



**Ben-Gurion University of the Negev  
Blaustein Institutes for Desert Research**

The Swiss Institute for Dryland Environmental and Energy Research  
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# High-Frequency Oscillations and Submesoscale Frontal Dynamics at the Air-Sea Interface

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## Abstract:

The ocean is arranged in small scale features such as strong jets, mesoscale eddies, and submesoscale filaments. The impact of these small scale features, particularly the submesoscales, on the large scale atmospheric circulation is still not clear. Recent studies have shown that small scale ocean features impact not only the atmospheric boundary layer above them but also large scale circulation patterns. These impacts include changes in storm track activity, ocean currents location, and vertical ocean heat flux. Many of these studies and others have focused on ocean features with time scales longer than a month justified by the slow evolution of the ocean. However, the interactions with the atmosphere are expected to happen at shorter time scales, perhaps several days, due to the fast evolution of the atmosphere. A high-frequency analysis is, therefore, required to resolve the interactions and to understand dynamic processes at the air-sea interface.

In this talk, I will show results from several global, coupled, and high-resolution simulations I performed, focusing on time scales shorter than a month. Analysis of these simulations revealed a previously unknown and yet ubiquitous three-to-six-day oscillation at the air-sea interface. I will describe this oscillation and confirm its existence using observations. In the second part of the talk, I will use results from the high-resolution simulation to augment the scope and understanding of air-sea interactions that were previously known based on coarser spatial and temporal resolution models and observations. I will show results that demonstrate that the strongest air-sea interactions occur mostly at the submesoscale. They have a characteristic time scale of several days, and they are highly correlated with strong background wind conditions. I will also discuss some future planned work to conduct new simulations and expand the analysis of the submesoscale impact on the ocean and the atmosphere.

**Date & Location:**

**Tuesday, June 10, 2020, 16:00  
ZOOM Lecture**