Reflecting Back on my Essay, What Geology Has To Say About Global Warming
by Bill Menke, January 2016

A correspondent recently said to me, "In discussions I've had, your essay *What Geology Has to Say About Global Warming*[1] has been put forward as evidence *against* the mainstream science. Instead, it is claimed that you're indicating that current changes are simply a continuation of prior variability. Would you consider this a fair consideration?"

I do not consider this a correct interpretation of my views, so I am elaborating them.

Over its long history, the earth has experienced a tremendous amount of variability in climate and environment. Some was caused by external events, such as the great meteor impact that killed off the dinosaurs. Some was caused by internal events, such as the tectonic activity that formed the Isthmus of Panama and isolated the Atlantic and Pacific Oceans. And some was caused by life itself, such as the Great Oxygenation Event in which the first photosynthetic organisms flooded the atmosphere with oxygen.

In the current era, we human beings, through our large scale burning of fossil fuels that releases carbon dioxide, are changing the atmospheric composition in a way that is beginning to cause climate to warm. Furthermore, because of our ongoing need to burn fossil fuels for energy, we will almost certainly cause far greater warming over the next few centuries.

Whether this warming should be considered *natural* or not, a continuation of an age-old pattern or not, is mostly a matter of perspective. The answer depending on whether you consider us human beings to be part of nature of above it. *We* are the causative agent, either way.

Fortunately, the Earth's climate is currently near the low end of the temperature range that it's experienced since the end of the Age of the Dinosaurs, 65 million years ago. The warmest time period since then, called the Eocene Optimum and caused by high atmospheric carbon dioxide levels, was about 50 million years ago. Another 150-300 years of business-as-usual burning of fossil fuels will bring global temperatures back up to where they were during the Eocene Optimum. Life abounded back then. Should we worry?

Yes we should. While the world of the Eocene Optimum was hospitable, it was not exactly the same world in which we live today. Some regions, like the poles, were warmer and more habitable; and other regions, like present-day coasts, were uninhabitable, at least by human beings, because they were underwater. With no glacial ice to store water on land, sea level was 200 feet higher than it is today.

The impact of future climate changes depend strongly on its pace. We human beings will hardly notice if it occurs over ten thousand years. But we will experience widespread suffering if tremendous change is squeezed into just a few centuries. Unfortunately, the geological record indicates that many changes in earth's climate were very rapid, including the end of the Ice Age. During that event, the great continental glaciers melted so rapidly that sea level rose by as much as three inches per year.

Climate change has both winners and losers. We human beings should strive to be among the winners. Consequently, I am in favor or policies that *slow* the warming, even if they do not necessarily stop it. I favor increased use of carbon-free energy sources and the capture and sequestration of carbon dioxide that would otherwise be released through the burning of fossil fuels.

[1]http://www.ldeo.columbia.edu/users/menke/blogs/geologicevidence.pdf