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Very Broadband High Frequency Underwater Acoustic Communications

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Many new applications for underwater observatories and sensor systems do not require long ranges, but do require very power-efficient, high-throughput communications. Recent work in phase-coherent underwater acoustic communications has shown that signal bandwidths of 10-40 khz at carrier frequencies from 80 to 120 khz may be used to achieve throughputs of up to 80 kbps at ranges of 100-500 meters in shallow water. The work has included channel impulse response measurements over time and with respect to range, and application of the adaptive decision feedback equalizer using signals at multiple bandwidths. The broadband, high-frequency propagation environment is characterized, and its impact on the reliability of very wide band signals (relative to the signal carrier) is presented.