

CONTRIBUTION OF SATELLITE RADAR DATA TO GEOLOGICAL AND MINERAL EXPLORATION IN WEST AFRICA AND FRENCH GUIANA

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The aim of the present study consisted in evaluating the use of satellite radar data from sites representative of the problems encountered during geological mapping and mineral exploration in inter-tropical areas: little documentation, poor outcrop, difficult access, thick vegetation cover and high nebulosity rendering optical observation systems poorly efficient. Two test sites were selected with high gold potential in Paleoproterozoic terranes in French Guiana and the Ivory Coast. The objective was to improve characterization methods for target selection, particularly in the early stages of mineral exploration. The database integrates ERS (1 and 2) data, RADARSAT (broad-swath Scansar mode and fine bi-angular viewing mode) data, DEMs acquired by various means, and geophysical data (airborne magnetics, spectral radiometry). Various methods (filtering, geocoding and stereoscopy) have been integrated or developed to create different map types. These data are analysed at various scales and validated using two approaches, namely checking in the field and fusion with airborne geophysical data (spectral radiometry and aeromagnetism). The results showed the radar to be a powerful mapping and mineral-exploration tool, and notably revealed that 1) the raw data can be used directly by geologists either for standard geological studies or as an exploration aid, and 2) fusion with geophysical data enables the identification of deformation structures and rapidly and efficiently increases the possibilities of lithological discrimination. This study has shown that ERS images are appropriate for regional scale (1:200,000 and 1:100,000) study, whereas RADARSAT images are particularly suited to more detailed scales (1:100,000, 1:50,000, or even 1:25,000).