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Heat waves in India caused by emission of deep hydrogen

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Abstract: It is known, that heat waves are especially characteristic of urbanized areas, and their development often occurs under conditions of high atmospheric pressure. However, the mechanism of heat wave generation remains unknown. There is reason to believe that the solution to the problem of the genesis of heat waves is provided by the results of research showing the effect of ozone destruction during the emission of deep hydrogen from tectonic faults and fracture zones. The release of huge amounts of heat is accompanied by the formation of water vapor, as well as electrical discharges. These physico-chemical transformations help to understand the atmosphere features during heat waves - hot, extremely humid air and thunderstorms. The paper presents a series of evidence pointing to the key role of deep hydrogen emission in the propogation of heat waves in the Delhi region.

Keywords: heat waves, deep hydrogen, emission, ozone, India, Delhi

1. Introduction

The increase in damage associated with abnormal human mortality, crops and farm animals losses, recurring fires and environmental degradation during heat waves determines the importance of a comprehensive analysis of this dangerous phenomenon in terms of its nature. It is known, that in the context of global warming, heat waves are especially characteristic of urbanized areas, and their development often occurs under conditions of high atmospheric pressure. However, the mechanism of heat wave generation remains unknown, therefore, the question of risk levels at one time or another in a given place remains unanswered, which makes it difficult to predict the weather.

There is reason to believe that the solution to the problem of the genesis of heat waves is provided by the results of research by V.L.Syvorotkin [1], who established numerous facts of ozone destruction during the emission of deep hydrogen from tectonic faults and fracture zones. The heat of combustion of hydrogen in oxygen is 286.2 kJ/mol, and the heat of combustion of hydrogen in the ozone is 333.9 J /mol. The release of huge amounts of heat is accompanied by the formation of water vapor in the proportion of 9 g per 1 g of hydrogen, as well as electrical discharges. These physico-chemical transformations help to understand the atmosphere features during heat waves - hot, extremely humid air and thunderstorms (often dry). In the paper [2] it is shown that the Syvorotkin's model allows us to give an exhaustive explanation of the causes of climate warming in Antarctica.

The following is a series of evidence pointing to the key role of deep hydrogen emission in the propogation of heat waves in the Delhi region.

2. Geological background

Hydrogen emission proceeds especially vigorously in tectonically mobile section of the earth's crust. Central Delhi occupies an area with discontinuous geological structures of different orientations, the largest of which include Great Boundary fault, Moradabad fault and Mathura fault [3, 4]. Therefore, the frequency of earthquakes is relatively high here (Fig. 1).

