

A Seafloor CSEM and MT Instrument

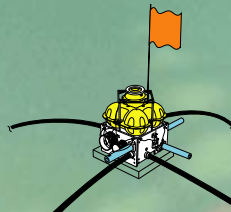
Steven Constable

Scripps Institution of Oceanography, sconstable@ucsd.edu

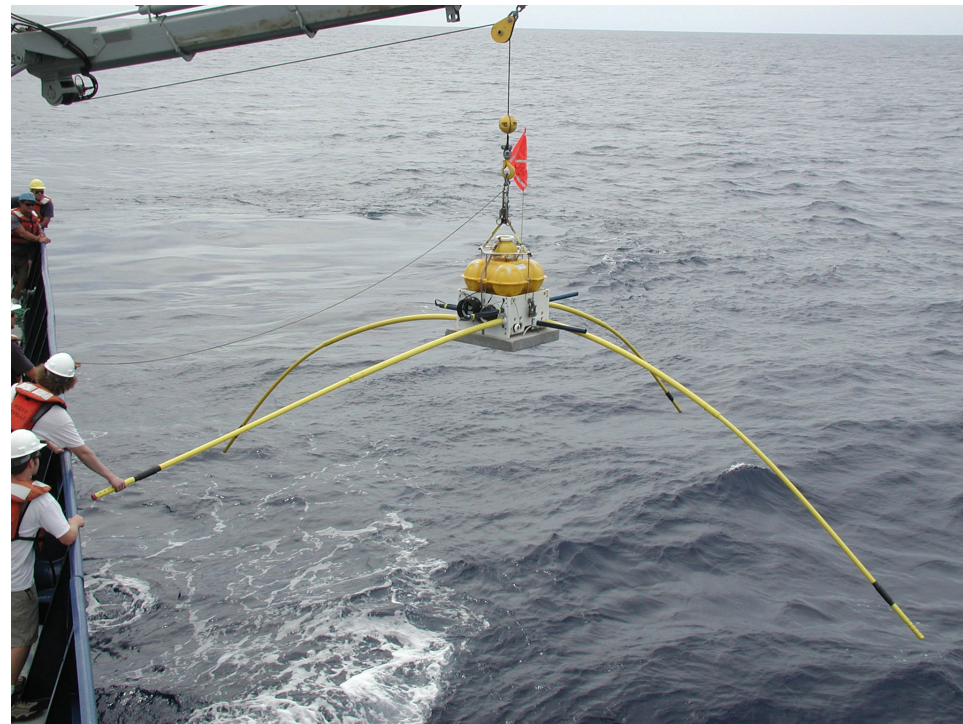
<http://mahi.ucsd.edu/Steve>



MARELEC
17-18th March 2004



A seafloor electromagnetic recorder



4 (8) Channels of data

24 bit ADC

90 GB (5 GB) data capacity

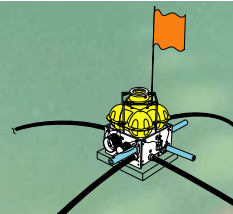
Power < 500 mW

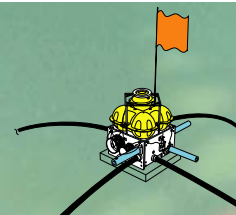
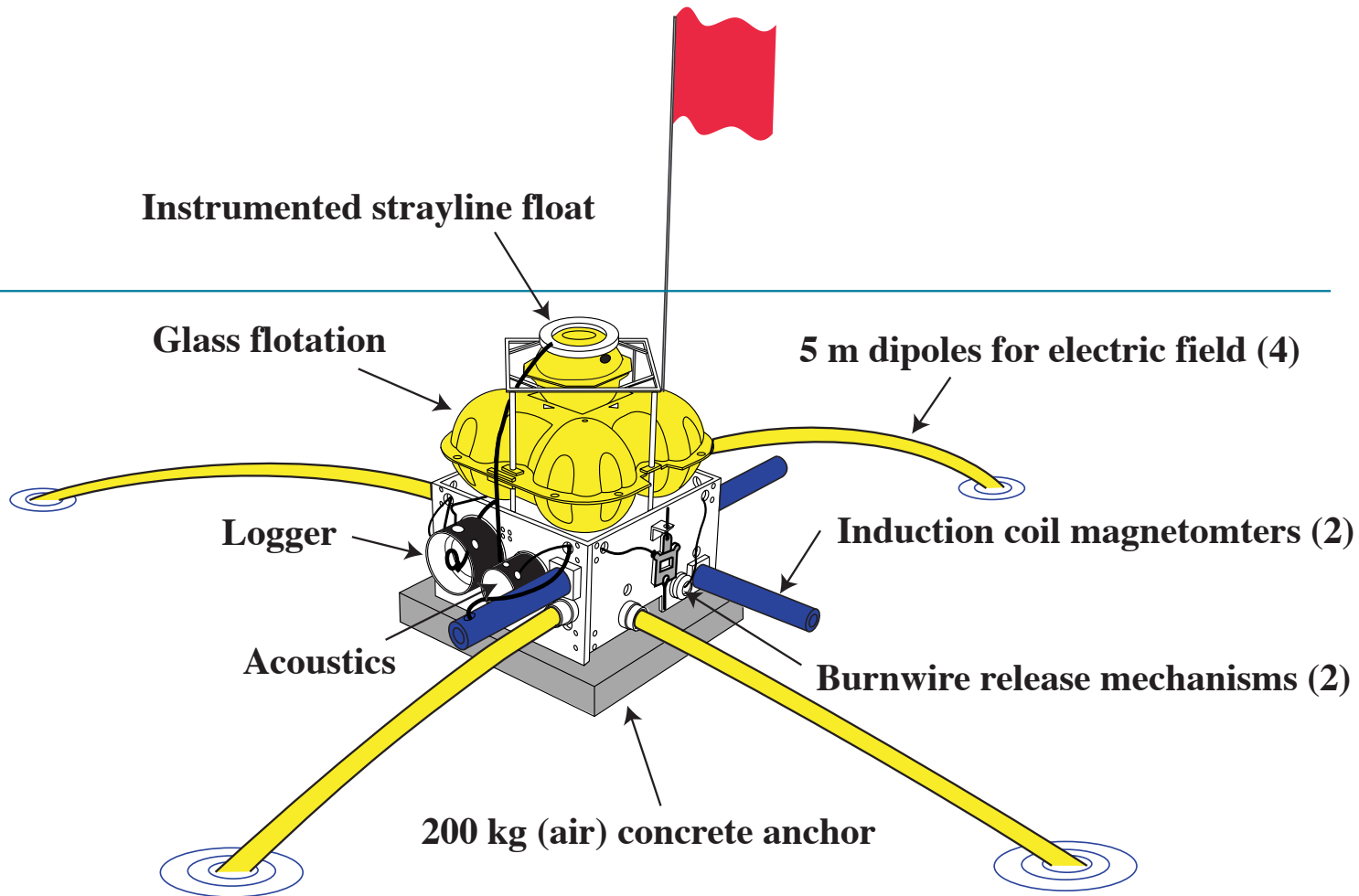
Battery endurance 60 days

Maximum sample rate 1 kHz

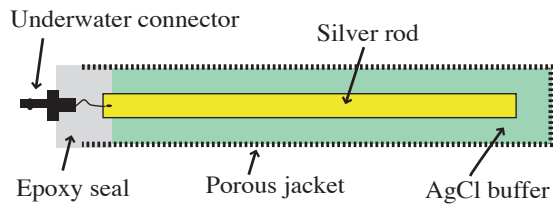
E-field noise $10^{-20} \text{ (V/m)}^2/\text{Hz}$ at 1 Hz

