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Determining role of the solar protuberance activity in the Earth's climate current warming

Elena A. Kadyshevich[1] , **Victor E. Ostrovskii[2]**

[1] A.M. Obukhov Institute of Atmospheric Physics, Russian Academy of Sciences
[2] Order of the Red Banner of Labor, L.Y. Karpov Research Institute of Physics and Chemistry

ostrovskii.victor@mail.ru

The prevailing view is that the global warming (GW) is caused by the Industrial Revolution (IR), which began in the 1890s and led to increased mining and processing of fossil carbon-containing substances and increased emissions of CO_2 and other greenhouse gases and vapors into the atmosphere.

But this opinion is doubt by the following reasons:

(1) The CO_2 atmospheric content is low, only one molecule per about 2 500 molecules of other gases.

(2) The total 60-year CO_2 increment into the atmosphere is low, only one molecule per 10 000 molecules of other gases; the total CO_2 increment includes not only anthropogenic CO_2, but also CO_2 from forest fires, volcanic activity, and other sources.

(3) Experimental work [1] shows that the CO_2, actually occurring in the atmosphere, should have a greenhouse effect smaller by a factor of several tens than that observed de facto.

(4) Authors of some other studies, e.g. [2–4], concluded that the solar activity variations rather than the greenhouse gases determine the GW.

(5) The PFO-CFO Theory initiated by us about 15 years ago and presented in its finished form in our last publications and in the lecture given in Amsterdam (2019) forecasts the long-duration GW (see [5]).

However, the mechanism of the solar effect on climatic variations of different durations wasn't revealed earlier. We did it on the PFO-CFO Theory basis. The Theory, its content, explanations of the principal past climatic variations, and predictions of the further ones will be considered in another our presentation at this Conference.

Note that the PFO-CFO Theory allowed us in 2015 to predict the unusually powerful solar protuberances (Prs) of October 2017 (see [5]).

We use no models, but only observations, experiments, calculations, and conclusions from them.

Here, we consider events of the last 2–2.5 centuries.

The soil-temperature increment rises over decades bottom-up [6]. This means that it is not magmatic processes that are causing the climate warming.

We proved that the current GW is caused by enhanced activity of solar Prs and have begun in different regions in 1850–1890. It can continue for several solar cycles, but possibly, much longer.

The Prs aimed at the Earth affect its climate by two mechanisms (M1, M2). A portion of Prs' energy scatters in space and only a residue reaches the Earth directly. The Earth absorbs quickly this residue (M1) and then absorbs slowly a part of the energy scattered in space (M2). The Prs that fly far from the Earth warm its surface through M2 only, i.e., slowly. Only a small fraction of all solar Prs flies near the Earth.

We studied the effect of solar Pr activity on the Earth's climate, basing on the available data about the yearly mean surface-air temperature monitored in Eurasian cities Ekaterinburg, Moscow, Berlin, and Rome since 1830, 1820, 1750, and 1810, respectively, and about the powers of all X-protuberances observed since 1976.

When analyzing the Pr activity and the temperature in these cities, we found that warming began before IR and confirmed completely the Pr effect on the Earth's temperature by M1 and M2.

Conclusion:

1. Earth’s warming is caused by enhanced solar Pr activity.

2. Warming can continue in the next solar cycles.

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[6] https://cc.voeikovmgo.ru/images/sobytiya/2022/12/Doklad_o_klimate_RF_2022.pdf, p. 93.