

TEMPORARY DESCELERATION OF GLOBAL WARMING: A CHILD'S PLOY?

The consumption of fossil fuels keeps growing. New deposits are continuously discovered and enter rapidly into production, which leads to ever increasing concentrations of greenhouse gases (GG) in the atmosphere. This year CO₂ surpassed the psychological barrier of 400ppm. The science of greenhouse effect establishes that GG accumulation should produce a progressive heating of the planet. Notwithstanding, after a gradual temperature increase during the 1980s and 1990s, in the present century the global surface temperature has remained practically constant, below that predicted by the IPCC-2007 models. This has given a strong argument to those skeptics who deny the reality of global heating produced by human activity.

As expected, scientists have explanations for such phenomenon. The accelerated atmospheric increase of CO₂ was mainly due to the growth of China and India, whose economies are based on carbon. The burning of carbon also produces SO₂ that is oxidized in the atmosphere to particulate sulfate, increasing the atmospheric albedo that, in turn, produces a cooling effect that counteracts the warming due to GG. This would be reinforced by volcanic eruptions that injected sulfur compounds into the troposphere and stratosphere. In previous decades CO₂ chiefly came from industrialized countries, that fought acid rain through desulfurization of fossil fuels.

On the other hand, a recent article of high impact and diffusion (*Geophys. Res. Lett.* 40: 1754-1759, 2013) presents solid arguments that explain to a large extent what is happening with the global surface temperature. The work includes ocean measurements in the period 1958-2009 that show a tendency to warming, with pronounced periodic cooling episodes. In the last decade the ocean has warmed

up in a sustained fashion, especially in its deeper layers (mostly 700-2000m), but the superficial layer (0-300m) has remained practically stable. A panoramic appraisal of the all the data (0-300m, 300-2000m and total ocean) shows that the increases and decreases in ocean temperatures are strongly modulated by the occurrence of El Niño/La Niña events. The wind patterns and atmospheric circulation associated to El Niño favor a decrease in heat uptake by the ocean, while the opposite occurs during La Niña: there is an increase in the uptake of heat, which is distributed mostly in the deeper layers. During the decade of 1990 El Niño predominated and the ocean temperature remained relatively constant; heat remained at the surface of the planet and the global temperature reached a record in 1998, only equaled in 2010, after 12 years of GG accumulation in the atmosphere. From 2000 on, La Niña conditions have prevailed, which translated into a strong rise of temperature in the deeper layers of the ocean and a relatively constant temperature on the Earth's surface.

It is evident that during the last years, drought, flooding and heat waves have increased; the summer Arctic defrost reaches a record every year, mountain glaciers are disappearing at eyesight, the speed of sea level rise doubled that of last century, etc. Climate is changing. The problem is that the global warming variable is not showing it. Anyhow, experts indicate that the current situation is circumstantial (i.e., high particulate sulfate in the atmosphere, heat transport to the deep ocean, etc.) and that warming will keep progressing: "a good *Niña* brought an interlude to the planet, but soon the next bad *Niño* will guide the return of warming". This is not a game, it is the nature of Children. The one playing the Russian roulette is mankind: it keeps burning fossil fuels without control.

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