

Abstract

The main objective of the most regional-scale aeromagnetic surveys is to assist in mineral development through improved geologic mapping. The aeromagnetic survey of the south-west of Algeria is used for diamond potential evaluation and target-area selection. This region of Algeria, forming part of the west African Craton, has until very recently been under-explored for diamonds. This paper is a contribution to area selection for primary diamond deposits based on a conceptual model for kimberlitic occurrences. According to the proposed exploration model, the emplacement of diamondiferous kimberlites is controlled by three principal criteria: (1) existence of a sufficiently thick lithosphere, favourable to diamond genesis and preservation, (2) presence of major tectonic trends and lineaments that could act as pathways for kimberlitic magma, the principal diamond-bearing lithology, and (3) the recognition of magnetic anomalies related to mafic–ultramafic intrusives, signs of deeply-rooted magma. Interpretation of the aeromagnetic data, using energy spectral analysis and different data-enhancement filters, has permitted elucidation of all three criteria. Their combination provides a final assessment for three possible areas as targets for primary diamond deposits emplacement