

Heave Cancellation for a Maritime Infrasound Sensor

Wide global infrasound coverage is obtained using the CTBTO land-based sensing network, whose primary purpose is to detect nuclear test explosions. However, two thirds of the earth's surface is composed of oceans, and no capability yet exists to monitor infrasound signals from sensors fielded in the maritime environment, for example, as hosted by ships, ocean buoys or Unmanned Surface Vehicles (USVs). Such a capability could provide additional infrasound coverage where it is not now present/reliable, or, valuable redundant coverage where it does, thereby improving infrasound event detection confidence, classification, localization, and environmental characterization capabilities worldwide. One of several technical challenges in operating infrasound sensors in the maritime environment is to overcome ocean heave-induced interference. Ocean heave causes interfering ambient pressure fluctuations due to vertical motion of the sensor. This interference may be of significant magnitude to obscure infrasound signals-of-interest. In this paper, we report on an experiment conducted with a microbarometer infrasound sensor deployed onboard a ship at sea. An ocean-heave cancellation method is developed and applied to the collected infrasound data. The results show the performance of this method in cancelling ocean heave-induced interference for infrasound sensors fielded in the maritime environment.

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