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# SOLAR-TERRESTRIAL RELATIONS AND PHYSICS OF EARTHQUAKES PRECURSORS

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## 3.3 Atmosphere and lithosphere interaction could triggered the 2023 $M_w$ 7.8 Turkey earthquake

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Preliminary data analysis based on the recently carried out the Earth's tilts and strain precise measurements by means of far distanced instruments and their comparison with atmospheric and cyclonic activity together with worldwide meteorological, oceanology and space environmental data are presented. The obtained results confirm the earlier proposed atmosphere, ocean and lithosphere interaction as a possible drive of triggering mechanism of major earthquakes. We have described this process as development of successively arising hurricanes (typhoons) in form of spatial-temporal swings of cyclonic active zones over the Earth's tectonic plates in E-W or N-S directions. The process starts 4–7 weeks before an earthquake and, after some cyclonic activity descending, it resumes wherein occurring a power seismic shock becomes high probable. Investigation of the decade 1997–2007 major earthquake series showed that above period of cyclones system swinging and earthquake preparation may increases up to 1–2 months for the most strong $M_w$ 8–9 seismic events. This study considers the initiation of powerful Turkey earthquake (6 February 2023) that could be a result of tropical cyclones interaction in the Indian Ocean and extratropical windstorms in North Atlantic and Mediterranean basins. The excitation of the Indo-Australian and African tectonic plates which border the southern side of the Arabian tectonic plate has progressed as NW-SE spatial and temporal swings of cyclonic disturbances between Atlantic and Indian Ocean basins during December 2022 – January 2023. The number of intense extratropical cyclones affected Central Europe and Mediterranean areas adjacent to the north border of the Arabian tectonic plate in its narrowest and most vulnerable flank, where the chain of strong earthquakes occurred in the beginning of February 2023. The observed atmosphere and lithosphere interaction was accompanied

by tilt-baric and strain-baric disturbances detected by our instruments over wide distances from the Central and East Europe to the Far East regions. Tilt-baric effects of the order of 1.2–1.5 $mas/mbar$ and strain-baric events of $(2-3)\cdot 10^{-8} mbar^{-1}$ were observed for the most intensive European windstorms and Indian Ocean tropical cyclones 7 weeks and 2 weeks before the $M_w$ 7.8 Turkey earthquake.

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