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Telluric currents observed at Lefroy

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Introduction

Telluric potentials were observed during a series of tests for piezoelectric effects from the quartz veins of the Lefroy goldfield. The equipment in use at the time included two porous pots containing copper sulphate-copper electrodes and a sensitive voltage chart recorder. Electrode separation was ten metres. The chart recorder was capable of displaying clearly all variations of voltage in excess of 2 V.

Observations

As only one orientation was recorded it was not possible to unambiguously describe the source directions of the current. Figure 1 indicates the waveforms present in nearly twenty-five minutes of recording. The following information may be directly deduced from the record.

Maximum amplitude: 30 V (10 m spread), amplitude equivalent to 3 mV/km

Normal periods: 3, 5, 6–6.5 units or 18, 30, 36–39 seconds

Frequencies: 1.5–3.5 Hz

Superimposed on the more obvious short period vibrations are others with an amplitude of about 10 V and period 90 seconds. Various interference effects may be noted in the record, e.g. points A, B, C.

Several periods of quiescence may be seen and several marked change points are present (indicated with arrows). It would thus have been possible to simply correlate with other records had they been made.

Comments

The voltages recorded are sufficiently large and bear adequate character to permit regional investigations. It may be possible to develop telluric techniques to examine structural relationships within the apparently invariable and monotonous Mathinna Beds sequence. Major structures have been suspected but are difficult to prove due to uniform lithology and lack of marker horizons. However such structures as major faults, thrusts, nappe blocks or fold structures should produce significant asymmetries in the telluric field, enabling pinpointing of their location. Further development is recommended.

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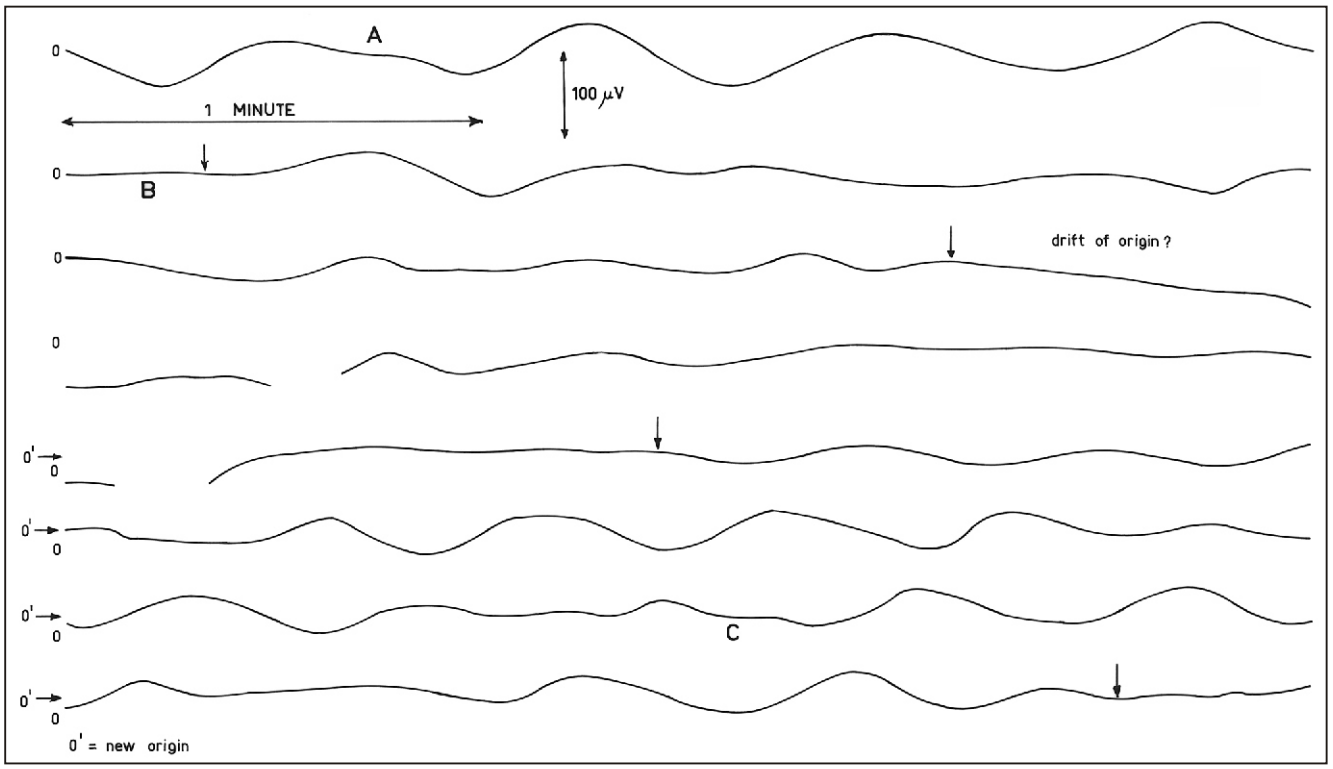

Figure 1. *Wave form, telluric voltage, Lefroy*