

Poster Papers

THE QUESTOR AIRBORNE DIURNAL MONITOR

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ABSTRACT

Observed aeromagnetic survey data are the summation of signals from the invariant background magnetic field, the attitude dependent magnetic field of the aircraft and the time and spatially dependent diurnal variations. In recent years, dramatic improvements have been made in magnetometer sensitivity and aircraft compensation using software techniques. Few improvements have been forthcoming in overcoming the problems of diurnal variation apart from using more base stations which are located closer to or within the survey area.

The spatial diurnal variations can be considered in two groups. The commonest daily variation arises from an overhead current system in the ionosphere which moves from east to west with the rotation of the earth. The second type of fluctuations are those associated with magnetic substorms and auroral current systems. Both types interact with the subsurface conductivity structure creating local distortions which will cause the observed fluctuation field to be spatially inhomogeneous. Field data from magnetometer arrays in the Canning Basin of Australia are presented to illustrate these phenomena.

Subtracting the variations recorded from a single base station is not necessarily adequate to remove the fluctuation field from the recorded total field airborne data everywhere in survey area.

Monitoring these variations along the survey line is now possible by integrating the difference of two independent magnetometers measuring the same field at different times. The time spacing is related to aircraft speed and sensor separation.

A simulation of the method using field data is presented along with preliminary data from the Questor Airborne Diurnal Monitor aircraft.