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Experimental analysis of statistical characteristics of a very shallow underwater acoustic channel

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Underwater acoustic channel is characterized as a time-varying and multipath environment. Not only each propagation path changes randomly but also the scattered waves from the surface and bottom deteriorate signal transmission resulting in fading channels and poor communication performance. In order to design communication algorithms and determine modem parameters the characteristics of random ocean channel must be analyzed in advance. In this paper we investigate the statistical channel properties with experimental data gathered in a very shallow water near the southern coast of South Korea using band-limited signals with center frequencies of 20-40kHz. The impulse responses at several distances up to 4km are estimated and their statistical characteristics in the complex domain are analyzed. We found that the statistical properties are highly dependent on the channel impulse response and the carrier frequency.