

Effects of absolute humidity on contact resistance between dry rock sample surface and electrodes

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Resistivity measurements of rock under various conditions are essential for accurately interpreting geoelectromagnetic survey results. However, the contact resistance between the rock sample and measuring electrodes is a problem in measuring the resistivity of a rock sample. Because the measurement of high contact resistance on the dry rock surface is particularly difficult, its characteristics have not been well studied.

In order to investigate the characteristics of contact resistance, we have developed a measurement method of high contact resistance. By using the method, we measured high contact resistance between the dry granite surface and the electrode made of conductive epoxy. Considering the interaction between atmospheric moisture and rock samples, the contact resistance was repeatedly measured under different humidity conditions.

We confirmed the contact resistance decreased with increasing absolute humidity. A clear relationship exists between contact resistance and absolute humidity, and the relationship was approximated by an exponential function. This result suggests that increasing the contact area between the electrode and the rock surface with rising humidity. Moisture in the atmosphere may have caused improvement of contact condition by filling the microscopic gap in the contact surface.

Keywords: contact resistance, atmospheric Moisture, absolute humidity, contact area, conductive epoxy, granite