Possible seismogenic trigger mechanism of activation of glacier destruction, methane emission and climate warming in the Arctic and Antarctic

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The problem of climate warming is one of the acute problems of our time. This phenomenon is often ex-plained by an anthropogenic cause - industrial emissions of carbon dioxide into the atmosphere -, that does not explain all the issues. One of such issues is the sharp increase in temperature on Earth, especially in the Arctic, timed to the beginning of 1980. This phenomenon could not be explained by the growth of global industrial production. Therefore, it is natural to discuss possible alternative approaches to explain the sud-den rapid climate warming at a specified time. It is obvious that they must be associated with large-scale processes of a catastrophic nature that can provide a sharp shift in the climate system, leading to rapid warming. For the first time in 2020, L.I. Lobkovsky proposed a hypothesis that warming in the Arctic could be caused by the arrival of deformation tectonic waves excited by the strongest earthquakes in the Aleutian Island arc into the Arctic shelf area and the destruction of the internal microstructure of metastable gas hy-drates located in the frozen shelf pores by additional stresses, which leads to the release of methane trapped in them and its emission into the atmosphere, causing climate warming due to the known greenhouse effect. A sharp warming to 1980 was chronologically well explained by the fact that the most powerful series of the strongest earthquakes with a magnitude greater than 8 in the Aleutian Arc occurred in the middle of the last century. It turns out that the surge of unprecedented seismic activity in the Aleutian Arc occurred ap-proximately 20 years before the onset of the phase of sharp climate warming. Such a time shift is logically explained by the speed of propagation of deformation waves in the elastic lithosphere-viscous astheno-sphere system of the order of 100km/year, since during this time the waves travel a distance of about 2000km between the Arctic shelf and the Aleutian arc.

Since the end of the last century, a similar sharp intensification of the process of destruction and chipping of ice shelves, accompanied by abnormal climate warming, has been in Antarctica. An analysis of the strongest earthquakes occurring in the subduction zones of the Pacific lithosphere shows that the phases of destruction of shelf glaciers correlate with the times of occurrence of the strongest foci earthquakes with a shift in the first decades associated with the time of arrival of the corresponding tectonic waves in Antarcti-ca. During the destruction and breakaway of glaciers, main cracks and faults form in them, leading to a lo-cal pressure drop on the underlying glaciers of sedimentary rocks, presumably containing gas hydrates, causing the dissociation of the latter and the release of released methane into the atmosphere through these faults, leading to a greenhouse effect and climate warming. The proposed scheme predicts a further acceler-ation of the destruction of glaciers and climate warming in Antarctica due to an unprecedented increase in the frequency of the strongest earthquakes in the southern Pacific Ocean.