B-field noise $10^{-8} \text{ nT}^2/\text{Hz}$ at 1 Hz

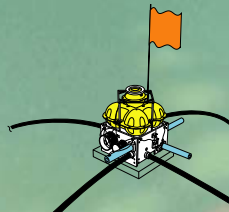
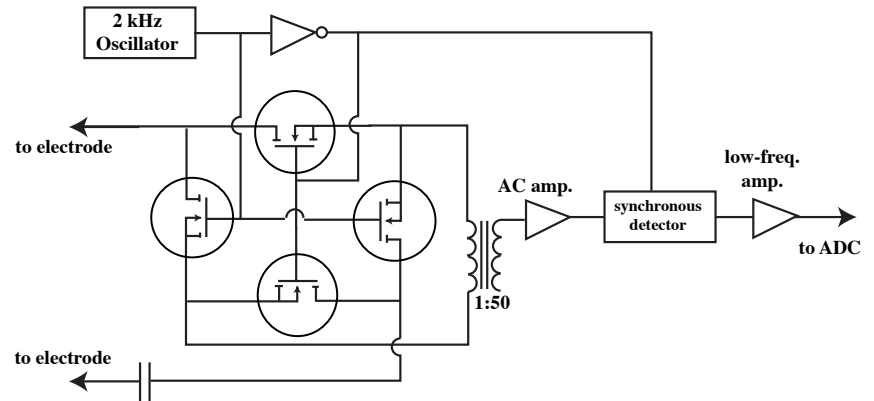


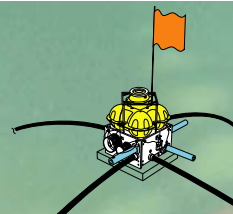
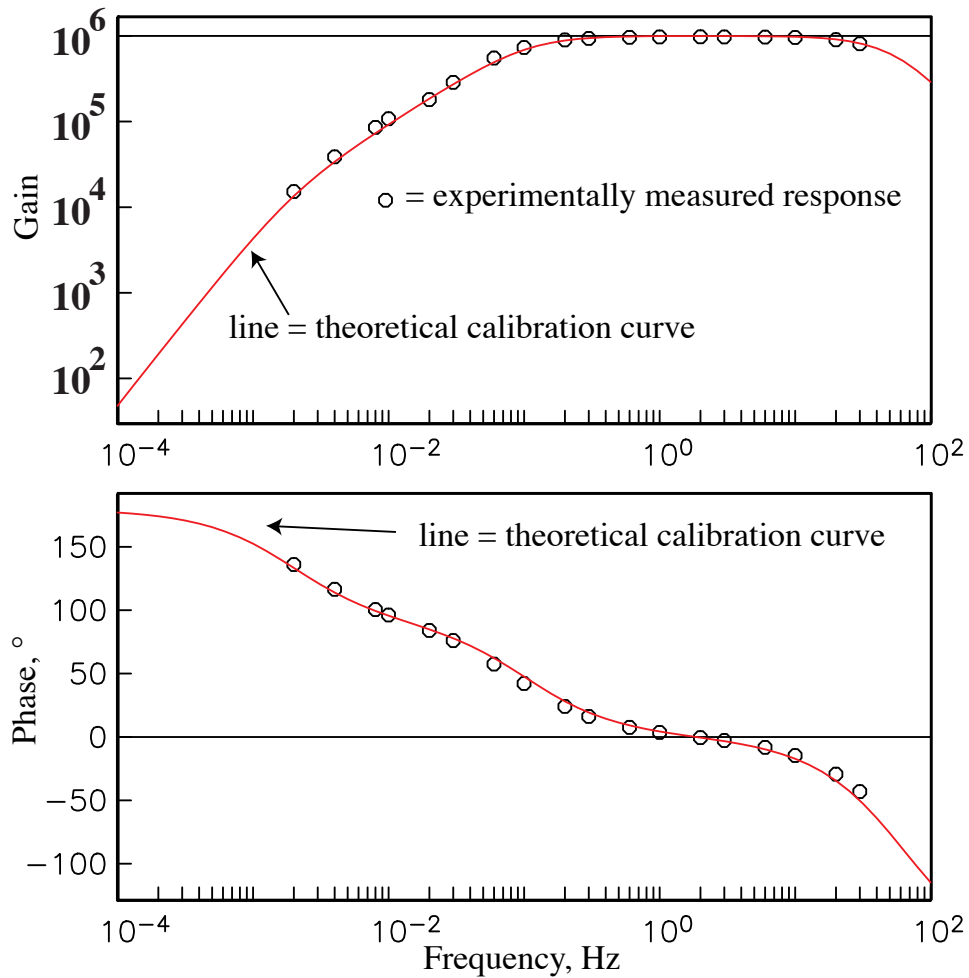


E-field sensor system

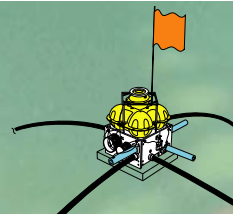
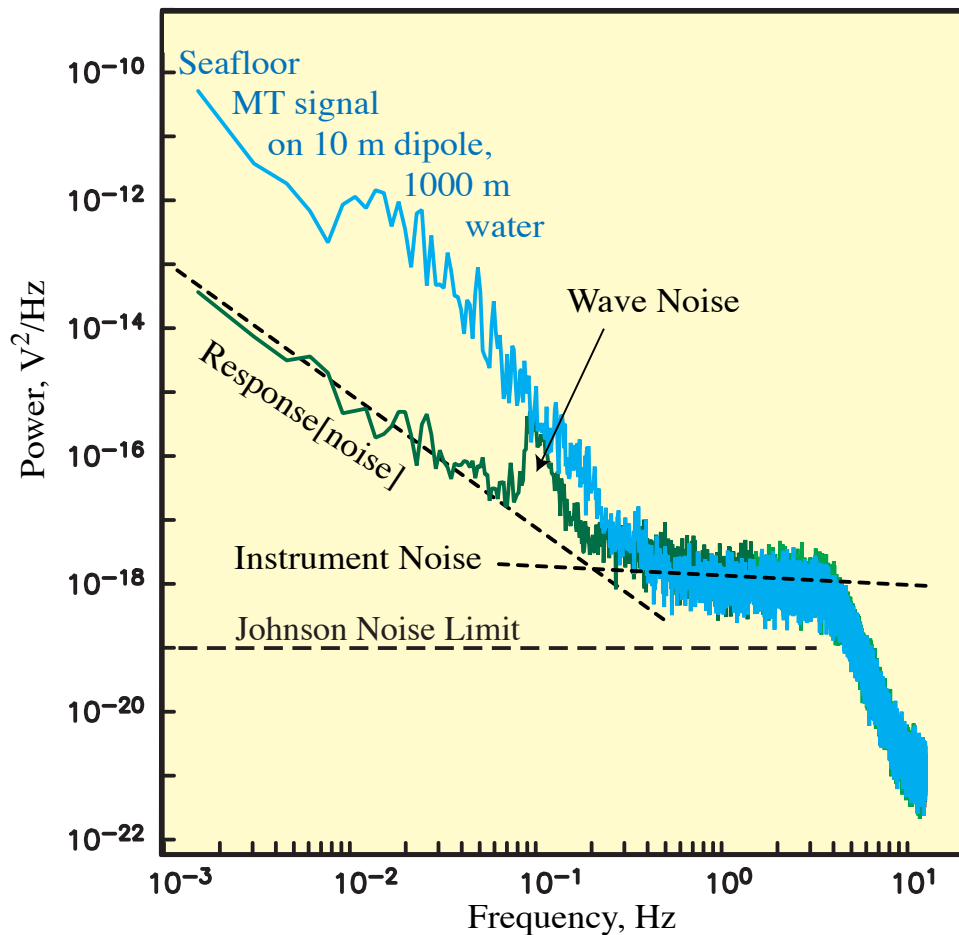


