

## CLIMATE SCIENCE SUMMARY

1. CO<sub>2</sub> molecules stay in the atmosphere for over 100 years and create a long-term greenhouse warming effect on Earth.
2. 97% of the international community of scientists agrees that global warming is human caused.
3. The CO<sub>2</sub> built up and average Earth temperatures are warming at an accelerating rate when viewed over decades since the industrial revolution. (Statistically there have always been year-to-year variations, but the trend in the last 150 years is clear and accelerating.)
4. The current CO<sub>2</sub> level in the atmosphere is 400 parts per million. Scientific opinions vary, but some leading scientists say that 350 parts per million is a safe and sustainable level.
5. There are four primary global warming engines or “feedback loops” resulting from human CO<sub>2</sub> production:
  - Vanishing Arctic ice  
(Darker water and land surfaces absorb more sun and heat)
  - Clogging of the ocean CO<sub>2</sub> sink  
(Warming waters slow CO<sub>2</sub> absorption into the deep waters)
  - Deforestation of the Amazon and other world forests  
(Trees are huge CO<sub>2</sub> absorbers)
  - Melting permafrost  
(Bogs release methane which has 25 times the CO<sub>2</sub> warming effect)
6. Each of the four “feedback loops” is by itself complex and challenging to predict, and each affects the other. Consequently, scientific modeling and prediction of the rate of global warming is somewhat variable and imprecise because there is no comparable historical data available upon which to base such predictions.
7. The temperature rise is getting very close to a point where the bulk of the world’s permafrost will melt. This will likely create a huge greenhouse gas surge that will very rapidly increase global warming and threaten world ecosystems.
8. At some point, probably when a significant part of the permafrost melts, the greenhouse gas buildup will reach a “tipping point” where the “feedback loops” are running so fast that humans cannot possibly stop them.
9. Once the critical “tipping point” is reached, the “feedback loops” will run their full course with the following fairly predictable outcomes:

## CLIMATE SCIENCE SUMMARY

- All Arctic ice is exhausted.
  - Tides will be at least 30 feet higher world-wide. Most of Florida, half of Louisiana, all of Manhattan and other eastern seaboard towns, most of Bangladesh, and much more of our populated world will be below sea level.
  - All permafrost is gone.
  - High ocean acidification (Corals and other species die out).
  - Previously relatively stable circulating wind and weather patterns will likely be greatly disrupted. (Like our stable North American jet stream pattern.)
  - Unpredictable and more severe storms and droughts will occur world-wide.
  - Collapse of many ecosystems and extinction of over 50% of the current species of plants and animals which will not be able to adapt fast enough to the climate changes in their local environments.
  - Since over 50% of the current world's human population lives in coastal communities, and since much of the world food production occurs in fertile areas which are currently fed by glacier and snow melt streams that will likely go dry more for long periods, and since many ocean and land species we eat will die off, there will be extreme pressures on human existence over much of the world.
  - World-wide human economic and political stability will likely become much more chaotic if it does not completely collapse.
10. To keep from reaching the unstoppable condition of the runaway "feedback loops" we must avoid the critical warming "tipping point", widely estimated to be about 2 degrees Centigrade or about 3.5 degrees Fahrenheit (since the start of the industrial revolution). Estimates vary, but some knowledgeable scientists predict that we are on a course to reach this critical level of warming in the next 5 to 10 years unless we rapidly curb our CO2 production habits.