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The Earth is not Warming in the 21st Century!

Fujii, Y., Hokkaido Univ.

1. Introduction

The fact that the earth is not warming in the 21st century is introduced and a possible cause is discussed.

2. Behavior of air temperature in 21st century

GST (Global-mean Surface Temperature) is not rising in the 21st century although CO_2 concentration continues to increase (Fig. 1). The average temperature for Sapporo or Abashiri shows a peak in 1990 and not rising after then (Fig.2). If people feel that the air temperature is rising, the cause would be the heat-island phenomenon because the environment around the instruments of JMA (Japan Meteorological Agency) is carefully maintained to minimize the effect of the heat-island phenomenon.

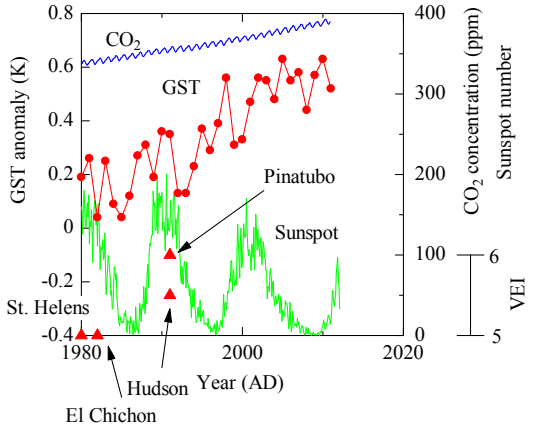


Fig. 1 GST (Global-mean Surface Temperature, source: NASA Web site, http://data.giss.nasa.gov/gistemp/graphs/Fig.A2.txt), CO_2 concentration at Mauna Loa, Hawaii (source: National Oceanic and Atmospheric Administration Web Site, ftp://ftp.cmdl.noaa.gov/ccg/co2/in-situ/mlo/co2_mlo_surface-in situ_1_ccgg_month.txt) and sunspot number (source: National Oceanic and Atmospheric Administration Web Site, ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SUNSPOT_NUMBERS/INTERNATIONAL/monthly/monthly.plt).

3. Cause of stagnation of global warming

GST has shown several stagnations or even temperature drop since 1880 (Fig. 3). The drop between 1945 and 1976 was explained by the effects of the atmospheric nuclear explosions (Fujii, 2011) or AMO (Atlantic Multi-decadal Oscillation, Schlesinger & Ramankutty, 1994, Andronova & Schlesinger, 2000). The other short term stagnations can be explained by the effects of the giant eruptions.

There are neither giant eruptions nor atmospheric nuclear explosions, however, in the period of the stagnation from 2001 to the present. Teleconnection should be investigated in future but solar activity can be pointed as a possible cause of the stagnation.

The sun is active when the sunspot number which varies at approx. 11 year period is high and when the period is short. The sunspot number which decreased from 2001 hardly began to increase in 2009 (Fig. 1). The period is abnormally long and the increase rate is much smaller than the previous rates. Magnetic field is decreasing and abnormally weak now (Fig. 4).

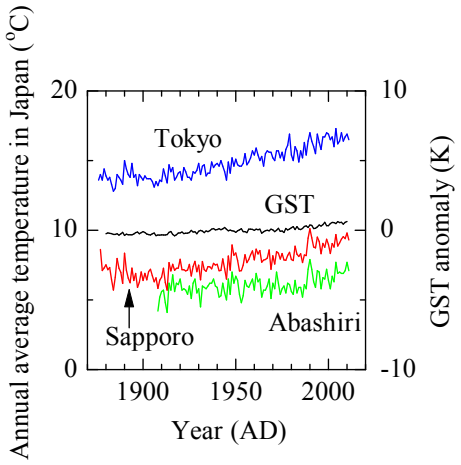


Fig. 2 Annual average temperature in cities in Japan (JMA data) and GST (NASA data).