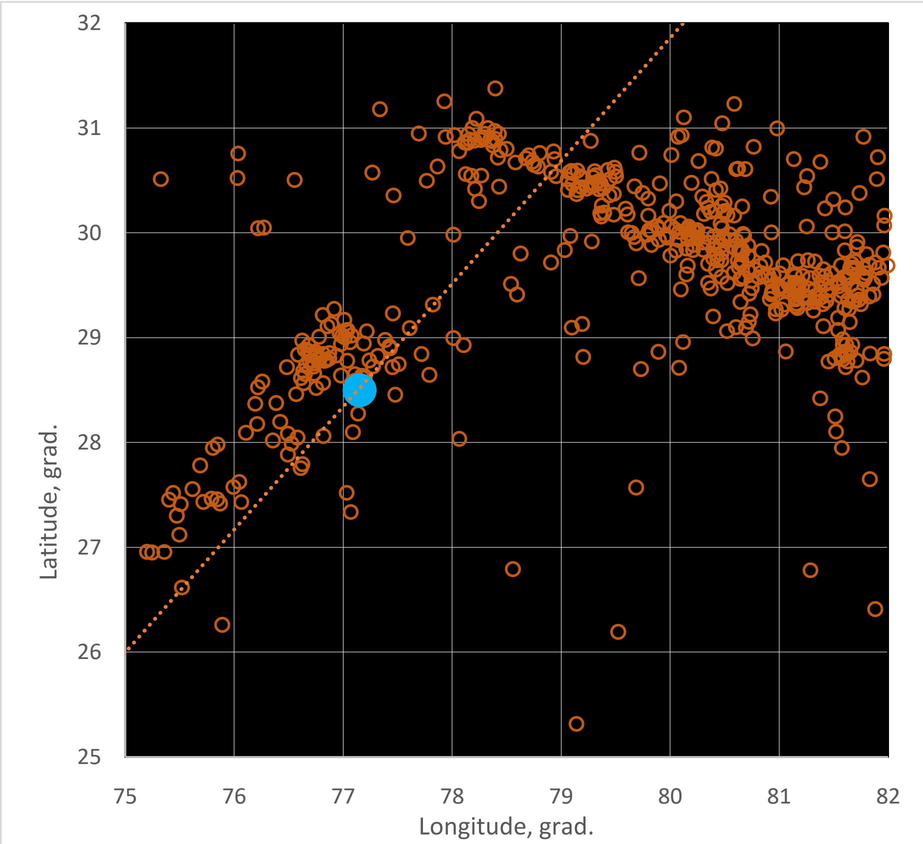

Figure 1. Epicenters of earthquakes with M ≥3 near Delhi
Source: compiled according to the data[5]

In the area under consideration, as well as throughout India, there has been a tendency to growth of seismic activity, the number of medium magnitude events (the most informative) has increased 3 times in half a century (Fig. 2)

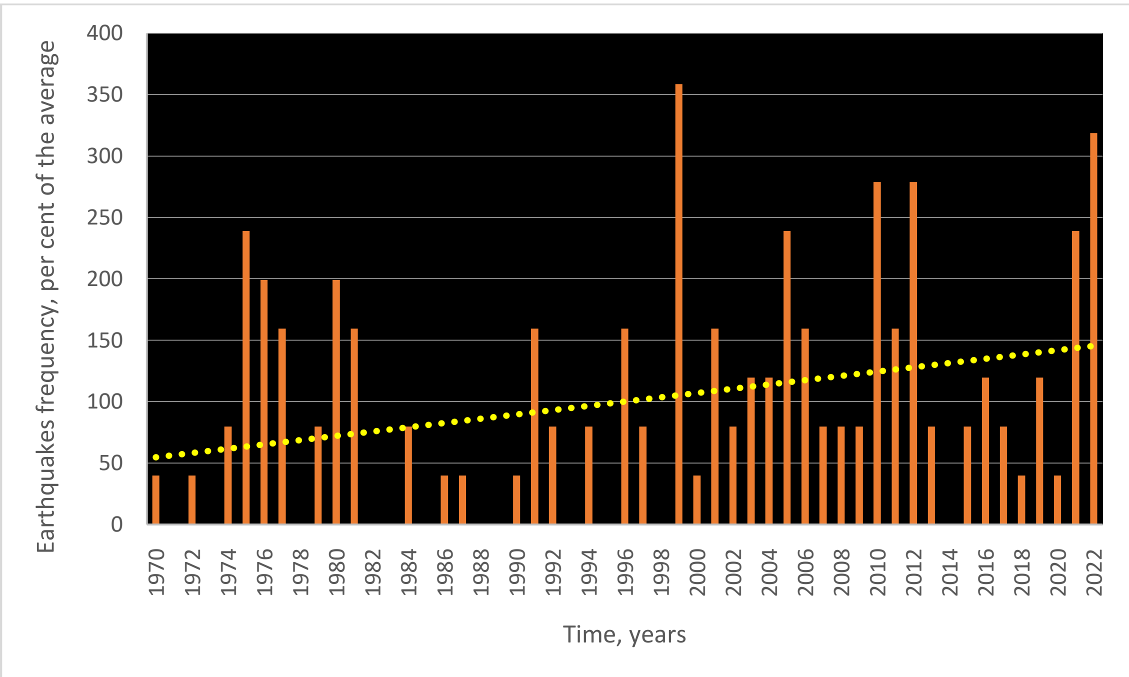

Figure 2. Frequency of earthquakes M ≥ 5 in the Delhi region (25-28° N, 75-82° E);a linear trend is shown

Source: calculation based on [5]

3. Earthquakes and heat waves

The clear picture of cause-and-effect relationships between seismic activity and weather is revealed when studying specific cases of the birth of heat waves. Here are three examples concerning the April months of 2021-2023, when the maximum air temperature in New Delhi exceeded 40° C.

