Acoustical Noise Spectrum from DUMAND
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(PRELIMINARY)

The JBEM acoustical system was operated for a few days following the deployment cruise, and some acoustical data were logged using a commercial DAT (digital analog tape) recorder, which samples two channels of audio signals at 48 kHz. The DAT was used because the shore station front-end boards required to directly digitize and log hydrophone data were not ready. Unfortunately by the time the boards were ready, the SC short prevented the JBEM from being used, so these may be the only data we have for a while.

The DAT tapes were re-digitized using a commercial 200 kHz A/D board in a 386 PC. The data presented here were digitized at 50 kHz for two channels, resulting in a 25 kHz sampling rate per channel. We will repeat this work using 48 kHz sampling on both channels, but the preliminary results are presented here for general interest. The low sampling rate of course limits our results to the signal frequency range below 12.5 kHz.

The attached figure shows the spectrum from a time series of approximately 400K samples (so about 16 sec of realtime) from a DAT tape logged with the JBEM on the bottom and the Oceano transponders operating in the background. Peaks due to the transponder frequencies are readily apparent over the noise spectrum, which behaves in the general manner expected. We should note that the acoustical environment at the site is extremely quiet: the ADC preamp gains were set to provide clear, strong transponder signals (see for example the graphs attached to the report by J. George) and at that level the noise background was a few ADC counts (scale 0--4096). For future ocean noise studies we have plenty of range to raise the preamp level to provide more noise amplitude.

The spectrum (power spectrum density distribution) shown was obtained from the discrete sampled data using a method described in ref. [1]. The time series of 400K samples was broken into 196 sets of 2048 samples, which were separately FFT'd without overlap, using a Parzen (triangular sawtooth) window weighting function to minimize spurious window-edge ripples. Results from the subset FFTs were averaged to obtain the final result.

Reference

[1] W. H. Press, et al, Numerical Recipes, Cambridge Univ. Press, NY, 1989, sect. 12-7.

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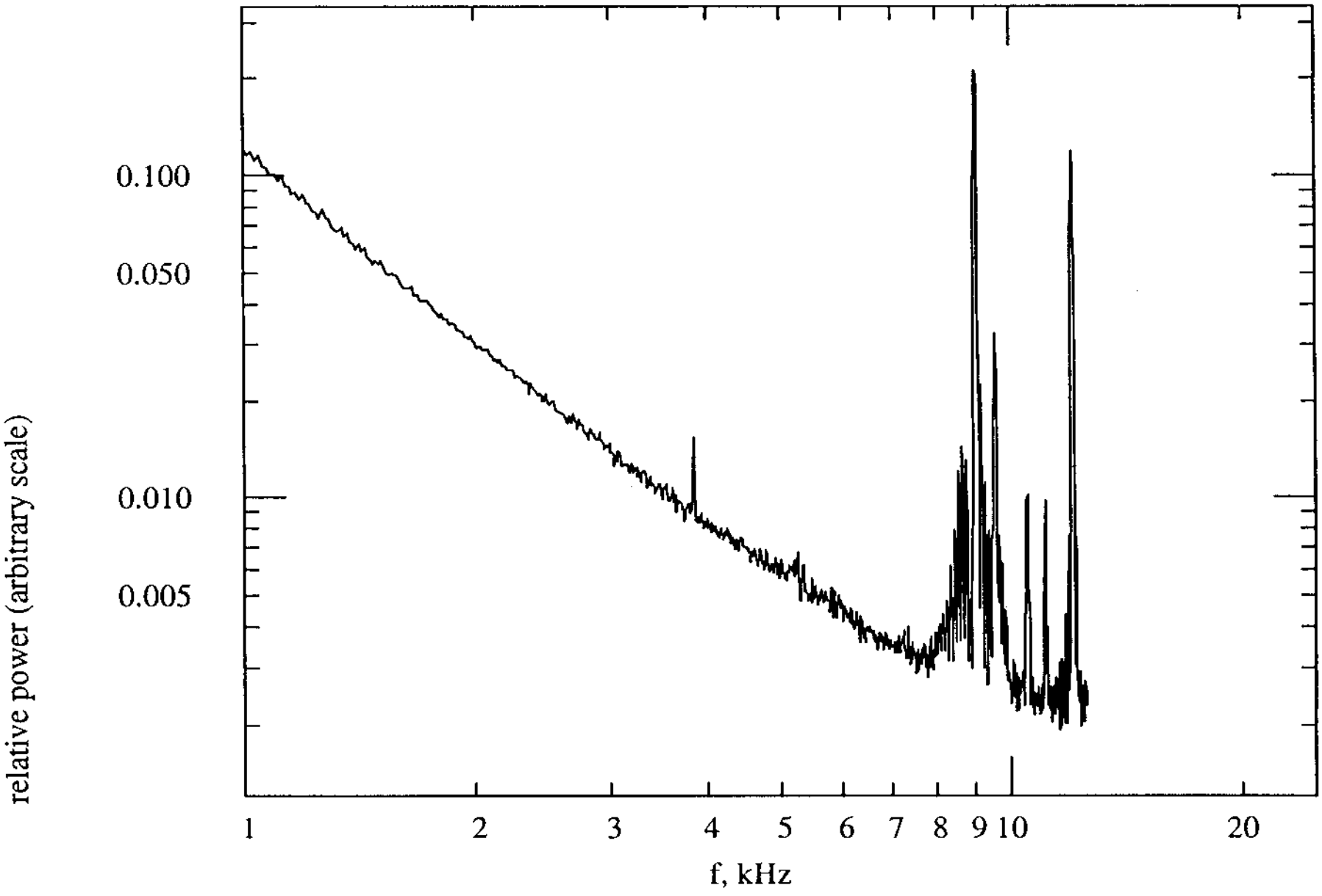

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