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On the role of air-sea-wave interaction in developing destructive Tropical-Like Cyclones DANIEL

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Between Sept. 4, 2023, and Sept. 12, 2023, a cyclogenesis develops close to the Greek coast in the Ionian Sea. The evolution of this cyclone is divided into two phases: a strongly baroclinic one with intense orographic precipitation in Greece, and a final barotropic phase with the formation of an intense tropical-like cyclone (TLC) impacting Libya, causing more than 10,000 deaths due to the intense precipitation causing the sudden break of a dam. In this work, we investigate this TLC (named "Daniel") initially using the standalone WRF model with different sea surface temperature sensitivity tests until we arrive at the use of the coupled atmosphere-ocean and atmosphere-ocean-wave models. The purpose of this work is to investigate the role of each environmental component in the development of the barotropic phase and the record-breaking precipitation. We also aim to study the energy fluxes and mixing factors between the atmosphere and the ocean. Preliminary results show that SST plays a crucial role in the intensification of the cyclone and precipitation, not only along the cyclone track but especially in the neighboring areas, where high values of heat transport are found.