E/B-field Chopper Amplifier

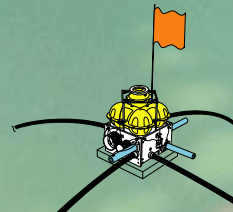


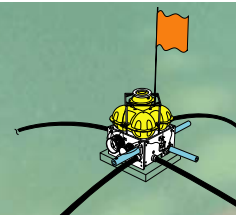
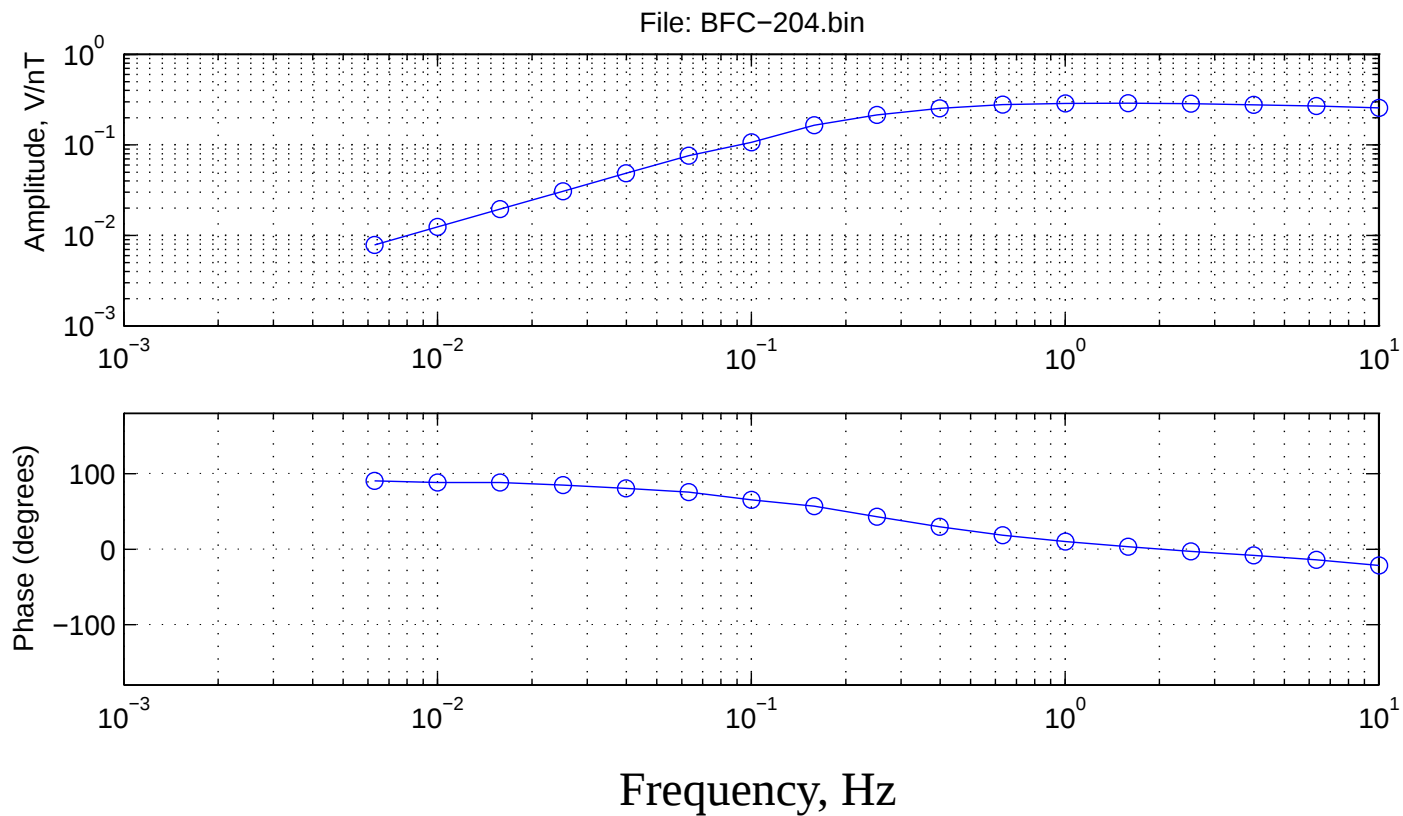


Voltage Signals and Noise

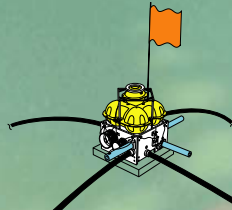
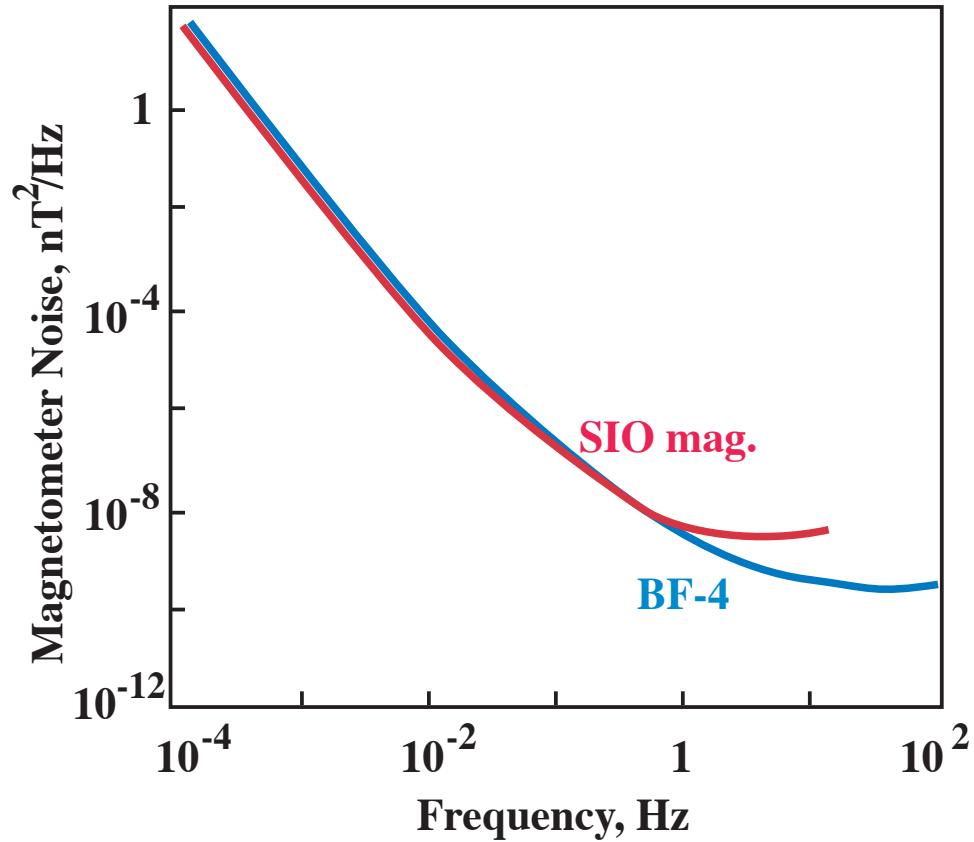


Induction coils:

