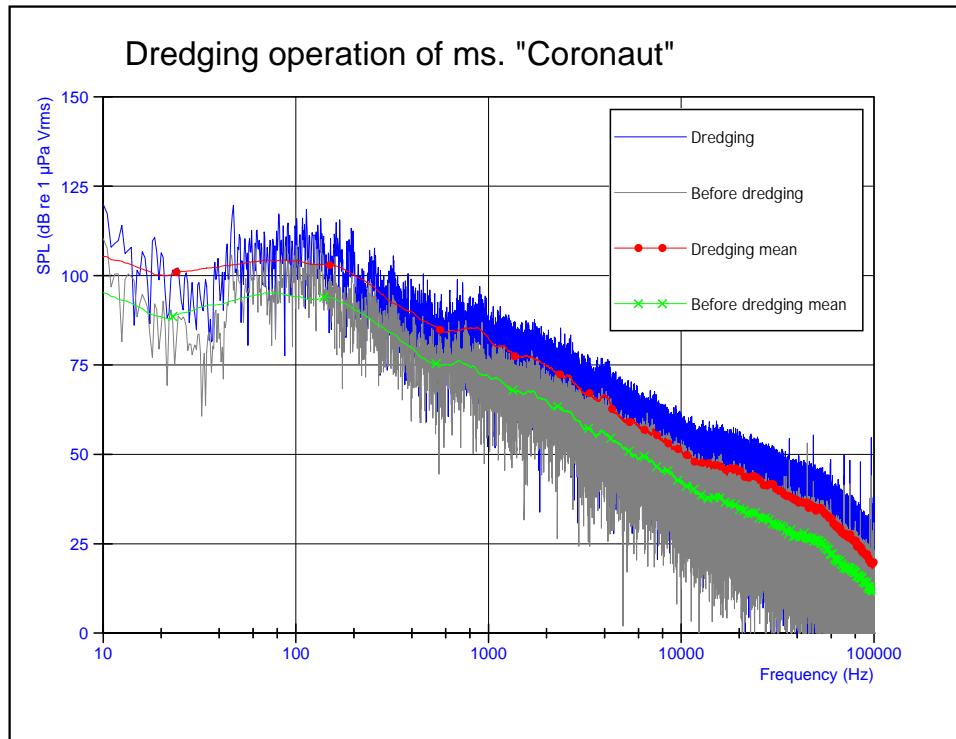


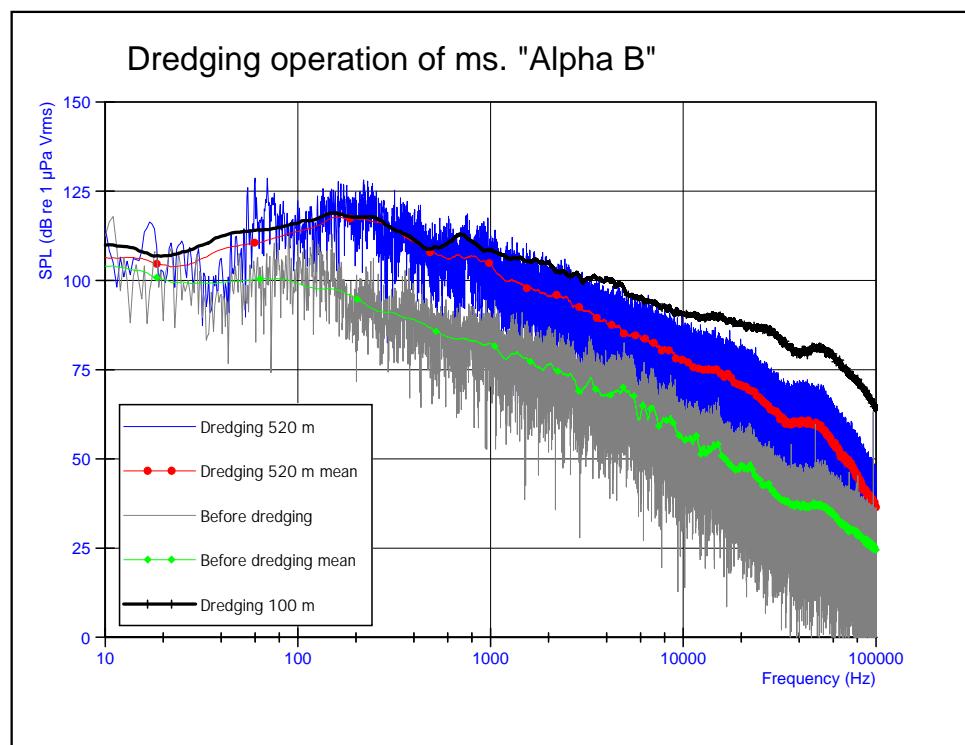
## Curves and graphs part IV (Graph 18/23)

