

ACOUSTICS2008/3478 Measurements of 3D propagation in the shelf environment

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In the Fall of 2007 measurements were made to calibrate the acoustic environment on the shallow water shelf off the coast of Florida. The continental shelf is quite flat (less than 1 degree slope) for a region approximately 10 km wide. Transmissions to a cross-shelf 900m horizontal line array were made from a source transiting along the shelf. The signal transmissions include broadband LFM (20-420 Hz) and a comb of narrow band frequencies spanning the same range. Narrowband beamforming results show the clearly identified source. The arrival angle for the source is as expected until a distance of approximately 30-40 km when there is an apparent bearing shift in-shore of up to 25 degrees. This behavior is expected in propagation on a shelf (of greater slope) but its behavior is surprising. The phenomenon was observed for several runs at various source and water depths. In order to explain the phenomenon, a hybrid adiabatic normal mode-Parabolic Equation method will be applied to the environment. This model computes the vertical modes and phase speeds at each location and then uses the PE to propagate each mode individually using it's spatially varying phase speed and attenuation. Comparisons of theory and data will be made.