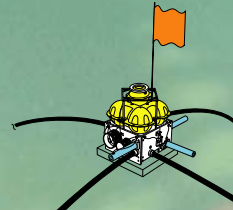
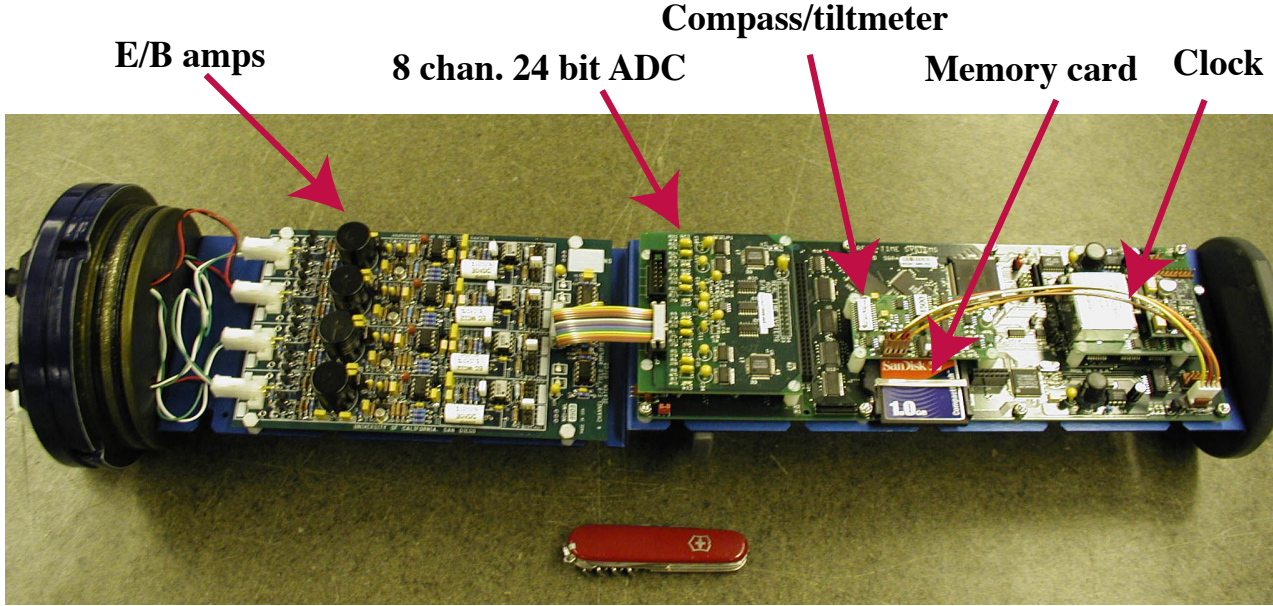


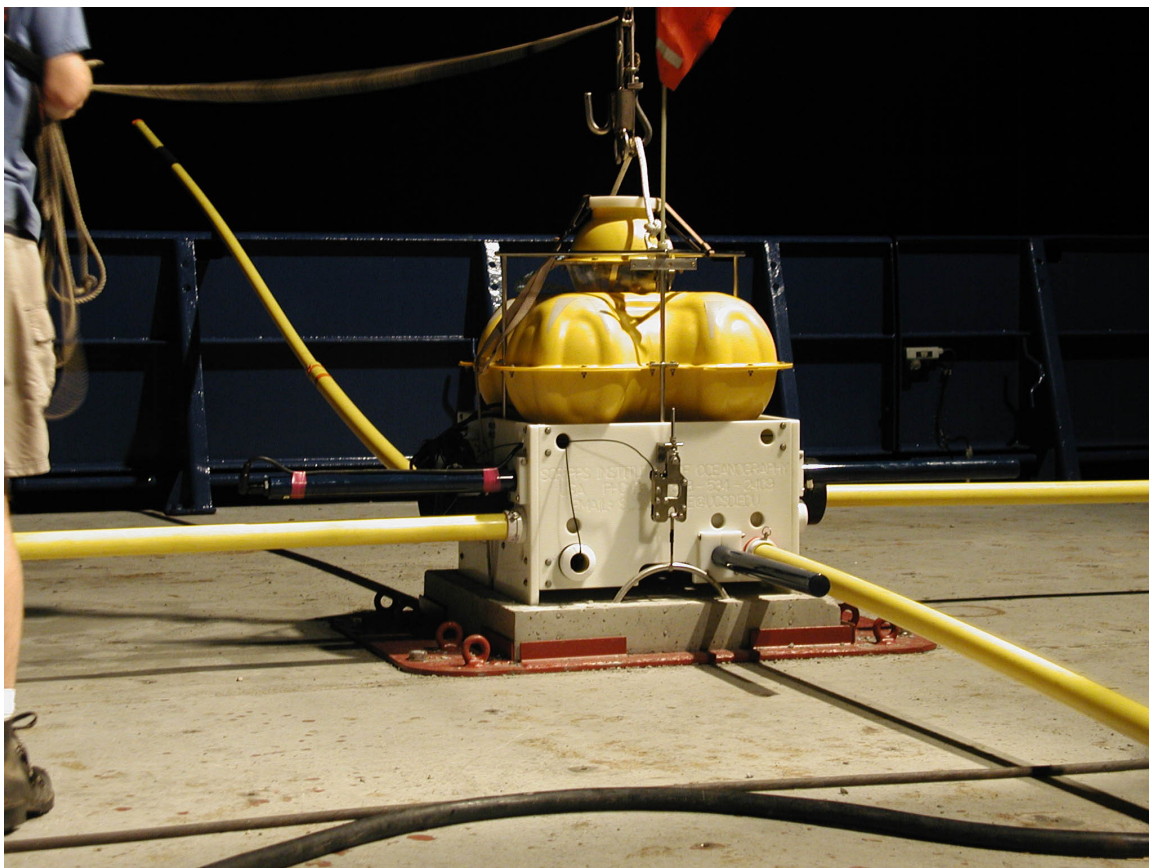


SIO coils noisier than BF-4 above 1 Hz:

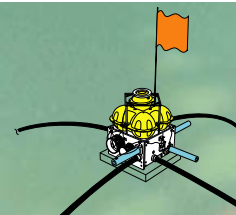


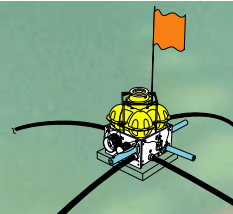
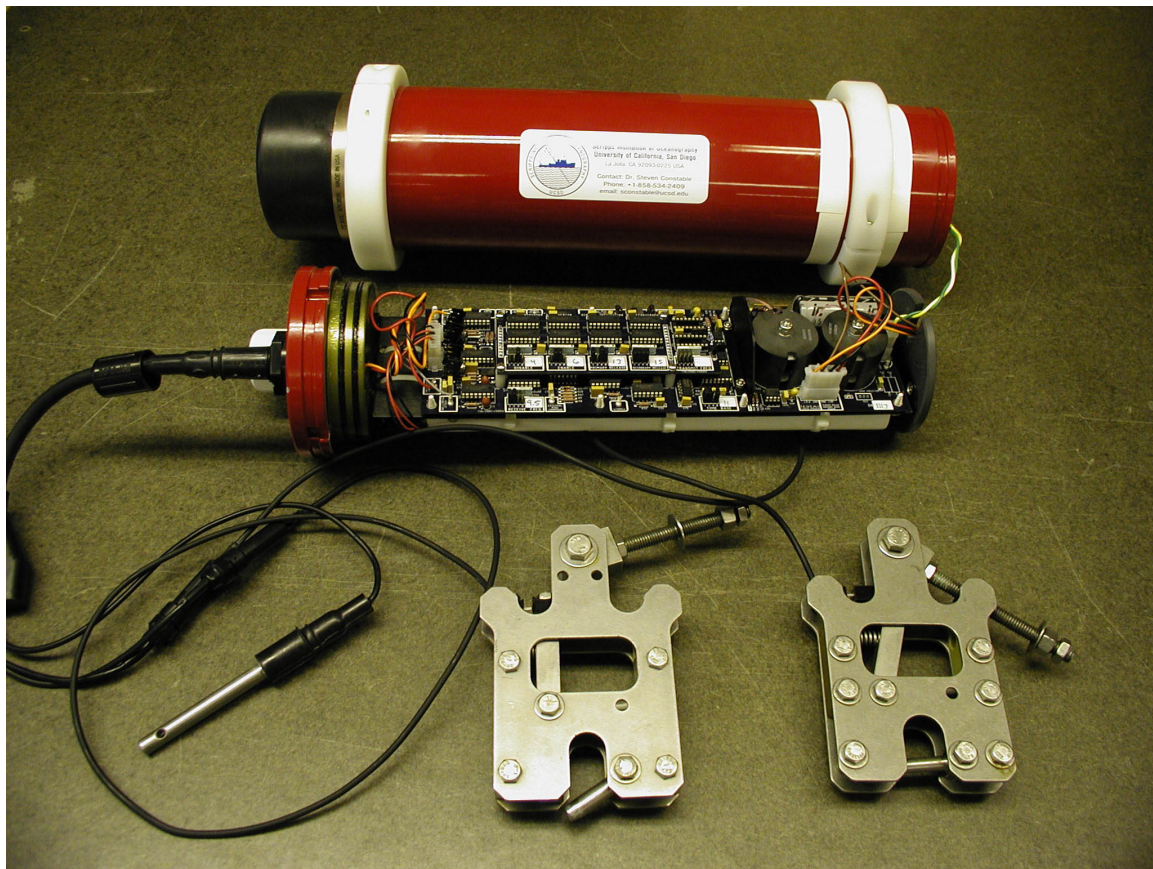
Current generation of logger:



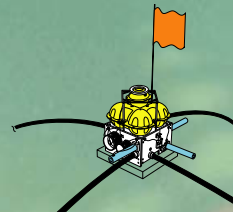
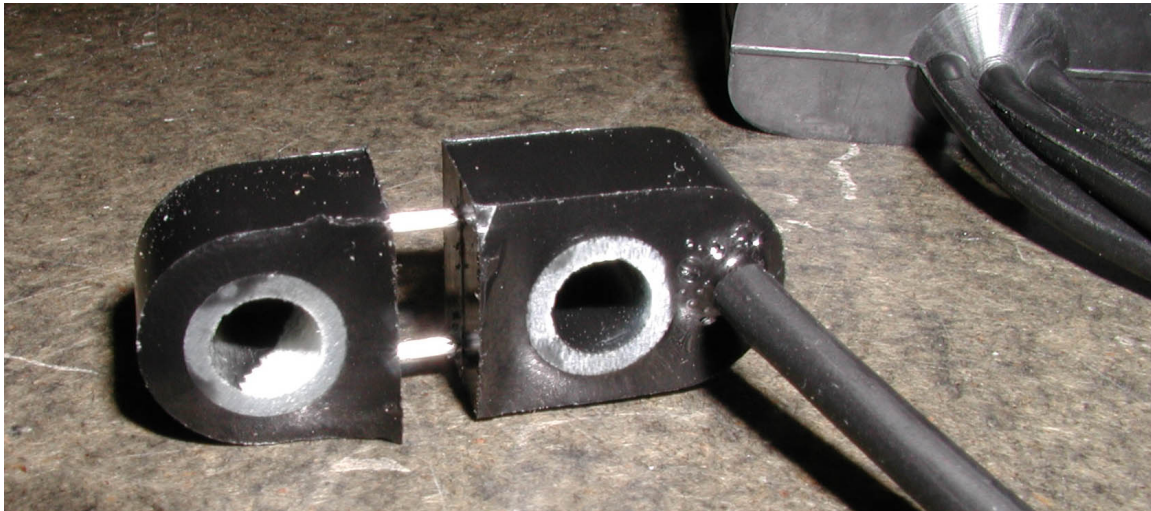


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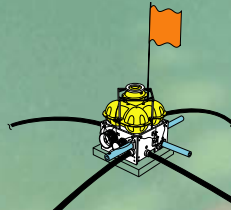




Edgetech/EG&G burnwire element:

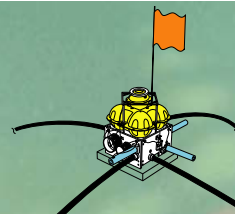


Instrumented strayline:



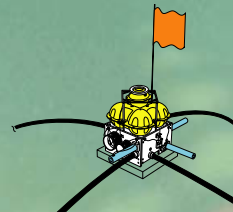
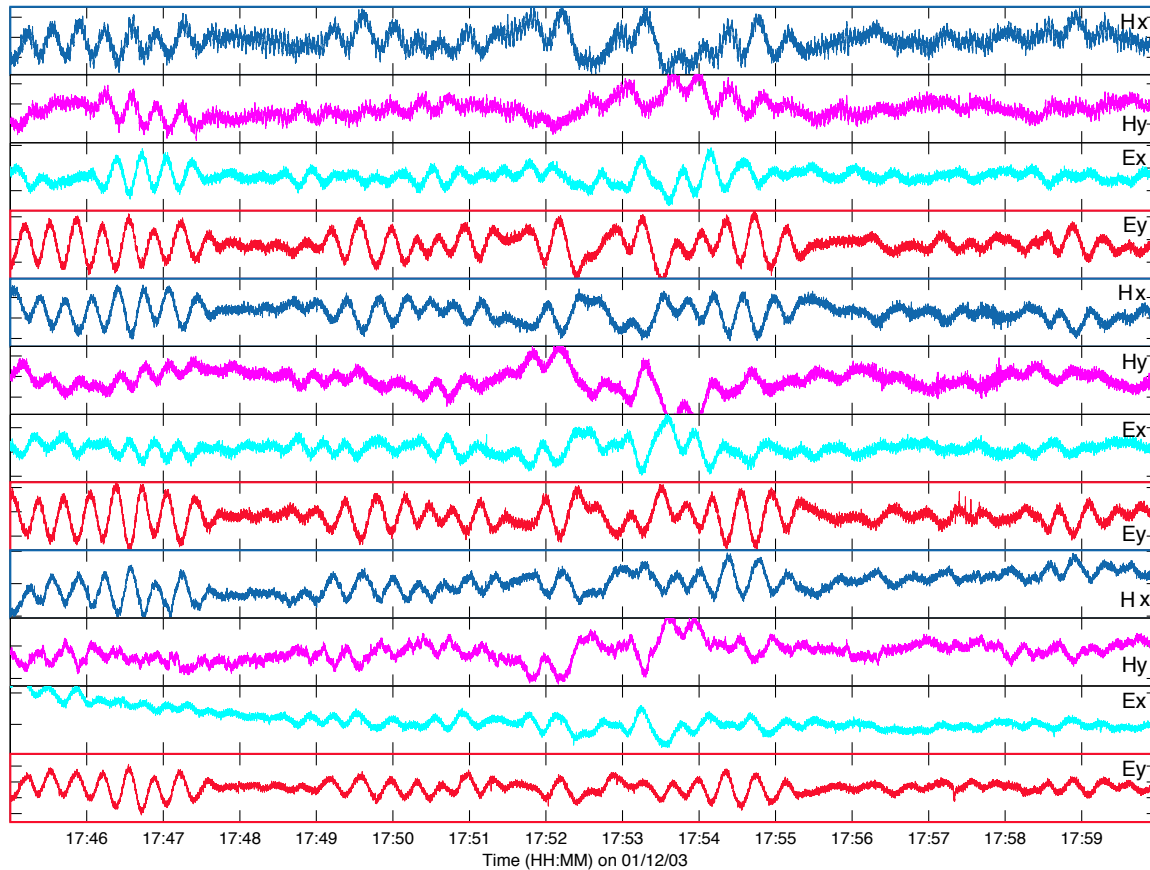