Sand dredging operations on the north side of the NSW area



Graph 18 Dredging operation of ms. "Coronaut" recorded at a distance of approximately 0.6 nautical miles. The data of the curves "dredging" and "before dredging" were taken from a single data file, in which the actual starting of the dredging was captured. The time difference between both curves is 14 seconds. The grey curve is the raw FFT result of spectrum before dredging started and the blue spectrum during dredging, both representing 1025641 samples and a frequency resolution ( $dF$ ) of 0.5 Hz with the curves expressed as mean are the smoothed results (symmetrical smoothed 200 points). The green and red curves are the mean results of the smoothed raw spectra (200 points symmetrically divided).

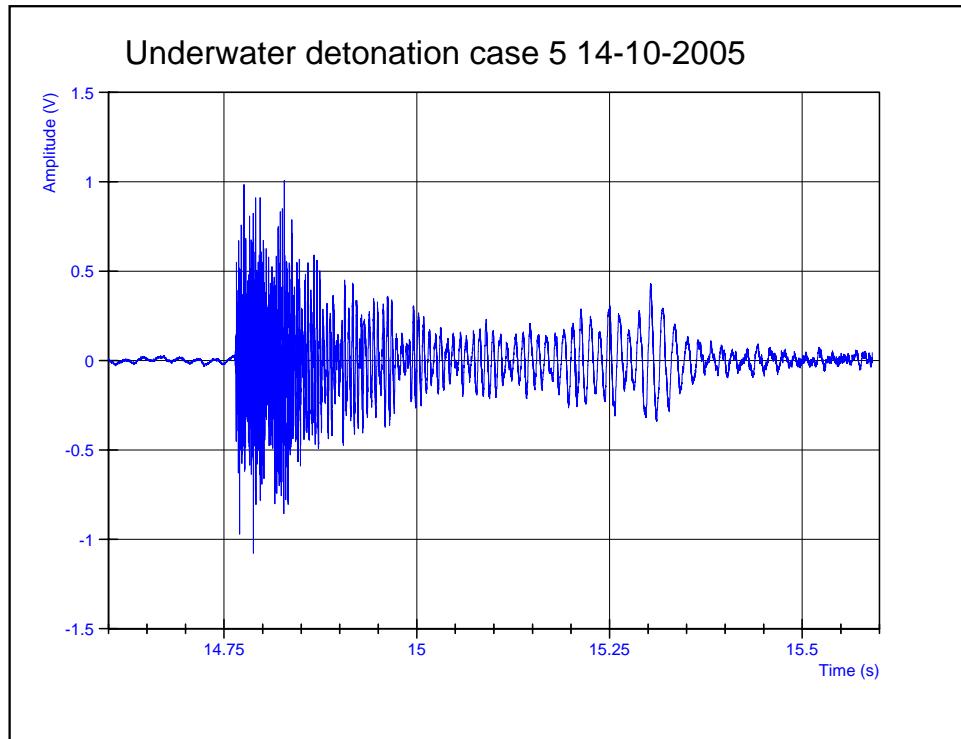
## Noise signatures of dredging vessel "Alpha B"



Graph 19 Dredging operation of ms. "Alpha B" recorded at a distance of approximately 500 and 520 m. The time lag between the curves "dredging" and "before dredging" is 70 seconds. The curve "dredging 100 m" was recorded 1hr50min later. The grey curve is the raw FFT result of spectrum before dredging started and the blue spectrum during dredging, both representing 1025641 samples and a frequency resolution ( $dF$ ) of 0.5 Hz with the curves expressed as mean are the smoothed results (symmetrical smoothed 200 points).

