

# Microbarom Sources from Tropical and Extra-tropical Cyclones

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**3:00-3:30 pm Coffee Hour  
3:30-4:30 pm Seminar**

## Abstract

Beach Monitoring stations around the globe routinely detect microbarom signals with a dominant frequency of  $\sim 0.2$  Hz from regions of marine storminess. Acoustic signals dubbed microbaroms are created by the interaction of opposing ocean surface waves with similar frequencies most commonly generated in the lee of extra-tropical and tropical cyclones. The generation of microbaroms from within a tropical cyclone is demonstrated by the use of a parametric wind model, a spectral wave model, and a theoretical acoustic source model. This approach excludes ambient wave conditions and facilitates a parametric analysis to elucidate the source mechanism within the storm. A stationary tropical cyclone produces the strongest microbarom signals at the center with the maximum amount of converging waves. As the cyclone moves forward, the converging wave field becomes less coherent and the maximum microbarom source lags behind the storm center. A relationship between the forward speed of the storm and location of maximum microbarom intensity is shown to be consistent with infrasound observations from Hurricane Felicia in 2009. The modeling efforts are expanded to recreate Hurricanes Felicia and Neki of 2009 in the central Pacific that were well recorded by the infrasound array IS59 Kailua-Kona, Hawaii. The model results elucidate origins of infrasound signals from the tropical cyclone waves as well as their interactions with the ambient conditions consisting of swells, wind seas, and storm waves from nearby systems. In general there is agreement between the IS59 observations and the theoretical microbarom estimates supporting the use of infrasound signals for inference of tropical cyclone waves. With the encouraging results, the methodology is applied to model extra-tropical cyclones at the global scale by use of a 10-year hindcast illustrating the prevailing source regions.

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**Please join us for the coffee hour at the seminar venue a half hour before the seminar, 3:00 – 3:30 pm**