Smog

Then one night in 1707AD, four ships of the British Navy ran aground because their computations of longitude were wrong, so the British royalty put up a large cash prize for an accurate and dependable method of computing longitude, which entails an accurate measurement of time. To build accurate clocks it was necessary to build an accurate lathe, the key to the industrial revolution. With a lathe you can build the engines that harness the solar energy stored in hydrocarbon. The mother of smog is born.

After the billions of years that it took to distill solar energy into coal, oil, and natural gas, all that energy is ripe and ready, and those clever humans have found a way to harvest it. The feeding frenzy begins. The concentrated essence of life, available on demand, and humanity undergoes a metamorphosis in its energy metabolism. Then one day Edison runs an electrical current through a wire in a vacuum, quickly followed by Tesla building an electric power plant at Niagara Falls, and an ever-increasing portion of humanity begins to glow in the dark in yet another metamorphosis of its metabolic rate.

The energy made available by the industrial revolution has so enabled the growth of humanity that it now physically covers a major portion of the earth habitable to land mammals and is actively feeding on most of the rest, pushing aside and often exterminating many of the rest of the world's species.

As it is with feeding frenzies, there's a lot of waste, and when the food runs out there's nothing left but hunger and a whole lot of poop. Now that the humans have devoured the easy half of the earth's hydrocarbons, there's a lot of poop piling up and much of it is toxic, so they bury what they can of it as best they can. Unfortunately, they can't bury smog.

Most of the gasses of smog capture infrared reflected by land and warm the atmosphere. Because greenhouse gasses only operate over land [the oceans reflect very little in the infrared spectrum], there is a substantial temperature differential between air over land and ocean that is variable by season. As the great winds of the earth carry plumes of hot summer air and rivers of cold winter air from land to ocean and warm, moist air from ocean to land, they swirl and gradually blend as evaporation transfers the solar energy stored as heat in the ocean into the atmosphere. Water vapor is the primary greenhouse gas. As the oceans warm, more water vapor enters the atmosphere. As the atmosphere warms, its carrying capacity increases, resulting in an increase in the overall amount of water and energy in the atmosphere.

In a complex interplay of ocean, land, and air compositions and currents, modified and modulated by a variety of factors such as season, dew point, topography, and color, these differentials in temperature, humidity, and albedo generate the world's weather.

The particulate portions of smog cool the earth's liquid and solid surfaces as they shade the sun. Above the dew point, particulates warm the atmosphere by direct absorption of sunlight, and cool the surface by shading it. Below the dew point, particulates substantially cool the surface and lower atmosphere as they

seed a reflective cloud layer. When particulates fall on snow and ice, they melt it by converting sunlight to infrared, substantially increasing the rate of ice and snow melt.

If you've ever been on a summer snowfield, it's easy to see that a major cause of snow and ice melt is not just atmospheric temperature, but opaque particulates of any kind or size, including particulates from coal, diesel, and wood smoke that absorb solar radiation and convert it to infrared, a frequency that snow, ice and greenhouse gasses absorb. The melting glaciers are varying shades of brown and black, not white.

Greenhouse gasses contribute to glacial melt by altering snowfall patterns and not covering dirty snow and ice with fresh reflective, insulating snow, as well as melt by direct conduction from warmer air. The carbon based greenhouse gasses are only part of the many factors that control atmospheric temperature, though they are a major player in the events that have accelerated the earth's climate toward a major tipping point.

In the Southern Hemisphere, until recently, the current warming trend resulted in a modest change in white to blue and brown albedo ratios, but as the atmosphere warms and increasing amounts of particulate smog are deposited on the ice, its melt rate is substantially increasing. The increase in the fresh water of melting shelf ice is lowering the salinity of the southern ocean around Antarctica, causing a decrease in the power of the annual thermohaline pulse that drives the circulation of the world's oceans, causing the deep oceans to warm. Due to increased particulate deposition and warming temperatures of water and air, the duration of the winter sea ice has decreased by about 90 days, resulting in a massive increase in solar gain.

In the Northern Hemisphere, increasing temperatures are resulting in a massive contrast in albedo as the ocean covering the pole melts and turns from a reflective white desert to an absorptive blue ocean almost completely surrounded by the continental land masses of North America, Europe, and Asia. The Arctic Ocean is rapidly warming, but the moisture plume evaporating from the new open ocean is depositing an early snow on the surrounding continents, resulting in an early winter. While the rest of the world is warming, northeastern North America and eastern Siberia are getting substantially colder.