In 2021, the critical threshold was crossed on April 15, the day marked by the earthquake (MW 2.2, the hypocenter at a depth of 10 km), which happened 44 km from the New Delhi ozonometric station. Two days earlier, the minimum values of the total ozone content in the atmosphere were recorded here, and its deficiency was felt throughout the week (Fig. 3). It is extremely characteristic that at that moment the relative humidity reached 92% and a thunderstorm broke out.

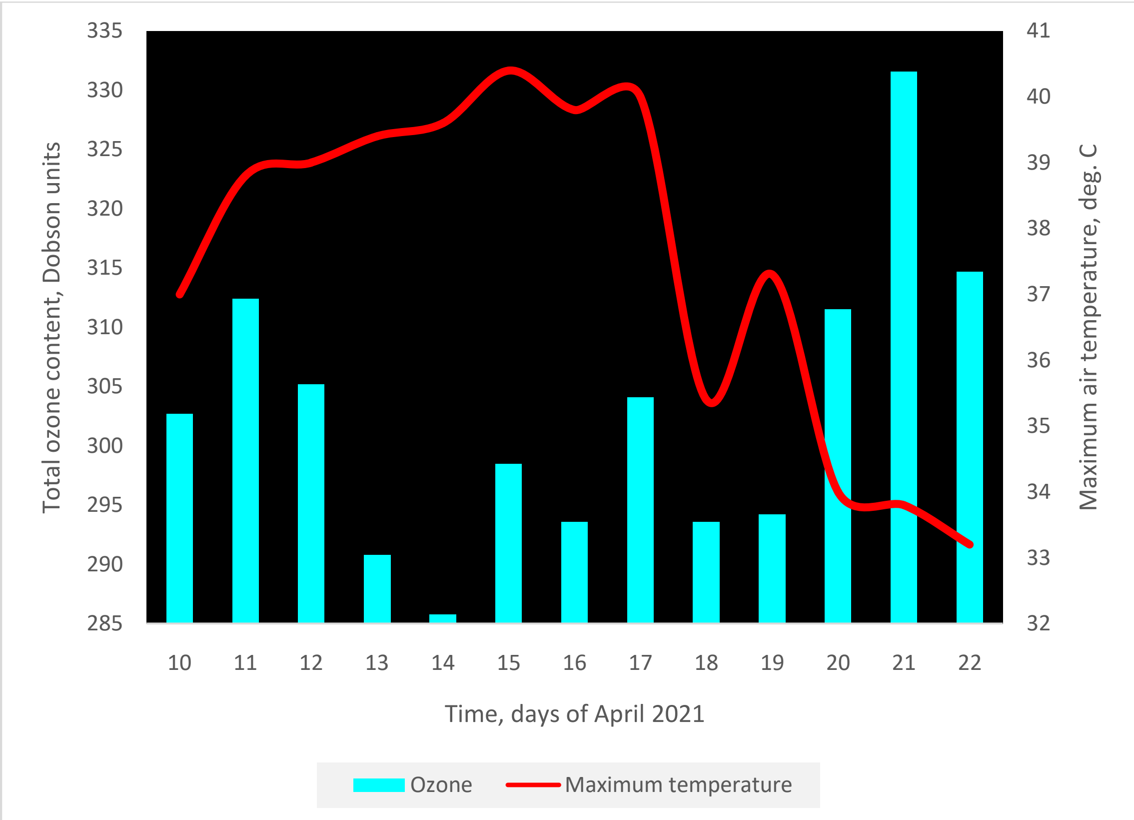

Figure 3. Heat wave in April 2021

Source: compiled according to the data [6, 7]

April 2022 was distinguished by the earlier onset of very hot weather with relative humidity at the level of 70-72%, when a negative anomaly of total ozone also occurred (Fig. 4).

