

THE USE OF MULTIFRACTAL METHODS IN THE SEPARATION OF GEOCHEMICAL ANOMALIES IN GOLD MINERALISATIONS IN NORTHERN PORTUGAL

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Recently, it has been proposed in the literature a novel method to separate geochemical anomalies from background using multifractal theory. This method has been successfully applied by the author and co-workers either to chromium, nickel and vanadium mineralisations, and gold mineralisations. The current work deals precisely with the study of gold mineralisations in the Arouca region, Northern Portugal. The geological study revealed that gold mineralisations developed along quartz veins structurally controlled by a major shear zone. These veins show a polyphasic development under different deformation regimes, being gold precipitation associated to the later events, mainly during brittle deformation. Therefore, two different gold grades are identified: a primary low grade in the range of 300-500 ppb; a secondary grade generally above 1.5 ppm, and up to 7 ppm. There is also a widespread of smaller scattered veins with gold grades equivalent to the lower values reported above. The soil geochemistry was used to characterise the anomalies in the studied region and, using the multifractal method, it was possible to separate geochemical anomalies for gold, being the concentration threshold in soils, equal to 600 ppb, remarkably close to the lower range grade in the quartz veins. Therefore, this threshold value separate local anomalies from a regional anomaly, being the background missed by the limited precision of the analytical method. The geochemical mapping of gold values in soils, using the 600 ppb contour as a cut-off, revealed the areas where the most rich structures reside, providing us with a good exploration tool.