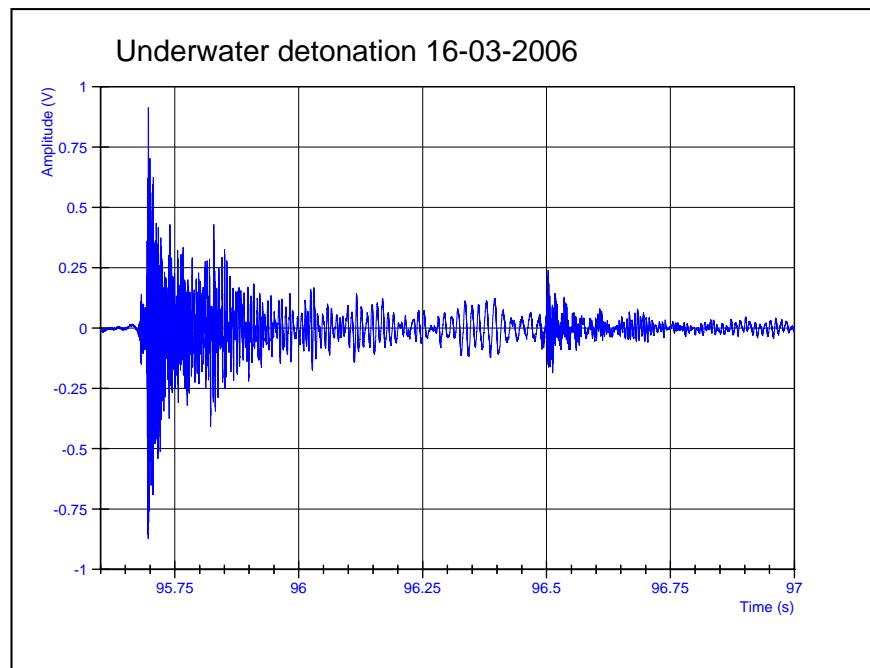
## Underwater detonations

*Time series of the fifth detonation (P 2.5) recorded on 14 October 2005*

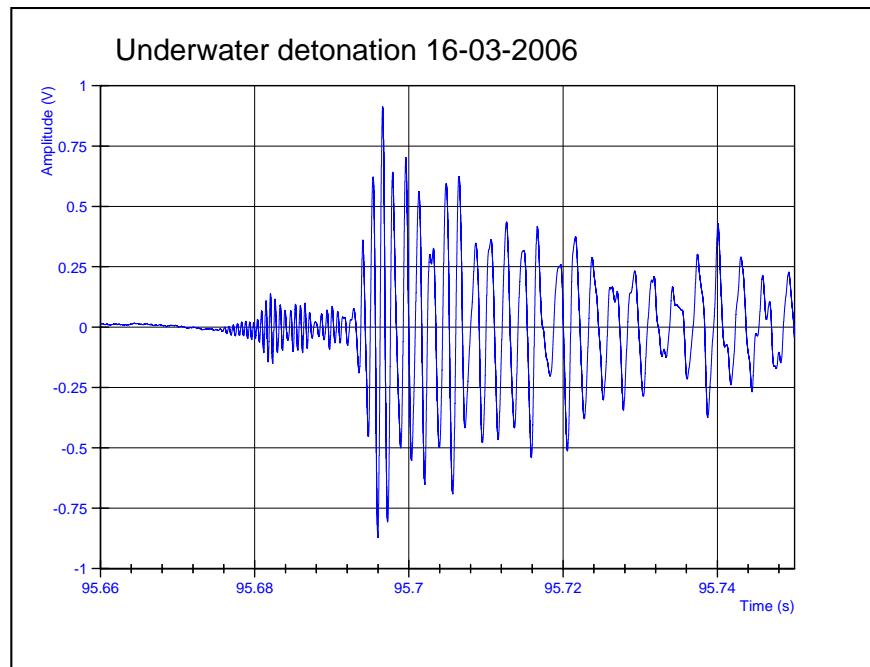


*Graph 20 Time series of the fifth signal of the detonations recorded on 14-10-2005. The time domain signal illustrates the strong reverbs after the explosion. The fast Fourier transformed time window (Graph 21) of this case was over the first 0.2 s of the signal.*

