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Discussion on "Gamma-Ray Spectometry in Central Morocco," by A. Demnati and H. Naudy (GEOPHYSICS, April 1975, p. 331–343)

In their paper, Demnati and Naudy give the following formula for altitude correction of the total radiometric count:

$$Y' = Y^k,$$
$$K = (h - 150)/180,$$

where

Y' is the corrected value,
Y is the total count corrected for the background,
h is the recorded altitude (in meters).

It is my opinion that the background correction should be done *after* the altitude correction, because the background count is supposed to be constant with the flight height. Even if the background count happens to vary with the height, it does not necessarily vary with the same gradient of the measured value at every point.

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Reply by author to the discussion by Edson S. Sampaio

The comment of Prof. Sampaio is quite useful because until now I did not notice an error which has remained in the paper.

The true formula is not

$$y_c = y^{(h-h_0)/m},$$

but

$$y_c = ye^{(h-h_0)/m}.$$

In fact, the hypothesis generally made is that the background does not depend on the flight height. In the Morocco survey, its value was deduced from flights at an altitude of 2000 ft. With this hypothesis, it was logical to subtract it before the altitude correction.

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Discussion on "Search for Geothermal Seismic Noise in the East Mesa Area, Imperial Valley, California," by H. M. Iyer (GEOPHYSICS, December 1975, p. 1066-1072)

Dr. Iyer rightfully points out that cultural noise sources (e.g., traffic, canals) tend to mask smaller amplitude geothermally generated microtremors. These problems have been recognized by other investigators as well. However, we take exception to his conclusions questioning the validity of groundnoise surveys as a geothermal exploration tool based solely on this study or his other survey in Long Valley, California where he had 100 head of cattle nibbling on his geophones. Areas adjacent to cultural noise generators are not meant to be surveyed by this technique, as he points out. But what of the hundreds of other areas that are culturally silent? Results from these areas have yet to be weighed. Preliminary results from suitably applicable areas appear to have favorable indications. One prospect drilled on a groundnoise anomaly has been confirmed as a major geothermal find. Crustal inversion techniques applied to groundnoise spectra have been used to interpret geological structure. Gravity and resistivity profiles, and well log information over the same areas, have verified the groundnoise interpretations. As with many other geophysical methods, groundnoise should be used as a reconnaissance tool or in conjunction with other surveys.

We do not mean to be critical of Dr. Iyer's work, but in fact have the greatest respect for his professionalism and most informative investigations. What we wish to point out is that all results are not yet in.

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Reply by author to discussion by L. J. Katz and W. D. Wagner

Nowhere in my paper have I questioned the validity of ground noise surveys as a geothermal exploration tool. My conclusions are specifically for the Mesa geothermal anomaly in Imperial

Valley, California. I do believe that geothermal seismic noise exists and can be detected under favorable conditions, as was shown at Yellowstone (Iyer and Hitchcock, 1974). At Long Valley, in spite of "1000 head of cattle nibbling" at my geophones (did Drs. Katz and Wagner get the word from the cow's mouth, perhaps) we found indications of "high-velocity" seismic noise associated with the geothermal system in the area (Iyer and Hitchcock, 1976).

Quoting success stories using seismic noise in geothermal exploration based on classified, unavailable data is pointless. I suggest that Drs. Katz and Wagner endeavor to publish all available information on geothermal noise in open literature and place the facts before the scientific community. Such a course of action is probably the best service they can do to the science.

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REFERENCES

Iyer, H. M., and Hitchcock, Tim, 1974, Seismic noise measurements in Yellowstone National Park: Geophysics, v. 39, p. 389–400.
——1976, Seismic noise survey in Long Valley, California: (to be published in J. Geophys. Res.)

Discussion on "EM Coupling, Its Intrinsic Value, Its Removal, and the Cultural Coupling Problem", by Jeffrey C. Wynn and Kenneth L. Zonge (GEOPHYSICS, October 1975, p. 831–850)

We agree with the authors that an understanding of inductive coupling is important in the proper interpretation of induced polarization data. We also agree that "the ultimate value and purpose of studying coupling is to effect its removal from induced polarization data and thereby contribute to the value and usefulness of these data."

We question, however, how the section in this paper on "removal of coupling" can further the reader's understanding. The authors state that they have developed a coupling removal technique, that by "using a combination of theoretical, empirical, and quasi-heuristic inputs . . . , it is possible to 'curve-match' EM coupling effects for any environment," and that "several empirically observed behavioral characteristics of laboratory and in-situ spectra are used to determine the success of coupling removal after each iterative attempt." Following this obfuscation, the authors show a number of results without further elaboration on the specifics of the operation.

What theoretical aspects are utilized in this operation and what criteria were used to establish the success of the coupling removal? A reference to Wynn's dissertation (Electromagnetic coupling in induced polarization, University of Arizona Dept. of Geosciences, 1974) was followed up for clarification. On page 71, Wynn states, "The conclusion reached here is that in general, the electromagnetic coupling equations for *grounded* electric dipoles over a multilayered earth differ from the homogeneous earth equations by two multiplicative constants. An iterative technique based on this principle has been developed. Two constants may be manipulated by an operator using a graphics computer terminal and a dedicated PDP-8e computer to remove the coupling. Several empirically known behavioral characteristics of laboratory sample spectra are used to determine whether or not all coupling has been removed. Several examples of the use of this technique are shown in Figures 4.2, 4.3, and 4.4. The separable character of EM coupling and the complex resistivity rock response is due to the very different behavior of these two components." Therefore, no specifics are given here, either.

The authors then compare their decoupled results with those from quadratic phase extrapolation in Figures 17 and 19. However, this comparison is complicated because two different extrapolation formulas are given, neither of which is compatible with the set of specified measurement frequencies.

The reason for this obscure presentation is obvious, in that this technique has been used in a proprietary contractor service by Wynn and Zonge. This incompleteness is acceptable in an oral presentation, and in fact Jeff Wynn was awarded a Best Presentation Award for his paper at the 44th Annual International SEG Meeting. However, GEOPHYSICS is a reputable professional journal and should include papers of solid, complete, technical merit. We consider the above paper particularly inadequate in its present form.

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