Obviously this was the meteorological effect of an earthquake of considerable strength (Mb 5.1) with an epicenter at a distance of about 280 km from the city.

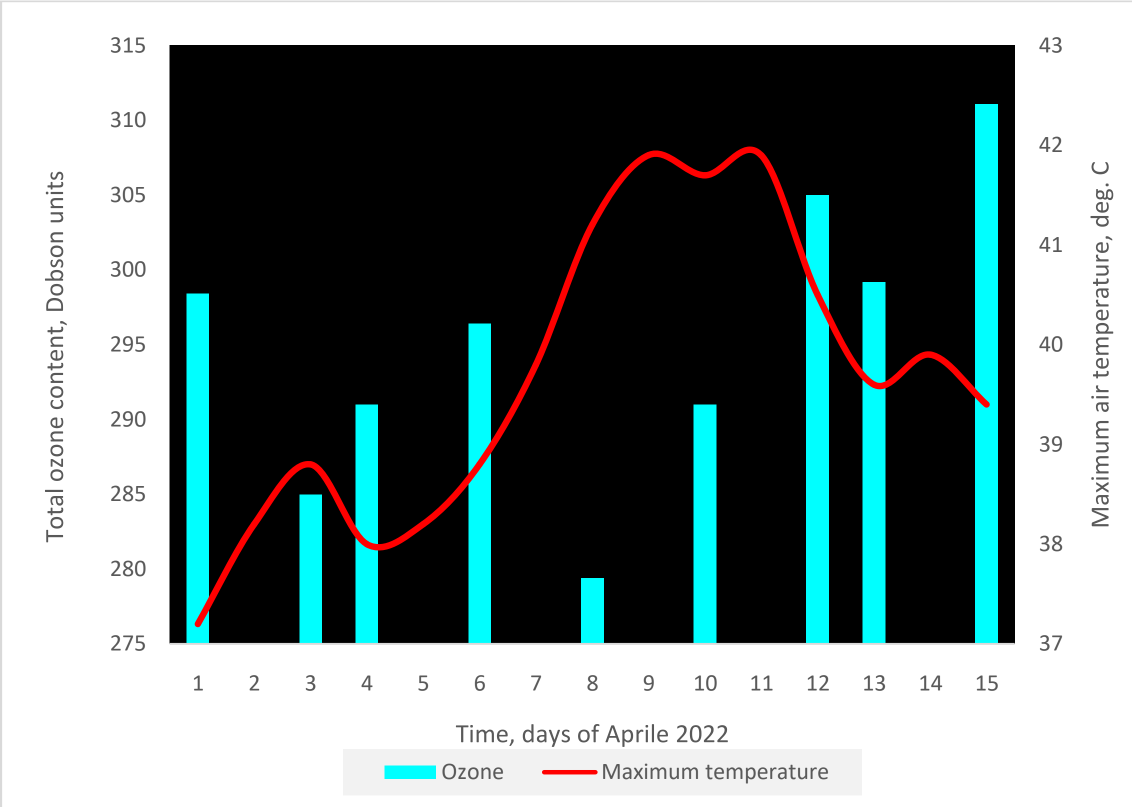

Figure 4. Heat wave in April 2022

Source: Ibid.

The reality of such kind of seismic impact on the atmosphere is evidenced by the significant size of the ozone anomaly (Fig. 5).

