Anthropogenic-Induced Climate Change

Temperature and CO2 Proxies for Recent Climate Change suggest a "secular" increase.

However, could it just be part of a LONG-TERM NATURAL CYCLE?

Figure 33.1 A Warming Earth – Lots of Evidence

Figure 33.2 A Steadily Warming Earth?
Evidence Supporting CO\textsubscript{2}-Induced Temperature Increase

Warmer Temperatures

Increased CO\textsubscript{2}

The Big Question
Are These Facts Related?

Figure 33.3 Are the Facts Related?

Evidence Supporting CO\textsubscript{2}-Induced Temperature Increase

Ice Core CO\textsubscript{2} and Temperature Records are Similar

WHAT IS CAUSE and WHAT IS EFFECT?

Figure 33.4 Is there cause and effect or just similarity?
Different Model Estimates of Temperature Climate Sensitivity to CO$_2$ Doubling

Figure 33.6 Climate Modeling
There are a number of different models available to predict the future temperature changes although no one is quite sure which will turn out to be the most accurate. (??)
Increased Cloudiness in Tropics will Cool Earth

Figure 33.7 Climate Physics Uncertainty (SA)

Figure 33.8 Ocean Uptake of CO2 – It’s Already Happening! (NG)
Figure 33.9a Ocean Carbon Cycle – (NG)

Figure 33.9b Coral & Algae At Risk – (NG)

Figure 33.10 Temperature Change Distribution -2005- Very Uneven (NG)
Figure 33.11 Arctic Ice Melting (NG)

Figure 33.12 Earth Temperature Prognosis (NG)
Past Observations – Orange
Model Past, Present, Future -Yellow
**Figure 33.13 Earth Temperature Prognosis (NG)**
Future SW U.S. Temperature versus CO2 Level

**Figure 33.14 Temperature Change Distribution - Forecasting**
Past & Present Sea Level Rise

Figure 33.15 Sea level Rise

The wet get wetter...

And the dry get drier

Figure 33.16 Terrestrial Consequences
Figure 33.17 Fate of the Conveyor?