# LANDSAT IMAGE PROCESSING TECHNIQUES FOR EXTRACTING AN IRON INDEX ASSOCIATED WITH Pb-Zn MINERAL DEPOSITS IN NORTHEAST BRAZIL

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LANDSAT TM images have been used in mineral exploration to map alteration patterns related to hydroxyl and iron oxide-bearing minerals. These patterns are often associated with metallic mineral deposits. Several digital processing techniques are described in the literature but few papers describe the relative advantages of different techniques.A LANDSAT 5 TM subscene of the Irecê Basin, State of Bahia, northeast region of Brazil was used to test the application of band ratio, band subtraction and principal component transformation techniques to compose an iron index. The area has a semi-arid climate and is thinly vegetated. Stratabound Pb-Zn sulfide deposits hosted by Neoproterozoic carbonate rocks of the Salitre Formation occur in the area. The deposits are spatially associated with gossans containing goethite and hematite with quartz, and with high concentrations of Zn and Pb. Sixteen gossan training points were used to evaluate the accuracy of the results. An index using TM band ratio 3/2 includes most of the gossan points. The spectral anomalies are mainly associated with weathered materials containing ferric iron oxide minerals over a dolomitic unit that controls the main sulfide mineralization. In some places the index pattern is not well explained so far, but may be related to ground water movement.