

THE MAGNETIC RELIEF PROBLEM

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1. Introduction

Airborne magnetic surveys represent a fast and inexpensive reconnaissance method of gathering information about the main signatures of the magnetic field caused by geological structures in the subsurface.

In regions of sedimentary basins, the variations in the magnetic field are mainly due to the igneous basement rocks and can be considered as arising from two causes: from lateral changes in the magnetisation of the rocks, and from the relief of the basement structure. Experimental evidence (see Nagata [1953]) seems to indicate that, for most igneous rock masses, the magnetisation can be taken to be parallel to the inducing field. One may therefore assume that the variations in the magnetic field are predominantly due to the relief of the basement structure. The following problem, which we address here, therefore arises:

The determination of the depth to the basement rocks, their relief, and the occurrence of steep gradients in the relief, from collected airborne magnetic data.

Work in this area started a few decades ago, and, because of its great importance in exploration geophysics, has attracted renewed attention more recently.