ANNEX III INSTRUMENTS AND FISHING GEAR USED.

ACOUSTIC INSTRUMENTS

Two SIMRAD scientific echo sounders, EK 400/38 kHz and EK 400/120kHz were used during the survey for estimation of fish density. The EK 400/38 was coupled to a digital integrator QD as well as to an analog integrator QM. The details of the instrument settings used are as follows:

	EK 400/38	EK 400/120
Range	0-100 or 0-250	0-100
Transmitter	High (5000 W Nom)	High (1250 W Nom)
Bandwith	3.3 kHz	3.3 kHz
Pulselength	1 ms	1 ms
TVG	20 log R	20 log R
Attenuator	20 dB	0
Rec. gain	8	5
Transducer	Split beam	Ceramic 10cm Ø

QD settings: Threshold 10 to 24 mv. Gain: - 35.9

QM settings: Gain 20 dB x 10. Threshold 7

An ES 400 color displayer was used for observation of hake in mid waters and for indications of target strengths.

A calibration experiment using a standard copper sphere performed in Baia dos Tigres on 12/6/90 gave the following results:

30x30 transducer: SL+VR 142.0, instr.constants 1 ms: 0.82, 0.5 ms: 1.94, gain QD 1 ms: 29.1, 0.5 ms: 32.9. ES transducer: SL+VR 135.4, instr. const. 3.89, gain QD 35.9

HYDROGRAPHY

Temperature, salinity and oxygen were sampled at standard depths with Nansen bottles. Oxygen was measured with the Winkler method and salinity determined with an inductive salinometer. Surface temperature was recorded at 4 m depth with a thermograph.

FISHING GEAR

Bottom trawl: High opening shrimp and fish trawl with net headline 31 m (floatline), foot-rope 47 m, gear with 12 cm diameter roller disks, 40 m sweeps, estimated headline hight 6 m and distance between wings during towing 18-20 m.

Pelagic trawl: Modified "Harstadtrawl" with a vertical opening of 20-25 m.

Cod ends of trawls with fine meshed inner lining.