This is the print version of the Skeptical Science article 'It warmed before 1940 when CO2 was low', which can be found at http://sks.to/pre1940.

What caused early 20th Century warming?

What The Science Says:
Early 20th century warming was in large part due to rising solar activity and relatively quiet volcanic activity. However, both factors have played little to no part in the warming since 1975. Solar activity has been steady since the 50's. Volcanoes have been relatively frequent and if anything, have exerted a cooling effect.

Climate Myth: It warmed before 1940 when CO2 was low
"Of the rise in temperature during the 20th century, the bulk occurred from 1900 to 1940. It was followed by the aforementioned cooling trend from 1940 to around 1975. Yet the concentration of greenhouse gases was measurably higher in that later period than in the former. That drop in temperature came after what was described in the National Geographic as 'six decades of abnormal warmth'." (James Schlesinger)

A widespread misconception is that anthropogenic global warming has been dominant over the last century. In actuality, CO2 warming has only been dominant since the "modern global warming trend" began in the mid-70's.

To understand climate change, you need to factor in all the various forcings that influence global temperature. In the early 20th century, while CO2 levels were much smaller, solar activity was on the rise. Also, after a burst of volcanic activity in the late 19th century, there was a relative quiet volcanic period in the early 20th century. These were two dominant factors in the warming from 1900 to 1940.

However, both factors have played little to no part in the warming since 1975. Solar activity has been steady since the 50's. Volcanoes have been relatively frequent in the last few decades and if anything, have exerted a cooling effect that has somewhat masked the CO2 warming effect.

Papers studying climate change over the early 20th century

- Estimation of natural and anthropogenic contributions to twentieth century temperature change (Tett 2002): "During 1907–57 we found that there was negligible net anthropogenic warming with the effect of greenhouse gases largely being balanced by other anthropogenic forcings. Therefore, in this period, the warming was largely naturally caused. The late century warming was largely explained by greenhouse gases offset by the effect of volcanic aerosol and the indirect effect of anthropogenic aerosols. Over the entire century natural forcings make no net contribution as they warm early in the century and cool from the 1960s on."
- Solar Forcing of Global Climate Change Since The Mid-17th Century (Reid 1997) finds a link between solar variability and climate change, concluding that "solar forcing and anthropogenic greenhouse-gas forcing made roughly equal contributions to the rise in global temperature that took place between 1900 and 1955".

Intermediate rebuttal written by John Cook

Update August 2015:

Here is a related lecture-video from Denial101x - Making Sense of Climate Science Denial

[*see video at* ***this link***.]

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Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a college textbook on climate change and the book Climate Change Denial: Heads in the Sand. Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.

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