

# **Effective onboard measurements of rock physical properties during Hard Rock Drilling**

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Lithological description, chemical analysis, and physical property measurement of drilling samples collected during the month-long expedition are performed in the shipboard laboratory of JOIDES Resolution and D/V Chikyu in the International Ocean Discovery Program (IODP). The onboard analysis is always a race against time and numbers of accurate analyses. Blum (1997) has been used as a bible for shipboard property measurements. Since the start of IODP Phase I in 2003, many hard rock drilling expeditions (Exps. 304, 305, 309, 312, 335, 345, 360) were conducted, and measurement methods were developed for efficiency. In addition, during the 2017-2018 International Continental Drilling Program (ICDP) Oman Drilling Project (OmanDP) shipboard description campaign (ChikyuOman 2017-2018), 3200 m long drilling samples drilled in Oman were transported to the D/V Chikyu docked in Japan, and various descriptions and analyses were conducted there.

In this presentation, we will present the physical property measurements we made at ChikyuOman, focusing on the innovations in the measurements after Blum (1997). In particular, in ChikyuOman2018, OmanDP Phase II, we measured electrical resistivity in addition to the conventional protocol. The resistivity measurements were performed on Whole Round core and discrete samples. On the other hand, reproducibility is required for accurate measurement of physical properties regardless of the measurer. Samples should be fully saturated after prolonged immersion for about 30 days, but in order to measure a large number of samples in a short time, moisture saturation was achieved by immersion in a vacuum vessel for more than 24 h. In ChikyuOman 2018, this condition was met as a minimum, and a large number of measurements were performed. As a result, we obtained meaningful physical property data that can be used for discussion even for samples with low porosity and high resistivity. In the future, we would like to further improve this physical property measurement and measure the physical properties of many samples in the shipboard laboratory immediately after drilling to comprehensively interpret the seismic structure survey, rock core description, and physical properties for a more accurate estimation of the subsurface structure.