

Scientific Party Job Titles and Descriptions

Core Describers

Core describers may have expertise in a wide variety of fields including sedimentology, petrography, petrology, or structural geology. The optimal mix of expertise is determined by the leg objectives. Core description may involve the following tasks:

- macroscopic visual description of split cores, entered in the core description database which generates the “barrel sheets” (sediments) or in more detailed core section graphic templates (igneous rocks);
- microscopic observations from smear slides and/or thin sections are written to word processing files and, in some cases, added to the macroscopic description forms;
- acquisition of digital images and physical property data with the split-core track, including diffuse color reflectance, and magnetic susceptibility; may also be done by the individual in the physical properties position;
- preliminary interpretation of depositional, diagenetic, magnetic, or deformational processes;
- selection of samples, in consultation with other scientists, for chemical, X-ray diffraction (XRD) and inductively coupled plasma-atomic emission spectroscopy (ICP-AES) analysis; and
- analysis of XRD and/or ICP-AES data, if the appropriate expertise exists (otherwise these data are not collected on the ship); may also be done by the individual in the geochemistry position.

Stratigraphic Correlators

Stratigraphy correlators are key positions on legs where complete stratigraphic sections (achieved by coring multiple holes at a site) are an essential component of the leg objectives. Completion of a meters composite depth (mcd) depth scale in near-real time guides coring operations and ensures complete stratigraphic coverage. For maximum efficiency, two correlators are needed to cover a 24-hour period and to guarantee feedback within hours. Correlation is achieved using a Sun workstation and the customized program “Splicer.” Precruise training is required for inexperienced correlators. The position typically also includes operation of the multisensor track since the main data sets used are magnetic susceptibility, natural gamma radiation, and gamma-ray attenuation density from whole-core logging. Other data may be needed to improve correlation such as color reflectance logs, macroscopic descriptions from split cores, or biostratigraphic information.

Biostratigraphy

The shipboard micropaleontologists’ chief responsibility is to obtain age data and an age/depth model for each stratigraphic sequence. This is accomplished by using (a) core-catcher samples as soon as possible after a core is recovered, and (b) additional samples as necessary. For

nannofossils, and sometimes diatoms, toothpick samples may be taken from the open ends of core sections on the catwalk. For other microfossil groups, samples taken in addition to the core catcher samples have to be taken from the split core working halves. Some stratigraphic boundaries may be analyzed in higher detail on ship, using samples taken from the split working half cores. Full assemblage analysis is not necessary on ship; rather, identification of useful microfossil datums for constructing age/depth plots and sedimentation/ accumulation rate curves is the primary emphasis. Microfossil datums are also used for integration with multisensor track data for core/core correlation and construction of spliced composite sections. Paleoenvironmental or bathymetric data, principally from benthic foraminifers, may also be of primary importance on certain legs.

Paleomagnetists

Paleomagnetists conduct or supervise paleomagnetic measurements and reduction of paleomagnetic data to intensities and direction of magnetization. They also provide absolute orientation data for deformational structures measured in the core, and serve as magnetostratigraphers as appropriate. Some additional rock magnetic properties can be acquired on the ship, which can be particularly useful if the magnetic properties are (partly) ephemeral (post-recovery dissolution, reduction, or oxidation of magnetic minerals).

Paleomagnetists are responsible for checking the performance and calibration of the shipboard paleomagnetic laboratory, assuring that it is maintained in good condition. They work with shipboard scientists and the drilling crew to ensure that core material is not damaged from a magnetic point of view (e.g., by heating, or exposing to strong magnetic fields), and that core sections are not inverted. For additional details, see ODP Technical Note #18.

Physical Properties Specialists

Scientists assigned to this job usually determine the following properties:

- moisture content and grain density on core samples;
- *P*-wave velocity on split cores and/or core samples;
- thermal conductivity on full cores or split cores, if appropriate; and
- vane shear strength on split cores, if appropriate

In addition, they oversee and document the overall physical properties measurement program in consultation with other scientists, including the full core and split-core logging systems. They also ensure that calibrations and control measurements are carried out according to protocol to ensure data quality control. For additional details, see the physical properties handbook, ODP Technical Note #26.

Geochemistry

Organic geochemists are primarily responsible for advice as to when hydrocarbons in cores may constitute a safety or pollution hazard, forcing abandonment of the drill site. To do this, they monitor the hydrocarbon content of cores by all available means, including gas chromatography, examining gas pockets, fluorescence, oil cysts, odors or visual signs. They advise the Operations

Manager, the Staff Scientist, and Co-Chief Scientists when hydrocarbon levels in cores may constitute a potential safety or pollution hazard.

Inorganic geochemists are primarily responsible for conducting elemental analysis on interstitial water and/or solid sediment or rock samples and provide preliminary interpretations. They will typically conduct interstitial pore water, XRD and inductively ICP-AES analyses. ODP marine laboratory specialists assist in geochemical analyses. For additional details, see ODP Technical Notes #6, #7, and #15.

Downhole Logging, Geophysics

This primary responsibility for the scientist in this position is to:

- advise the Co-Chief Scientists on the logging program for the cruise;
- work closely with the ODP Logging Staff Scientist in designing, implementing, and interpreting the logging program; and
- assist the Schlumberger field engineer with data acquisition as required.

This position often includes responsibility for other geophysical tasks, such as:

- acquisition, analysis, and presentation of downhole temperature measurements;
- seismic data acquisition and presentation (site surveys);
- construction of synthetic seismic profiles.

Microbiologists

The primary responsibility of shipboard microbiologists is to determine the nature, extent, and habitat control of sub-sea floor microbial activity as manifested in recovered core material. To do so, water, sediment, and rock samples are collected to determine cell abundance and total biomass, to extract and characterize DNA contained within the samples, and to establish cultures of microorganisms inhabiting these environments. To achieve these objectives, shipboard core samples are specifically analyzed to:

- determine the abundance and distribution of microorganisms by direct counting fluorescence microscopy and other means;
- conduct micromorphological characterization by microscopic observations;
- analyze adenosine triphosphate (ATP) to determine the biomass activity of the subsurface biosphere; and
- cultivate microorganisms at different conditions (thermal and aerobic/anaerobic) for enrichment purposes.

Other specialists

On certain occasions, specialists may sail to perform more specialized measurements, which may include:

- packer experiments;
- installation of CORKs;
- vertical seismic profiling; and
- seismometer installation

Amendments