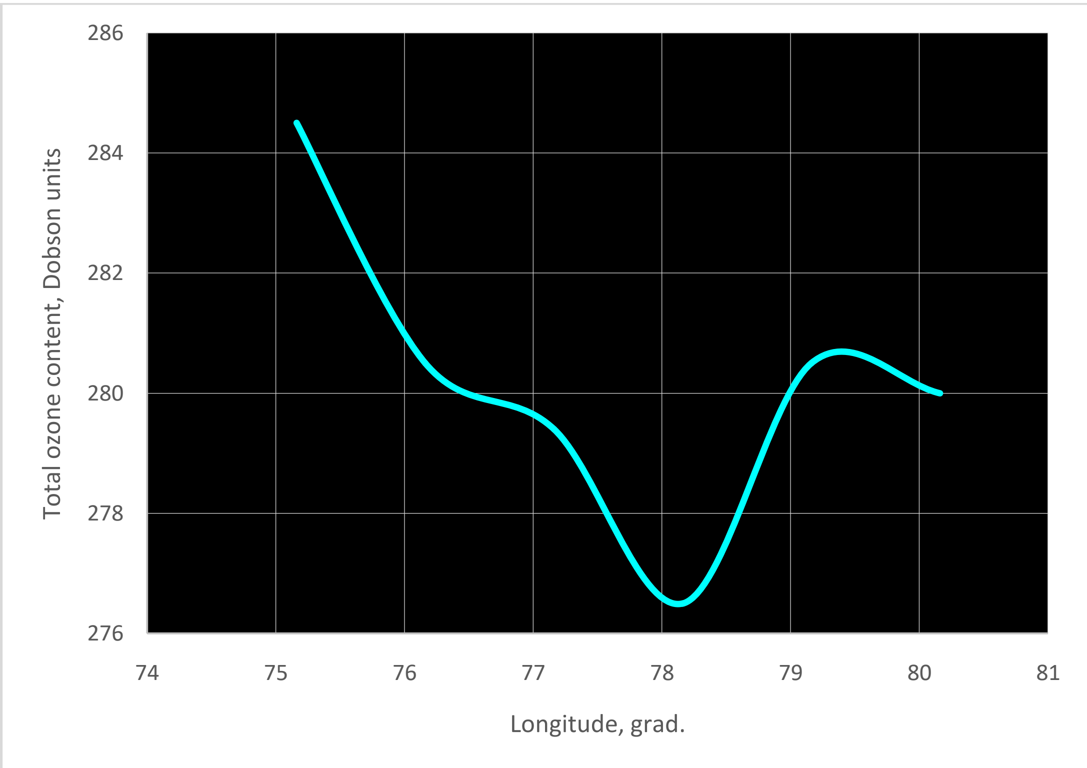

Figure 5. Total ozone anomaly at 8 April 2022

Source: compiled according to the data [8]

The largest heat wave that covered Central Delhi in mid-April 2023 can be associated with the earthquake Mb 3.5, which was registered on April 17 at a distance of 270 km from the ozonometric station. This is the conclusion that allows us to draw the fact of a large difference in the values of ozone deficiency between the coordinates of this station and the epicenter, exceeding 12 Dobson units (279.9 vs. 292). Thus, the release of hydrogen at the epicenter of the earthquake led to a reduction in the total ozone content in the atmosphere by 30 Dobson units (!), which caused a record warming of the surface air layer (Fig. 6), as well as high humidity (up to 80%)

