Cosmic Particles and Volcanoes

Most of what are commonly called cosmic rays are actually small particles such as free protons and other light element nuclei. There is a great variation in the concentration of cosmic particles throughout the galaxy and there are local events such as supernovas that occasionally flood nearby space with cosmic particles.

It's the suns heliosphere that deflects most of the cosmic particles in the interstellar winds that we encounter as we cruise through space. Gathering scientific data is indicating an up two twofold variation in the flux of the solar winds that produce the sun's heliosphere, on timescales of decades to thousands of years. The sun's magnetic field has recently been in decline. Sunspot activity on the surface of the sun reached a recent historical low in 2012. With all the newly deployed technology we should soon learn a lot more about the climate of the sun.

The earth's magnetic field also deflects cosmic particles. The earth's magnetic field is in decline, probably because we're about to experience a magnetic pole reversal. Were it not for the interplay of gravity with the other planets of our solar system tugging our planet's crust this way and that, we would probably have no magnetic field. The dynamo that powers the earth's magnetic field is generated by different rates of spin between the crust, mantle, inner and outer core, and is not stable due to variations in speed between the solid and liquid layers and the core. The movement of the crust and plastic mantle relative to the liquid outer and solid inner core determines the strength and polarity of the magnetic field. Our planet has undergone a multitude of polarity shifts, and it seems that we're due again. There's no historical data that I know of indicating any great threat to life on earth, but we're due for a period with a weak and probably at some point almost non-existent magnetic field.

Variations in the amounts and kinds of particulates and aerosols in the earth's atmosphere, predominately from volcanic activity and human activity, also affect the amount of cosmic particles as well as solar energy input that reach the lower atmosphere.

It's the interplay between variations in the concentrations of cosmic particles we encounter, variations in the power of the heliosphere, variations in the earth's magnetic field, and variations in the composition of the earths atmosphere that determines the amount of cosmic particles that reach the earth's lower atmosphere where they produce aerosols that condense water vapor, enhancing the cloud cover and hence the albedo of the lower atmosphere, contributing to an overall increase in the albedo of the earth.

There is substantial evidence that the earth has gone through several periods of extreme cold over the last few billion years. There are a number of theories about how this happened, but the strongest hypothesis I've seen is that this is due to encounters with intense concentrations of cosmic particles in combination with major volcanic activity.

In the case of the last Little Ice Age, the abruptness of its beginning with the Great Famine of 1314 to 1317 which led to the Black Death in 1347, is likely due to an encounter with a cloud of cosmic particles, while its coldest period around seven hundred years later coincides with the Maunder Minimum in sunspot activity which

would indicate a weaker heliosphere. The closest major volcanic event is maybe sixty years previous. Volcanic activity only directly affects climate for a few years until the sulfur dioxide dissipates, but, like any event that increases albedo by increasing cloud, snow, and ice cover, there is a lingering increase in albedo till the white stuff dissipates, so the 1257 Samalas eruption was likely a contributing factor.

Cosmic particle immersion and volcanic activity are just two of numerous potential triggers for the tipping point into the next major ice age.

In the next hundred years or maybe sooner we'll either get our shit together or this civilization will collapse. Either way, greenhouse gas and particulate production will substantially decline. This is another tipping point trigger.

The new snows of the new Forth Northern Climate Zone spreading out from northeastern North America and eastern Siberia are our first entry into the next ice age. In the short term, their impact is an increase in temperature contrasts in the Northern Hemisphere, but as the Arctic Ocean continues to turn blue it's becoming a major tipping point.

While the roughly hundred thousand year by several million mile variation in the diameter of the earth's orbit around the sun provides a general overlay for the frequency and duration of the ice ages, albedo is a much larger factor. For instance, Venus is hotter than Mercury, even though Mercury is much closer to the sun.