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Advanced international investigations in to the "tropical cyclone -ionosphere" interaction

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Advanced international investigations in to the “tropical cyclone (TC) – ionosphere” interaction are connected with extreme difficulties of proving the action of possible mechanisms of TC effect on the ionosphere. TCs are the greatest troposphere disasters. Powerful surges of charged particles and neutrals, internal gravity wave radiation and low-frequency electromagnetic wave radiation from central points of TCs to considerable altitudes and distances are a manifestation of TC action mechanisms. In this presentation, the authors consider the results of different research groups working on finding the ionospheric response to tropical cyclones.It is well-known that the tropical zone of the global ocean – atmosphere system plays a key part in dynamics and evolution of synoptic and climatic meteorological processes on the Earth. Here, the ocean – atmosphere system of Earth’s tropical zone possesses a completely unique property of generating rather well organized and steady mesoscale vortical structures – tropical cyclones (TC) – from the atmospheric turbulent chaos in the global circulation system. For a long time the TC has been considered as a thermodynamic system with additional charging by the latent heat of water vapor evaporating directly from the ocean surface, or as the closed thermal machine (Carnot’s cycle). However, satellite investigations have shown that the tropical cyclone has no relation to the closed thermal machines – it represents the so-called (in the statistical physics) open system working due to continuous exchange of various forms of energy with an ambient medium. And, once the exchange breaks, the cyclone is “filled-in” and transformed into post-typhoon forms of various type.
The authors of this presentation have been working on the problem "TC – ionosphere" interaction for a few years.The authors of this presentation analyze the ionosphere parameters, received in the process of both ground and satellite probing above TC and at a certain distance from it. Cyclones, being examined in the paper, functioned in waters of the Indian Ocean and the Pacific Ocean in different years.