magnetic field is found 'by evaluating a surface integral involving surface slopes and electric fields. The numerical solution is verified by comparisons with dipole–dipole resistivity results from a two-dimensional finite-element model of a valley, and with analytic solutions for the magnetic fields over a dipping interface. Methods for terrain correcting mise-à-la-masse and magnetometric resistivity data are demonstrated with examples using actual field measurements. The results of this study show that (1) rugged topography can significantly distort measurements in mise-à-la-masse and magnetometric resistivity surveys; and (2) the described modeling technique provides an effective means of calculating terrain corrections for both the mise-à-la-masse and magnetometric resistivity methods over complex three-dimensional topography.

R. P. Ranaganayaki. *An interpretive analysis of magnetotelluric data*

A simple analysis to determine the dimensionality of magnetotelluric resistivity variations, to separate the near-surface resistivity variation from the variations at depth, and to find the relative resistivity variations with depth is described. Parameters derived from the magnetotelluric impedance tensor are mapped in pseudo-section and planar view for two-dimensional (2-D) model data and for survey data from Montana. These data illustrate procedures that can qualitatively map complex resistivity structures in the lateral distance-frequency domain or, equivalently, the lateral distance-scaled vertical distance domain. Phase-dependent parameters have better vertical resolution than parameters related to scalar apparent resistivity, but the latter allow estimates of the resistivities encountered. Phase parameters for the Montana data provide a semiquantitatively accurate cross-section of a geologically known anticlinal structure. This suggests a means of subsurface structural mapping with magnetotelluric data. The use of these parameters with sufficiently dense and accurate data provides a first-order indication of structure for subsequent quantitative modeling.

Y. Murakami. *Analysis of equivalence for the Schlumberger resistivity methods using the RHO-*R *and RHO-*C *curves in the resistivity transform domain*

The problem of equivalence in the resistivity methods is studied in the resistivity transform domain. The RHO-*R* and RHO-*C* curves, which are, respectively, determined by the transverse resistance and longitudinal conductance, are shown to define the asymptotes of the resistivity transform curve. Models which give almost identical asymptotes also give almost identical resistivity transform curves. Thus, equivalent models can be found by obtaining models which do not change the shape of these asymptotes. For a given layered model, a plot of the RHO-*R*, RHO-*C*, and resistivity transform curves graphically shows the range of equivalence of the model. Equivalent models can be obtained by changing either resistivity, thickness, or depth of the given model through a simple graphical procedure.

W. L. Anderson. *Computation of Green's tensor integrals for three-dimensional electromagnetic problems using fast Hankel transforms*

A new method is presented that rapidly evaluates the many Green's tensor integrals encountered in three-dimensional electromagnetic modeling using an integral equation. Application of a fast Hankel transform (FHT) algorithm (Anderson 1982) is the basis for the new solution, where efficient and accurate computation of Hankel transforms are obtained by related and lagged convolutions (linear digital filtering). The FHT algorithm is briefly reviewed and compared to earlier convolution algorithms written by the author. The homogeneous and layered half-space cases for the Green's tensor integrals are presented in a form so that the FHT can be easily applied in practice. Computer timing runs comparing the FHT to conventional direct convolution methods are discussed, where the FHT's performance was about 6 times faster for a homogeneous half-space, and about 108 times faster for a five-layer half-space. Subsequent interpolation after the FHT is called is required to compute specific values of the tensor integrals at selected transform arguments; however, due to the relatively small lagged convolution interval used (same as the digital filter's), a simple and fast interpolation is sufficient (e.g. by cubic splines).

J. Korringa. *The influence of pore geometry on the dielectric dispersion of clean sandstones*

In an idealized description a clean sandstone is an isotropic two-component medium consisting of a solid with dielectric constant ϵ_1 and a pore fluid (brine) with dielectric constant ϵ_2 and conductivity σ_2. On the basis of D. Bergman's work [*Ann. Phys.* 138, 78 (1982)] the dielectric response of such a medium is expressed in terms of the dc conductivity and of a real, positive and bounded function, defined in $<1, 0>$ and independent of ϵ_1, ϵ_2, and σ_2. This function is restricted by three relations which express weighted averages of it in terms of the asymptotic value of the dielectric response at high frequency, the porosity, and the dc conductivity. The formalism is exact for two-component media of the type specified. It supplements an approximate treatment by Lysne (1983) and can, without much difficulty, be generalized to any isotropic two-component composites.

S. A. Arcone. *Field observations of electromagnetic pulse propagation in dielectric slabs*

The propagation of electromagnetic pulses in naturally occurring dielectric surface layers has been examined. Pulse duration used in field experiments reported here has been on the order of nanoseconds with pulse bandwidths in the high VHF to low UHF band. The layers were sheets of fresh water ice and granite at thicknesses ranging between 0.4 and 4 m. Both transverse electric (TE) and transverse magnetic (TM) modes were attempted but only the TE propagation could be interpreted. Analog recordings of wide-angle reflection and refraction (WARR) profiles were taken and recorded in a continuous graphic display. The displays allowed easy identification of phase fronts thereby facilitating study of the dispersion of the pulses. The phase and group velocities of the wave-group packets agree well with the velocities