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On shallow water ocean acoustic tomography system based on parametric arrays physical properties evaluation

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Unsophisticated acoustic tomography system properties using envelope of radiated acoustic signal for ocean long-range inhomogeneities control, presumably, in most unfavorable, in the author view, shallow water regions, are evaluated. Unique solution to be used there is a narrow directional parametric radiation array. When pump wave signal decay range to array Frauengopher zone dimension ratio exceeds pump wave frequency to radiated signal frequency ratio, parametric radiation array operation model turns to "horn" model instead of "traveling wave" model conventionally used for consumed power prediction. For utmost distance achievement both ends of tomography system should be designed as narrow directional parametric arrays working on optimal frequency basic propagation (first) mode. For instance, signal optimum frequency 40 Hz. is shown to be necessary for model inhomogeneity (100 meters long cylinder) control on 500-km radiation array distance in water layer of depth 200 meters with unfavorable attenuation properties. Major lobe solid angle should be chosen not wider than 0,03 radians. Array frequency ratio is advised to be of an order of 10, while array length - 100 half wavelength for pump sound field frequency. Then estimate of power consumption looks like 180-200 kWt of pump signal acoustic power.