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Application of remote sensing techniques in the lithological characterization of Rocha da Pena (southern Portugal)

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Currently, the application of remote sensing techniques is a key factor for the extraction of information in the area of Earth Sciences, including Geology, for the production of geological-structural and geomorphology maps. The aim of this study is to show the application of the techniques of remote sensing in the analysis of lithology of the Rock of the Pena (Loulé, Portugal) using Landsat TM5 and Google Earth images. The lithological discrimination was performed by image fusion techniques and texture analysis. The fusion of images was based on the red-green-blue (RGB) composition of false color images and processing for the system intensity-hue-saturation (IHS), which allowed separating the spectral spatial information to produce a hybrid image, with a better spatial resolution. Texture analysis was carried out by the statistical analysis method developed by Haralick (1973), known as "Spacial Grey Level Difference Method" (SGLDM), which calculates the probability of a transition between two pixels of the image in grey tones, separated by a specified spatial orientation. This method is commonly known as "Matrixes of co-occurrence". These techniques have proved to be effective in discrimination of limestone structure and Mértola formation and less efficient in individualizing the margo-carbonated rocks and the alluviums.