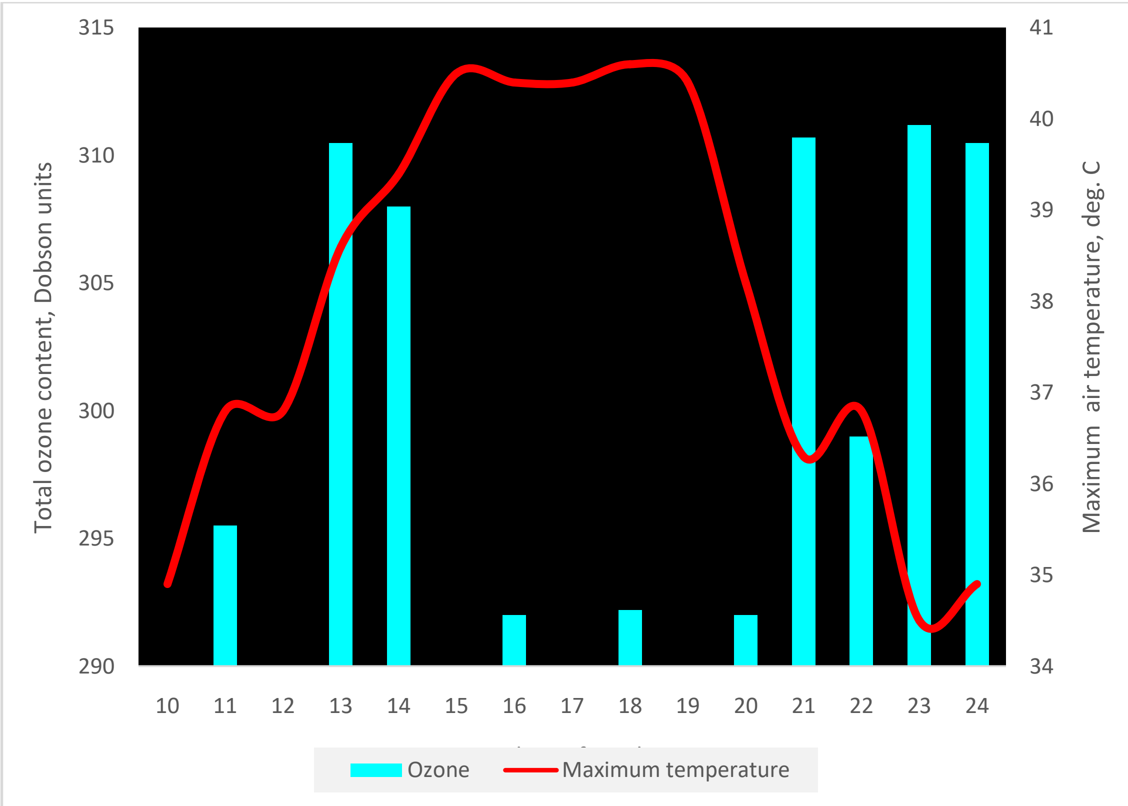

Figure 6. Heat wave in April 2023

Source: compiled according to the data [8, 9]

4. General picture

As expected, the increase in seismic activity due to high hydrogen emission in recent years has been accompanied by a noticeable decrease in the total ozone content in the atmosphere (Fig. 7).