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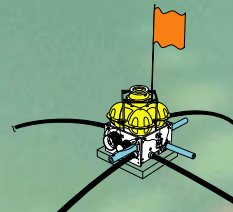
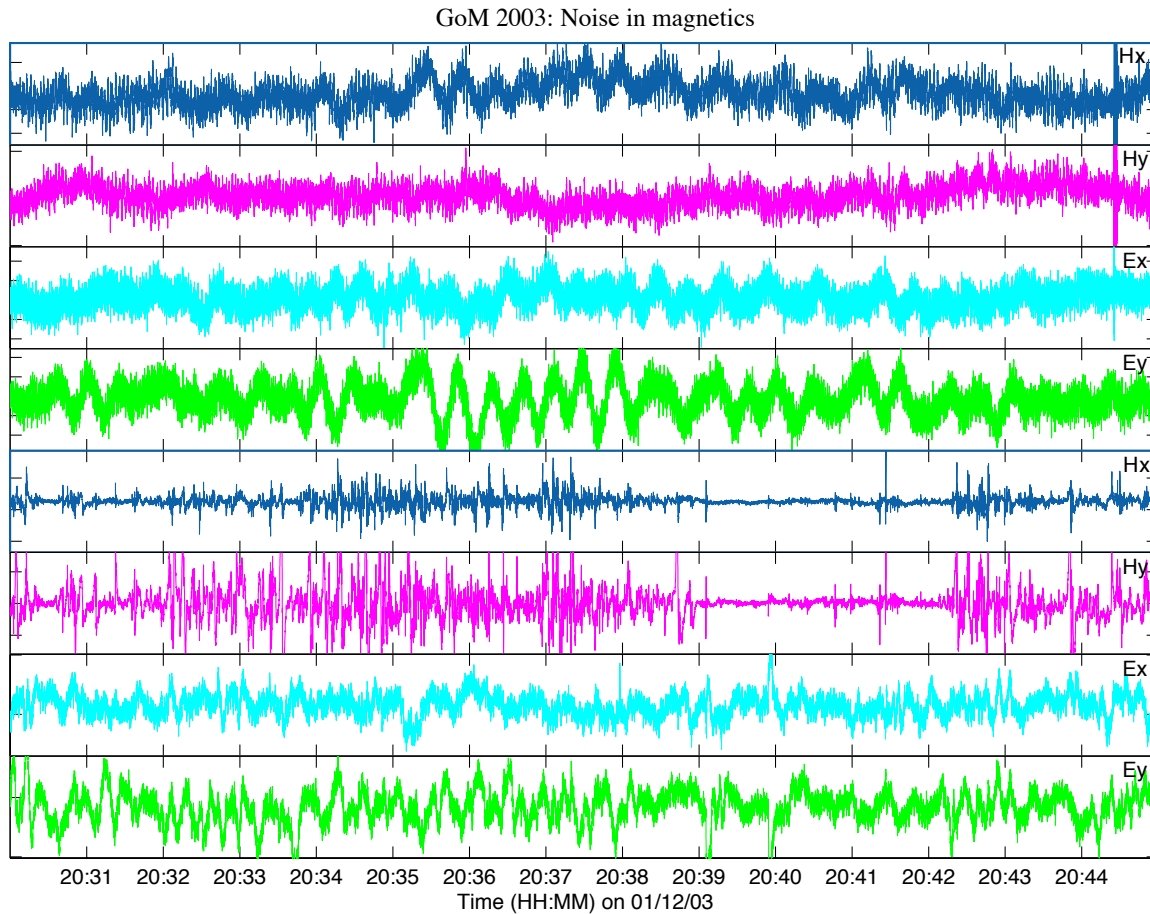


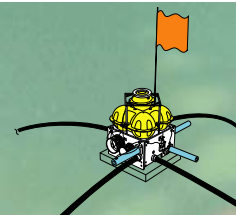
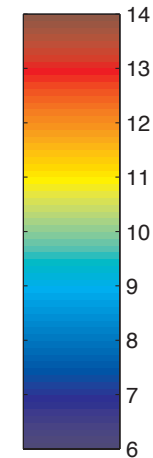
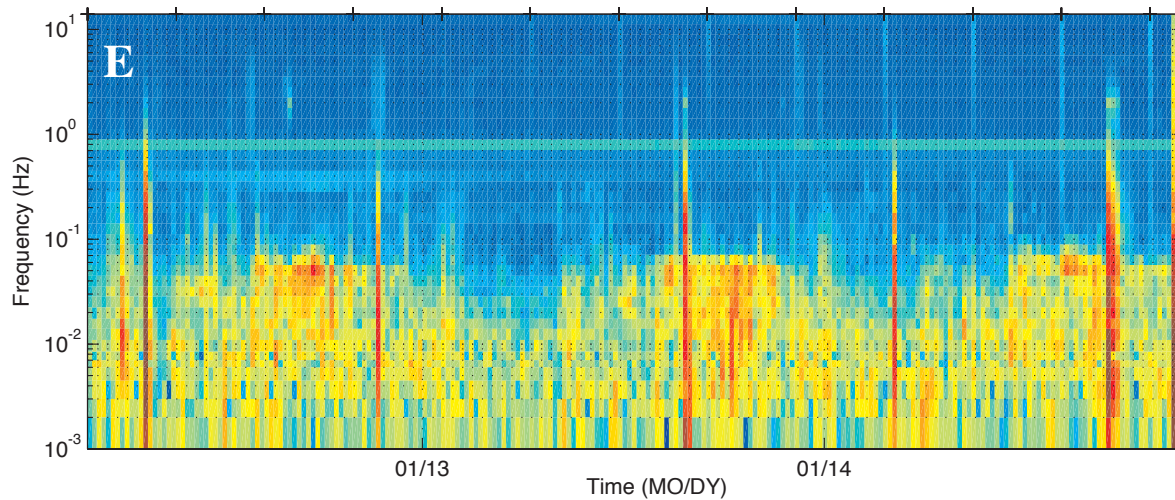
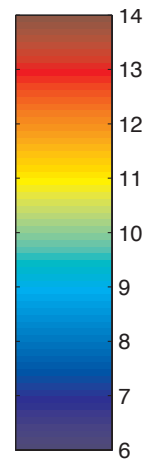
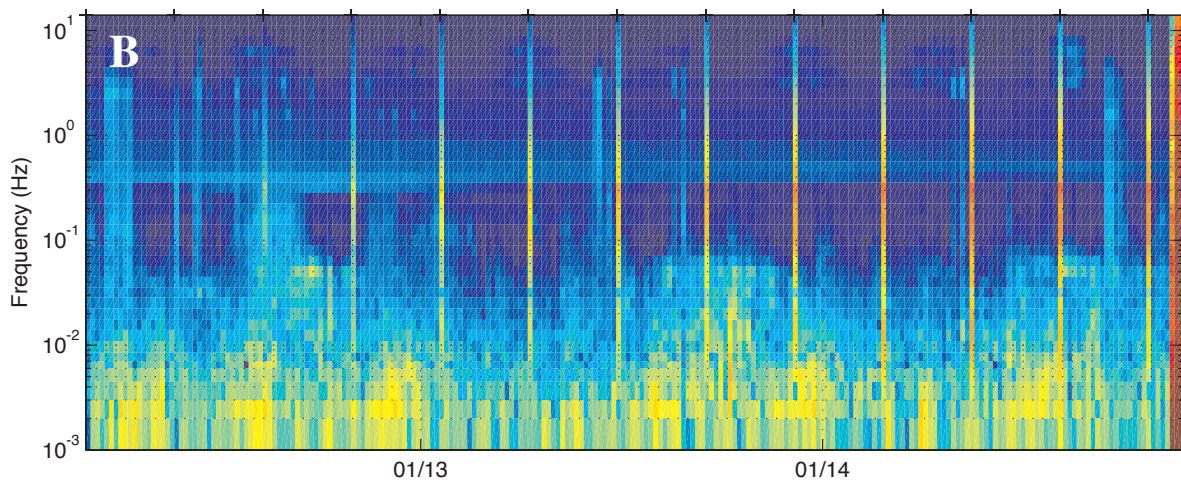
Magnetotelluric data:

Sites t03, t38 and t51 from GoM 2003: 15 minutes at 32 Hz sampling

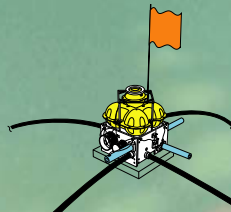
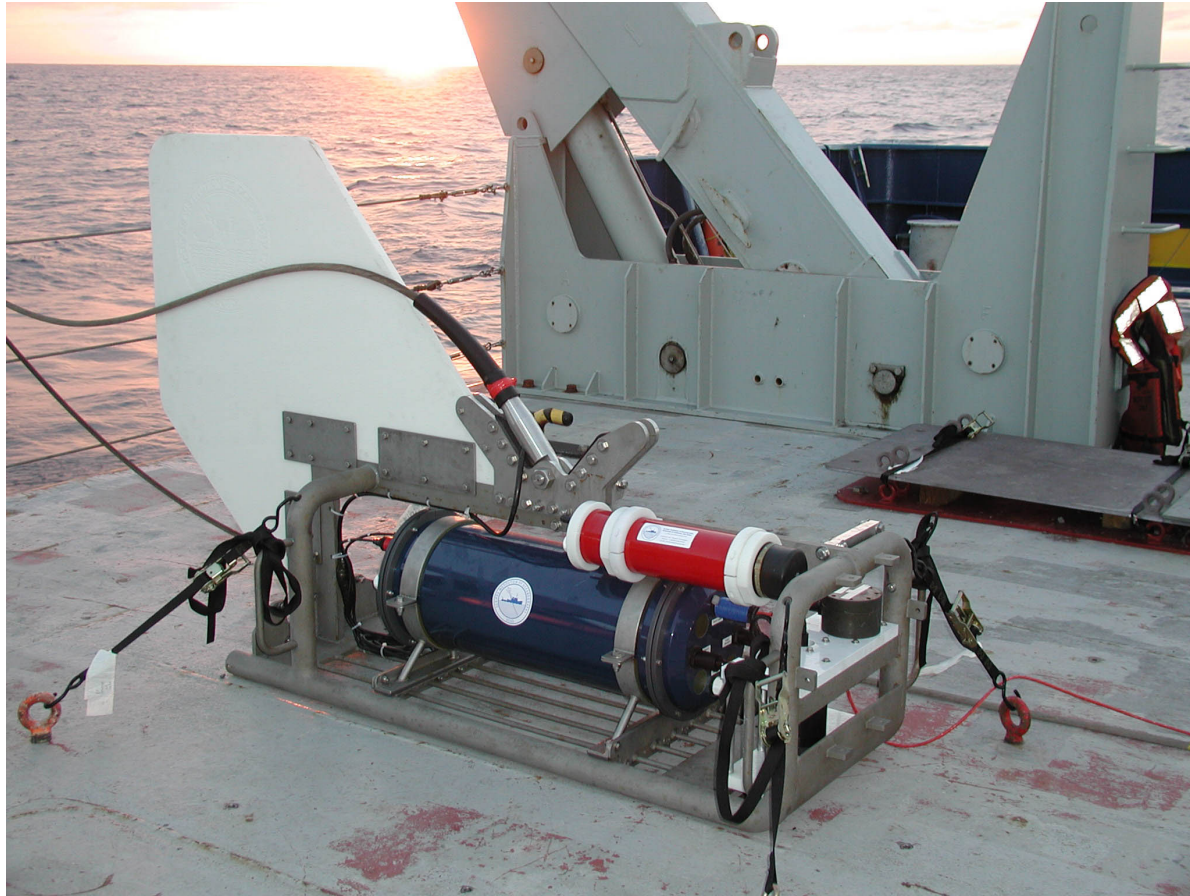


Noise in magnetics:

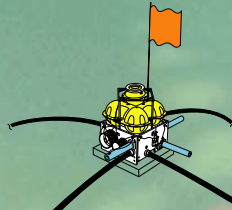
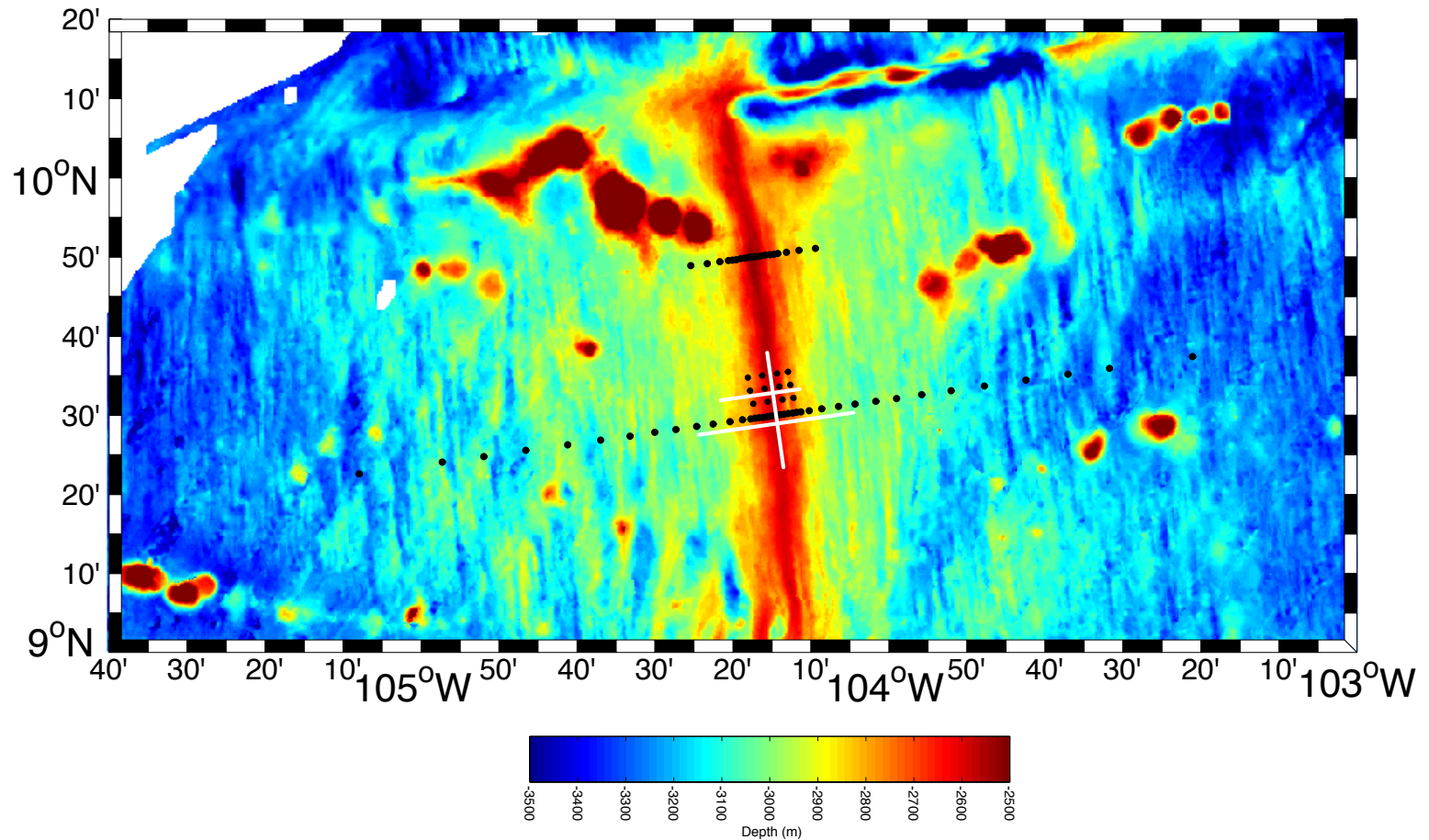




