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Global Science of Meteorological Tsunamis: From Planetary to Mesoscale Processes (GLOMETS)

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Meteorological tsunamis - atmospheric ocean waves in the tsunami frequency band - and generally nonseismic sea level oscillations on tsunami timescales attracted a lot of attention in the recent decade due to the global availability of high-resolution sea level and ancillary measurements and advancement of both atmospheric and ocean models. This became even accentuated after the century-level event of the Hunga Tonga-Hunga Ha'apai explosive volcano eruption on 15 January 2022, which created global acoustic-gravity waves in the atmosphere and meteotsunamis in the ocean. In that spirit, the Global Science of Meteorological Tsunamis (GLOMETS) 4-year project has been proposed for funding to the Croatian Science Foundation and launched on New Year's Eve of 2023 to tackle the following research topics: (1) global meteotsunami hazards from explosive volcanic eruptions and asteroid impacts, (2) meteotsunami hazards at the sub-kilometre scale from both weather- and explosive volcano-induced events, (3) reproducibility of meteotsunami hazard by climate models, for their eventual assessment in the future climate, (4) eventual optimization and improvement of the meteotsunami monitoring, and (5) developing stochastic techniques for meteotsunami uncertainty quantification. To achieve these objectives, state-of-the-art tools will be used, like (1) global quality-checked high-frequency sea level analyses, (2) coupled atmosphere-ocean global and (sub-)kilometre models, (3) climate simulations, reanalyses, and products, and (4) uncertainty quantification techniques and optimal experimental design methods. This presentation will overview state-of-the-art in the quoted topics, with planned work-to-do and research activities, hopefully to initiate fruitful discussions and new research directions and to establish new collaborations around the project.