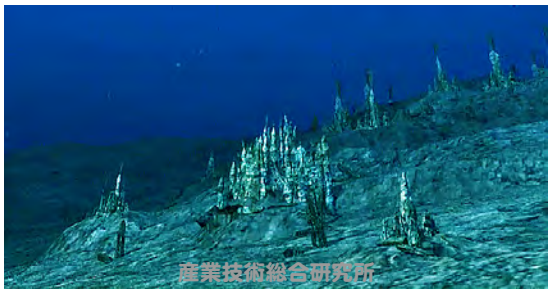
海底熱水鉱床の探査・評価手法について

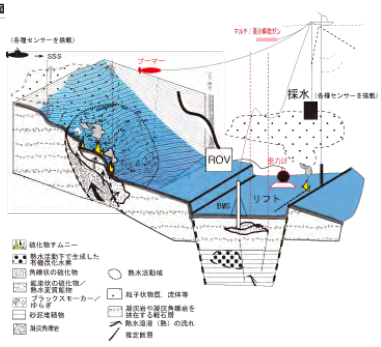


産業技術総合研究所
飯笹幸吉

探査・鉱物資源量評価手法

- **地質学的手法**
  - 重鉱物、地質・構造
- **地球化学的手法**
  - 海水・堆積物の化学
- **地球物理学的手法**
  - 音波、重力、磁気

海域調査概念図

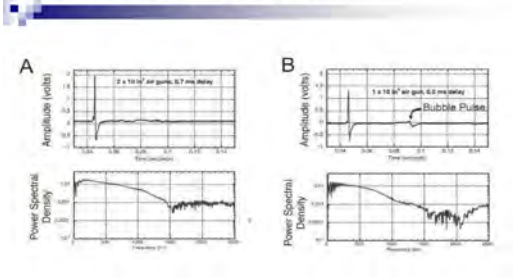


(K. Iizasa, 2009)

エアガン調査　仕様

音源		
種類	周辺機器	特徴・性能
高圧空気型 ・ エアガン ・ GIガン ・ ウォーターガン	エアコンプレッサー 吐出容量（2 m³／分以上） 重量（数百ｋｇ以上） 大型発電機	・周辺装置搭載には中型・大型船舶が必要 ・音圧：3～4bar-m
高電圧ブーマー	小型発電機 容量（2～3 kVA） 電圧（100-240V）	・小型発電機は小型船舶で対応可 ・音圧：0.5bar-m
受信ケーブル		
種類	特徴	
マルチチャンネル	反射信号（重合信号）重合により信号対雑音比が向上 受信部分ケーブル長：チャンネル数×チャンネル間隔 チャンネル間隔：12.5m、25m	
シングルチャンネル	反射信号（1CH）受信部分のケーブル長：５～20m	

Air Gun Array – Air Gun



(D.C. Mosher and P.G. Simpkin,2008) Status and Trends of Marine High-Resolution Seismic Reflection Profiling: Data Acquisition

Huntec deep-tow seismic (DTS) system

Dimensions and Architecture of Submarine "Lobes' off East Corsica*
By Mark E. Deptuck1, David J.W. Piper2, Bruno Savoye3, and Anne Gervais4
Search and Discovery Article #50124 (2008)

The deep tow boomer was developed by BGS to further enhance their seismic suite of tools to gain high-resolution images from deeper targets. The tool can operate in water depths of down to 2000 m and as shallow as 100 m. The boomer has a penetration of up to150 m sec with a resolution of 1 ms or less. The idea is based on towing both source and streamer closer to the sea bed, (higher along track resolution) and in an acoustically quiet environment found at depth.

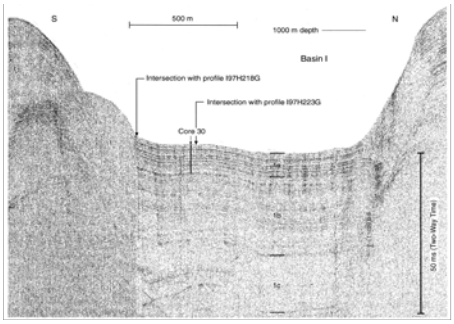


Fig. 10. Deep Tow Boomer section across Basin I. The vertical scale is provided by a floating 50 ms twt bar to the left. The water depth in metres is provided to the right for reference. Location of core PD92-30 with scaled depth of penetration is also shown. Numbers 1_0, 1_1, and 1_2 refer to seismic units. Location in Fig. 2.

M. Rebesco et al. / Marine Geology 151 (1998) 89–110

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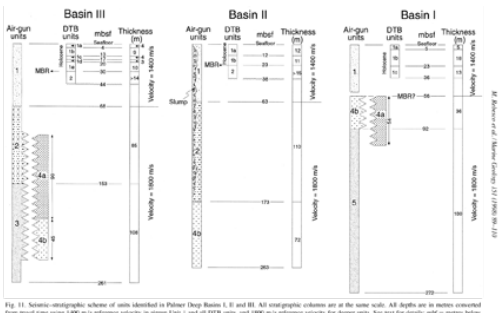
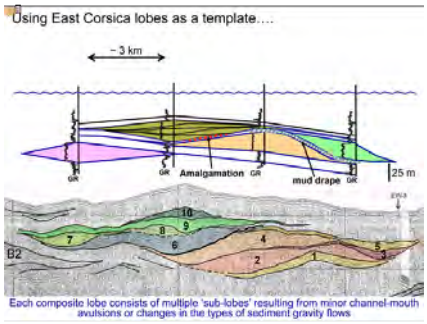


Fig. 11. Seismic-stratigraphic scheme of units identified in Palmer Deep Basins I, II and III. All strat.graphic columns are at the same scale. All depths are in metres converted from travel-time using 1400 m/s reference velocity in airgun Unit 1 and all DTB units, and 1800 m/s reference velocity for deeper units. See text for details; *mbsf* = metres below seafloor.

(Rebesco, Marine Geology 151 (1998) 89–110)



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海底設置型重力計

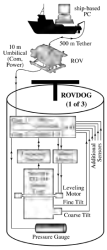

Figure 2. A signal flow diagram of the ROVDOG system. The micro-controller executes the detailed operation of the instrument, and exchanges pre-processed data and commands with the operator. The operator uses a graphical user interface (LABVIEW) to operate the instrument remotely and to view and log the data.

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(A New Seafloor Gravimeter: Glenn Sasagawa et al., 2002, Geophysics)

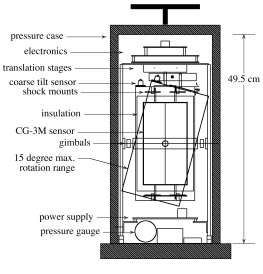

Figure 1. A cross-sectional view of a ROVDOG instrument; the 700m depth version is shown here. The gravity sensor is taken from a Scintrex CG-3M land meter. Power and data are provided through an umbilical cable (not shown). Mechanical manipulators can grip the T-handle at the top of the instrument.

(A New Seafloor Gravimeter: Glenn Sasagawa et al., 2002, Geophysics)

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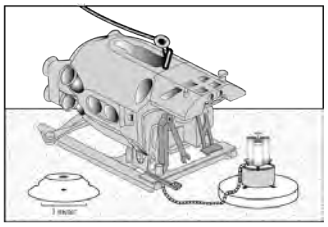

Figure 4. A sketch illustrating a ROVDOG deployment on the seafloor. The two types of benchmarks used in the TROLL field survey are shown. The ROV, ROVDOG, and the benchmarks are all shown in the same relative scale.

(A New Seafloor Gravimeter: Glenn Sasagawa et al., 2002, *Geophysics*)