*Time series of the detonation (P 3) recorded on 16 March 2006*

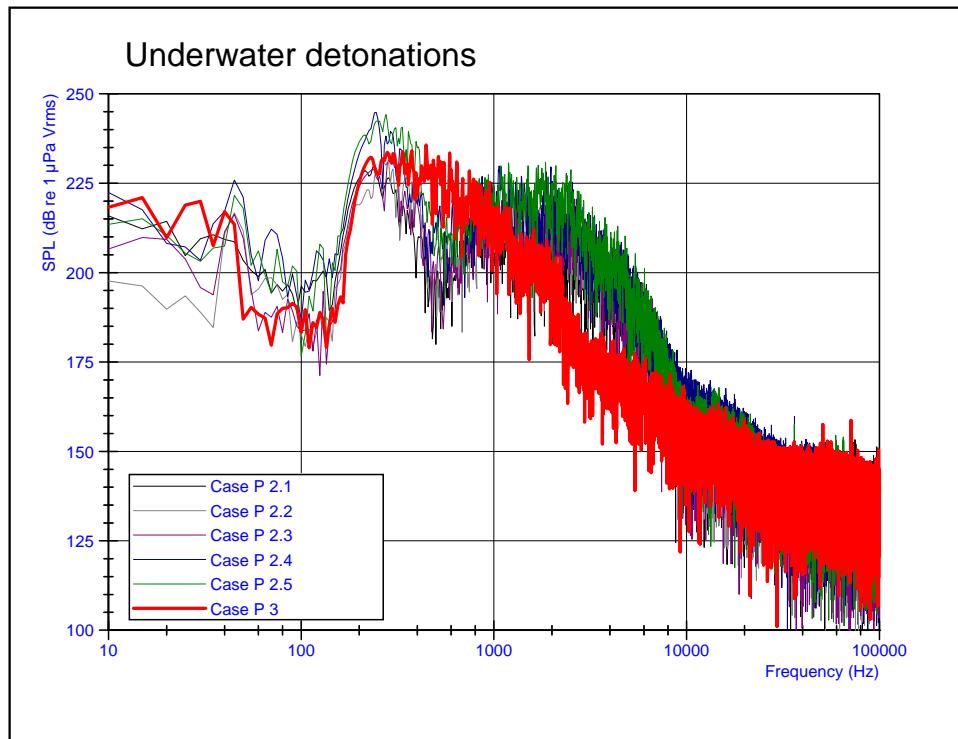


*Graph 21 Time series of the detonation recorded on 16-03-2006. The time signal illustrates a series of strong reverbs after the explosion. The fast Fourier transformed time window (Graph 21) of this case was over the first 0.2 s of the signal. Also a pre-pulse can be recognized close to the rising edge of the main pulse.*



*Graph 22 Zoom-in of the time series of the detonation recorded on 16-03-2006. The time signal illustrates the pre-pulse of the lead-In explosive which triggered the main source.*

## Underwater detonations recorded on 14 October 2005



Graph 23 Underwater sound spectra of six cases of underwater detonations recorded on 14-10-2005 (P 2.1-5) and 16 March 2006 (P3). The distance to the firing position varied between 29.6-30.6 (P 2.1-5) and 34.8 km (P3). The spectra represents the averaged fast Fourier transformed time window of 0.2 s time (102564 samples) over the main peak of the pulse, resulting in a frequency resolution ( $dF$ ) of 5 Hz. The window filter type "Hanning" was used to weigh the FFT result. Applied filter settings of the A1101 Pre-Amp 10 Hz high-pass and 150 kHz low-pass. The measured results were not compensated for the responses of hydrophone TC 4032 and pre-amplifier A1101. At 100 kHz the compensation of +3.7 dB to the outcome is not relevant (TC 4032 -6 dB, A1101 +2.3 dB). At 10 Hz the level has to be increased with 3.4 dB (See also Graph 3 Response of the A1101 amplifier).

The frequency spectrum of the P3 case (detonation of old sea mine) has a significant different characteristics, the spectrum peaks in a slightly broader frequency range (250-500 Hz), while there is less energy in the range > 1 kHz. The time signal (Graph 22 and 23) of this case showed another typical difference, the signature of a lead-in explosive.