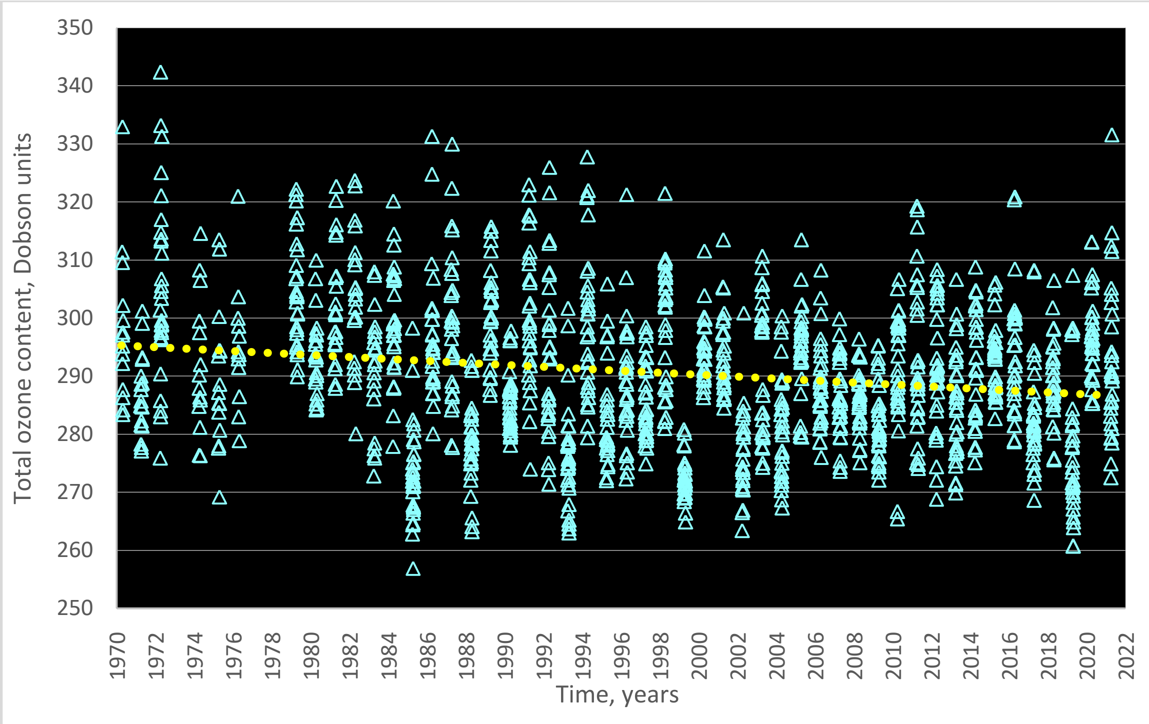

Figure 7. The total column ozone in April 1970-2021; a linear trend is shown
Source: compiled according to the data [6, 7]

The reaction of hydrogen with oxygen generates increasing amounts of energy entering the surface layer of air and feeding heat waves (Fig. 8 and 9).

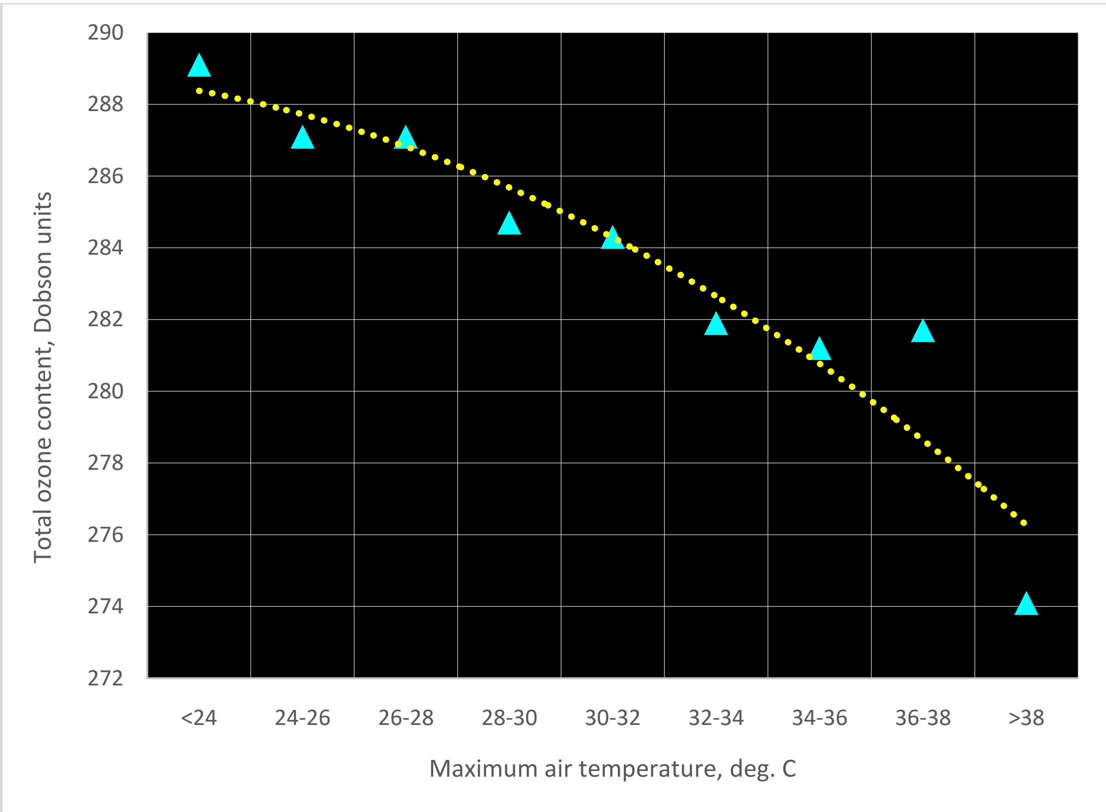

Figure 8. Maximum air temperature and the total column ozone in March 1990-2021; a polynomial trend is shown
Source: compiled according to the data [6, 7]

