



## **The role of gravity in ocean acoustics propagation and its implication to early tsunami detection**

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Oceanic low frequency sound generated by submarine earthquake travels much faster than tsunamis and leaves pressure signatures that can act as tsunami precursors. In this regard, it is anticipated that the correct measurement and analysis of low frequency acoustics would enhance current early tsunami detection systems. In this work we model the low frequency acoustics generated by the 2004 Indian Ocean earthquake using the "Method of Normal Modes" and the "Acoustics-Gravity Wave" theory. Ocean acoustic theories usually neglect the effect of gravity. However, we show for rigid and elastic bottom conditions how gravity influences the acoustic normal mode propagation speed. Practically, our results can help in the real time characterization of low frequency sources in the ocean. This will enhance the robustness of early tsunami detection systems.