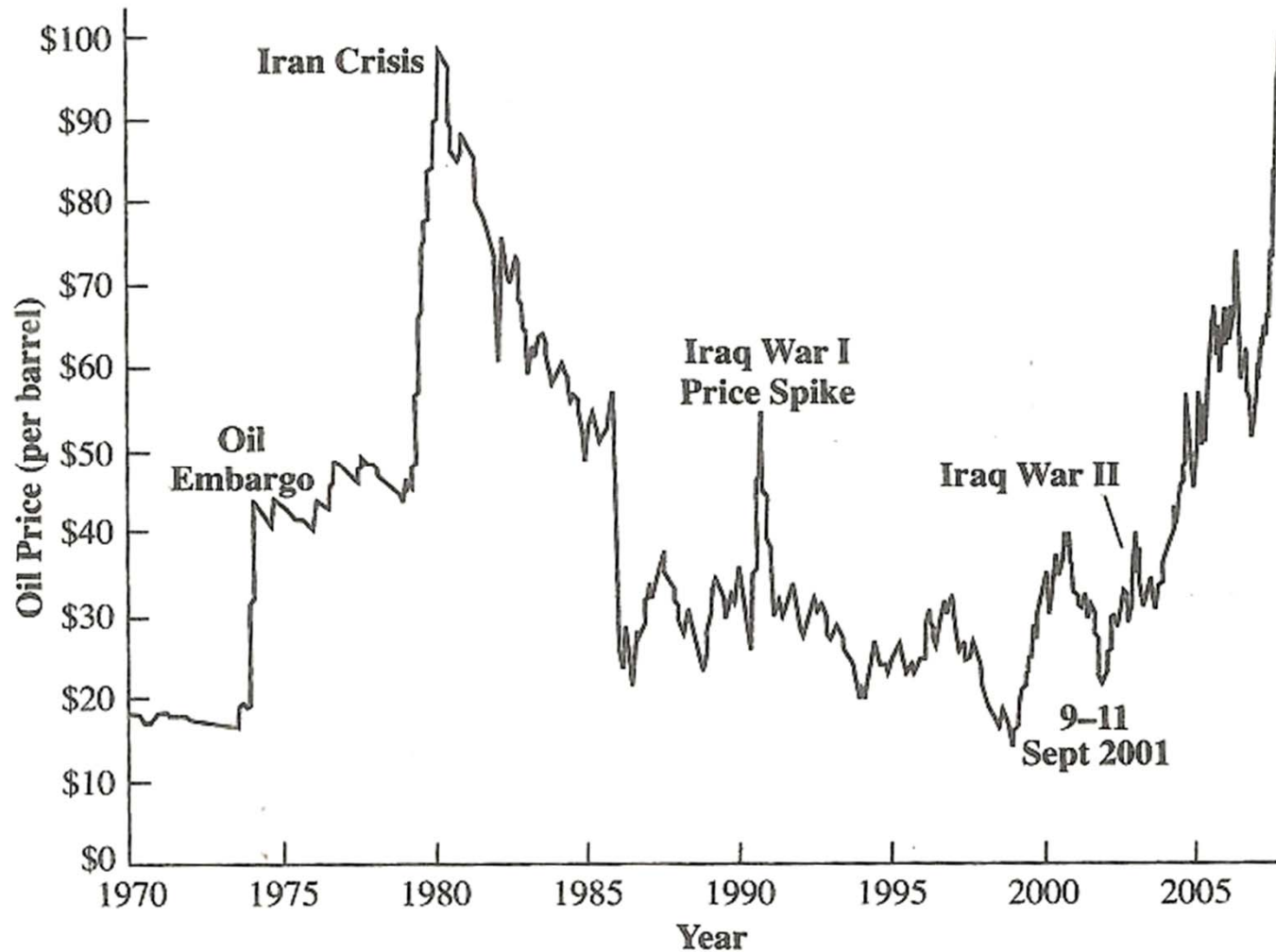
# The World Population and Some of The Major Events in The History of Technology



Notes: Population is measured in millions .

Source: Fogel (1999) p. 2.

# Oil prices (adjusted for inflation) from 1970 to 2008



Notes: US\$ Dollars per Barrel adjusted for inflation

Source: Muller (2008) p.90.



# References

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<http://cdiac.ornl.gov/ftp/trends/co2/lawdome.combined.dat>
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