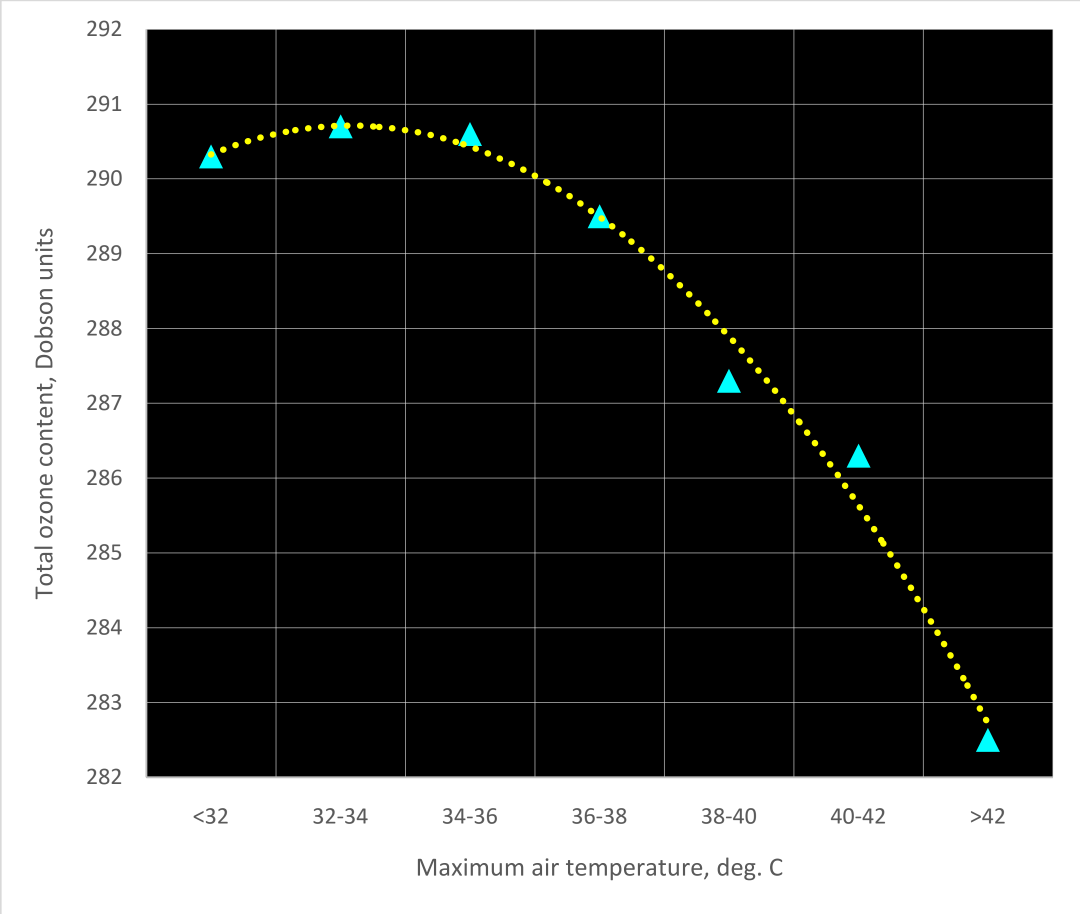

Figure 9. Maximum air temperature and the total column ozone in April 1990-2021; a polynomial trend is shown

Source: Ibid.

5. Conclusion

The facts presented above - their number could be multiplied arbitrarily - indicate that the cause of heat waves that bring death to all living things must be sought in the insides of the Earth. Three conclusions follow from this. First, an in-depth study of the connections between the geosphere is necessary. The second is to use the existing national seismological network for early warning of dangerous warming of the surface air layer. Third, more attention needs to be paid to the processes taking place in the planet's core.

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