

## The Spectrophotometer plays an active part in an international project

Utilizing its portability to convert the color of collected sediments to numerical data on board a ship.

### Background

The first information about rocks or minerals is obtained from its color in most cases. Previously this was done by visual comparison with the Munsell Rock Color Chart, and the results were recorded as Munsell data. In the "Ocean Drilling Program", in order to study the geological history or past environment, a hole is drilled in the seabed several thousand meters below the ocean surface, and sediments are collected from dozens of meters beneath the seabed. The color is then measured as one part of the information about the sediments. Visual evaluation on board a ship has several problems including, 1) different illuminating and viewing conditions, 2) measurement error due to individual observer difference, 3) collected data is only Munsell data, for which the color space is irregular and not so quantitative.

### Outline of the measurement process

On board, the cylindrical core sample collected from the seabed is cut in half. Sections of the core sample are then measured with a Spectrophotometer which is connected to a personal computer, and the position (depth) is input as the comment. Because of the rate of accumulation or the environment, the color of marine sediments is different at different positions due to oxidation and reduction. Therefore, in order to minimize color change caused by exposure to air, measurements are taken quickly. From the points where the color of the core sample changes, it is possible to determine its environment: whether it was at the coast or deep under the sea and also the numbers of creatures it contains.



[ Left ] Measurement sample / [ Right ] Spectrophotometer used on board

### Results

The accurate color measurement results make it possible to know the results quickly on board the ship where the cores are collected, and it becomes possible to judge whether or not additional core samples from the surrounding area are necessary. Therefore, core collection becomes more efficient. Color change according to depth

