Effect of Convection on Wavelet Estimation for a Multidimensional Acoustic Earth

Bashir Ahmad[1]* and Ambreen A. Khan[2]
1.Department of Mathematics,
Faculty of sciences,

King Abdul Aziz University,
P.O.Box.80203, Jeddah 21589,
Saudi Arabia.
E-mail: basher_qau@yahoo.com
2.Department of Mathematics,

Quaid-i-Azam University,
Islamabad, Pakistan.
E-mail: ambreen_tariq2008@yahoo.com

Abstract
We extend the wavelet estimation method due to Weglein and Secrest [4] to a marine seismic exploration model by taking into account the fluid motion and obtain the wavelet amplitude of the reflected data. This consideration is important for processing marine seismic data and for modeling seismic response. In case of known source location, the method predicts the source spectrum whereas the wave-field is predicted when the source (discrete/continuously distributed) is completely unknown. Moreover, this method is independent of the information about the properties of the earth. We find that the wavelet amplitude tends to zero and as a result, the corresponding reflected waves will be suppressed when the speed of the moving fluid gets closer and closer to the speed of sound. When the speed of the fluid motion is minuscule in comparison with the wave speed in water (Mach number $M \ll 1$), it does not effect the wavelet amplitude and the fluid motion can altogether be ignored which is in accordance with the physical observation.

---

* Keywords and Phrases: Marine wavelet estimation, Reflected wave, Acoustic earth.