Tropical Cyclones as a Trigger of Lithospere Earthquakes

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Long–term studies of the earthquakes probability have shown that they occur in areas with the greatest development of deformation processes, which is most fully reflected in the works of IEPT RAS [1]. At the conference dedicated to the 100th anniversary of the birth of Academician V.I. Keilis-Borok, the authors' report [2] discussed the triggering effects of lithospheric earthquakes h>20 km due to the effects of tropical cyclones (TC). Using the example of a series of TC during the development of one of the strongest typhoons of the 20th century, Gay-92, it is shown that lithospheric earthquakes on various faults occurred during the phases of a sudden change in the intensity of TC [2]. Moreover, the movement of earthquake foci occurred following the movements of the TC. Four mechanisms of TC impact on lithospheric plates are considered:

1. The main mechanism is associated with raising the plate in the rarefaction area of the TC and lowering the boundary, where earthquakes occur due to interaction with the adjacent plate [3].

2. The plate can be tilted by a large oceanic island when exposed to the dynamic pressure of the surface wind of the TC, which serves as a lever. Moving lithospheric earthquakes were observed during the passage of the Harry-89 TC through the island of New Caledonia [2-3].

3. The mechanism of the hurricanes impact in the shelf zone on earthquakes was studied in detail using special sensors at ∼2800 seismic stations in the USA for more than 10 years [4]. It is shown that they are accompanied by the excitation of long-wave oscillations.

4. The transmission of the impact of the TC on diametrically opposite plates of the other hemisphere, apparently, can be explained by the antipode effect of both infrasound and long-wave seismic vibrations. Thus, after the underground nuclear explosions in France in November 1991, three tropical disturbances intensified to the fifth category. The impact of the "phantom"typhoons Page, Owen and Sina on the earthquakes of the American continent is considered in [5].

It is assumed that the addition of stochastic methods of earthquake prediction [1] by the effects of the interaction of TC with lithospheric plates can improve the forecast.

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