

ACOUSTICS2008/314

Tank experiment : the ultrasonic approach to ocean physics

Philippe Roux

LGIT - CNRS - Université Joseph Fourier, Maison des Géosciences, 1381 rue de la Piscine, BP 53, 38041
Grenoble, France

Acoustic/elastic waves ranging from a few kHz to a few MHz are nowadays easy to emit/receive through the use of "key in hands" multi-channel systems. These systems provide the instantaneous amplitude and phase of the deterministic wave propagating in the medium with a dynamic larger than 90 dB in some cases (16-bit amplitude sampling). The use of a large number of channels (at least 64) is mandatory to simultaneously investigate the spatial and temporal aspect of wave propagation in complex media. The advantage of a laboratory-scaled ocean model relies in the ease with which it can be build, modified, and/or controlled over time. Finally, the trend in ocean wave physics is now to study the dynamics of such medium (internal waves, turbulent flow, sensor motion...) that requires the use of a real-time acquisition system. Examples of the types of analog experiments that could be carried out with a laboratory-scaled system are the study of nonuniform doppler shifted fields in reverberant environments, ocean acoustic tomography and similar inverse problems, coherent communications in complex moving environments, etc. After the description of the equipment, we give more specific examples of potential experiments to illustrate the versatility of the laboratory set-up.