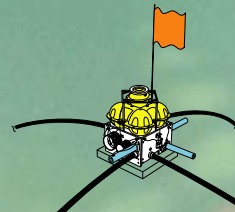
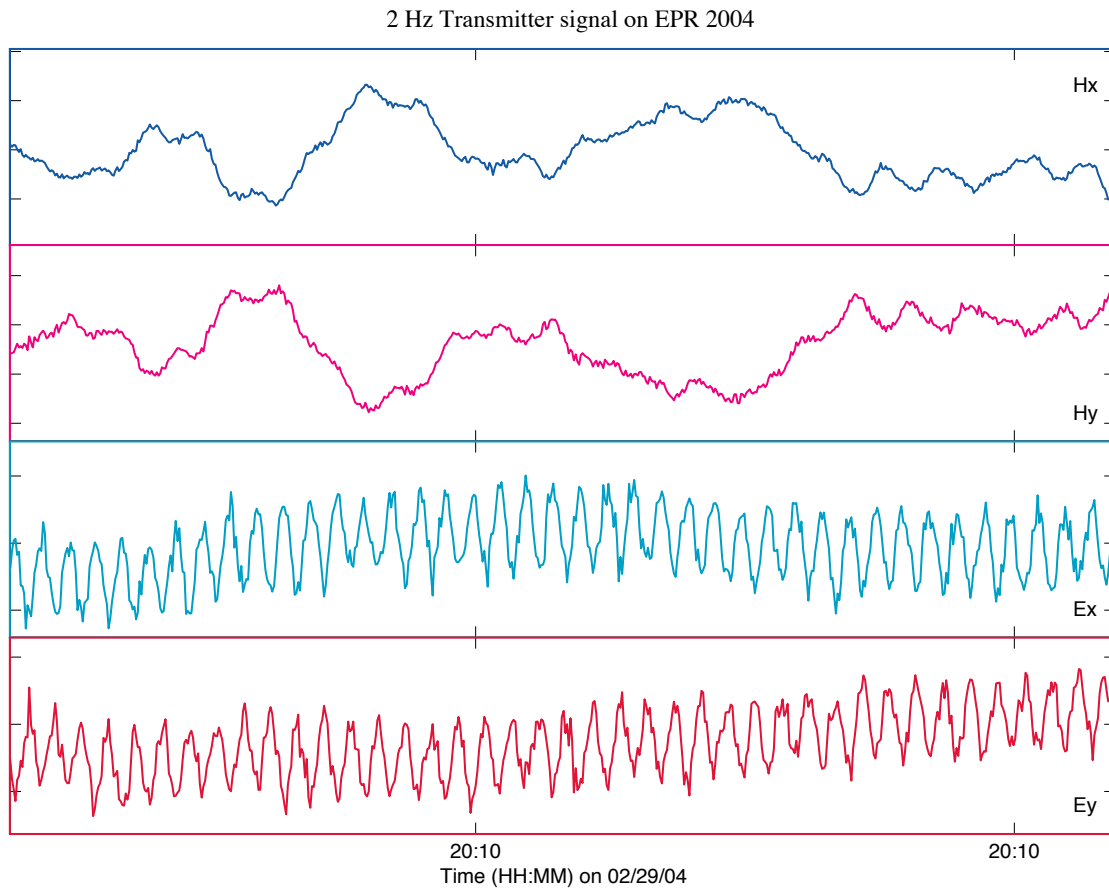
Scripps Undersea Electromagnetic Source Instrument:



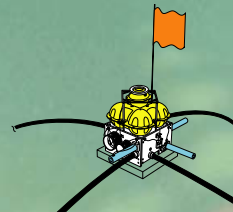
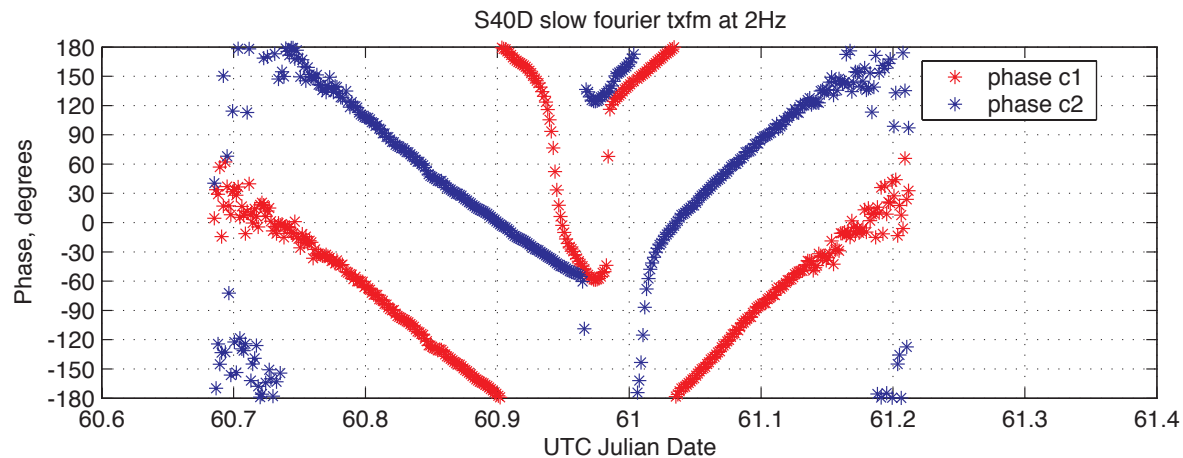
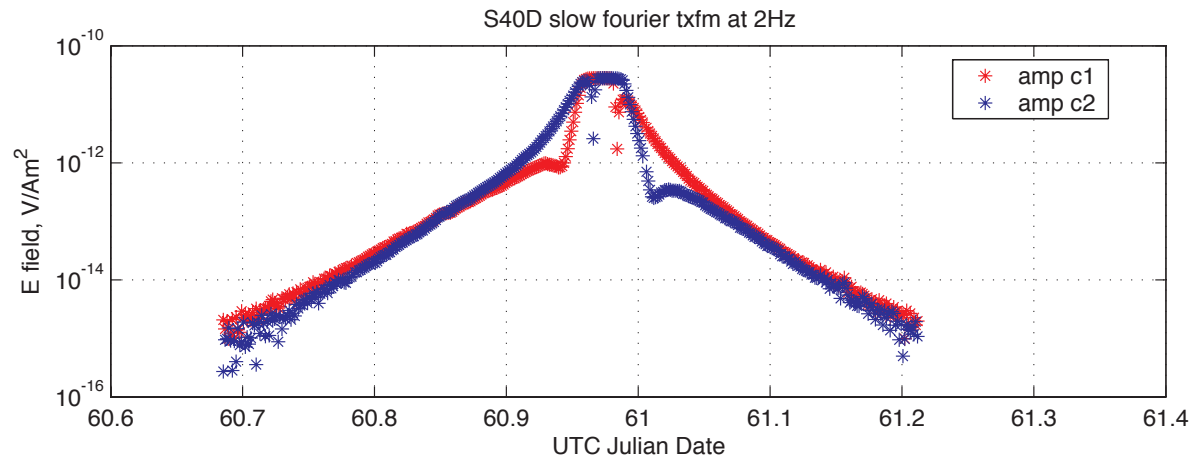
East Pacific Rise, 2004: 69 MT sites, 1000 receiver-hours of CSEM



CSEM data:



CSEM data:



Summary:

A versatile, reliable, low-noise, low power, E/B recorder

About 100 have been built

$\approx$ 1500 deployments, loss rate $<1\%$, data recovery rate $>95\%$

Useful for MT, CSEM, ASW