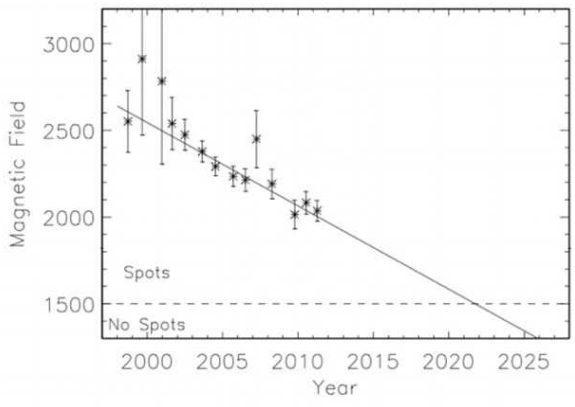


Fig. 4 Sun's magnetic field (http://www.dailymail.co.uk/sciencetech/article-2003824/Earth-facing-mini-Ice-Age-years-rare-drop-sunspot-activity.html)

4. Concluding remarks

The earth is not warming in 21st century. One of the causes is the inactive sun. Food will become short and as serious situation as the rice shortage in 1993 in Japan would be expected if global cooling begins and continues because the self sufficiency ratio of food in Japan is just 40%. Air temperature and solar activity should be very carefully observed.

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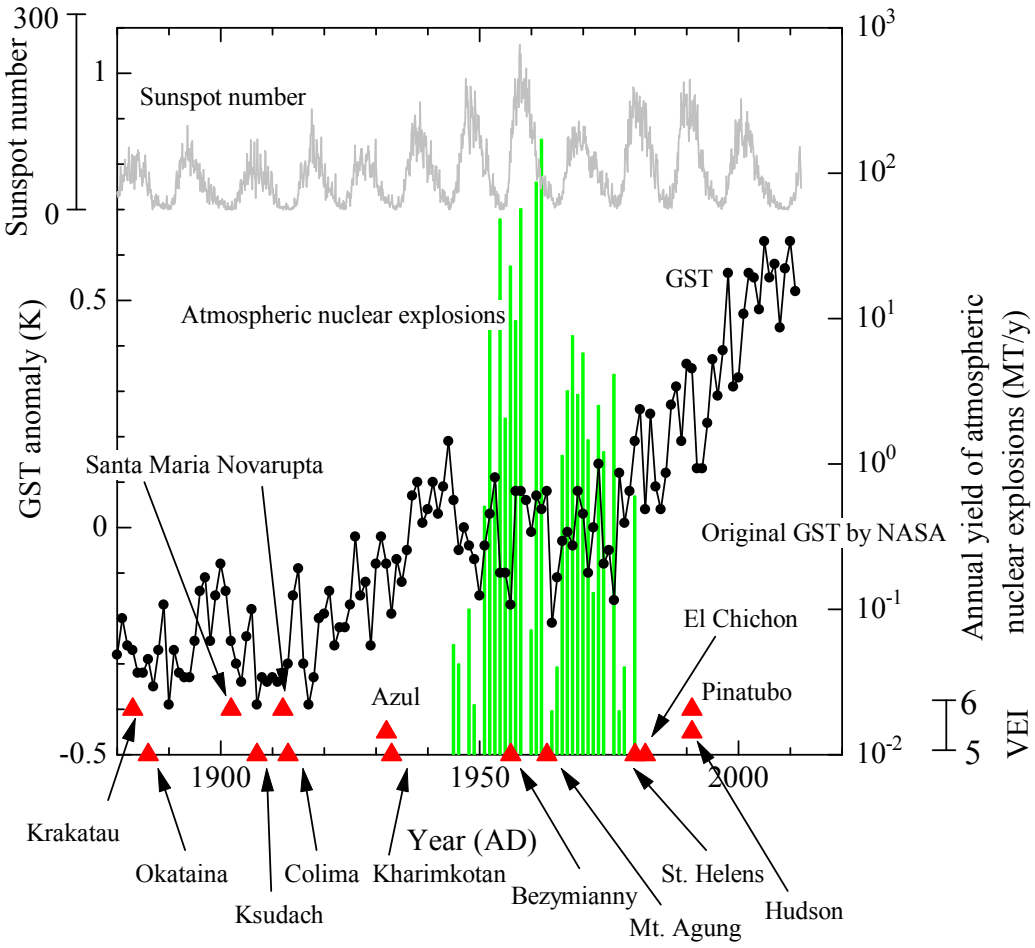


Fig. 3 Anomaly in global-mean surface temperature (GST) (source: http://data.giss.nasa.gov/gistemp/graphs/Fig.A2.txt) between 1880 and 2008. Red triangles: eruptions whose VEI (volcanic explosivity index) is equal or greater than 5 (source: http://www.volcano.si.edu/world/largeeruptions.cfm). Green vertical bars: annual yield of atmospheric nuclear explosions (UNSCEAR, 2000). Gray line: sunspot number (source: ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SUNSPOT_NUMBERS/INTERNATIONAL/monthly/MONTHLY.plt)