

Interactive comment on “Remote sensing data processing by multivariate regression analysis method for iron mineral resource potential mapping: A case study in Sarvian area, central Iran” by Edris Mansouri et al.

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Referee Report (RC2) - The abstract has a slight problem with language and writing style such as using of unknown abbreviations (R2 and R2 adj), the studied area and problem definition is missing, clear the importance of the point. Answer: This part corrected.

- The introduction lacks motivation and context. There is no clear statement as to the problem at hand (why the work was done) or what is to be learned in terms of geology,

C1

iron occurrences in the area, comparison between the applied processing methods and the traditional techniques such as Principle Component Analysis (PCA). Give more details about the importance of the applied technique as previous works. Check the references in the part. Answer: This paragraph added to introduction: The aim of this paper is processing of satellite images by mathematical method of regression analyses and using of its applications in remote sensing and geological units. This method was used in the study area due to existence of discovered mineralization (dependent variable) in the region. Therefore, existence of a dependent variable is the main condition of using regression analyses. Due to the fact that Sarvian as a skarn type ore deposit with 8 million tons of magnetite was discovered before, the probability of skarn mineralization in other parts of the study area is also possible. According to the capabilities of regression analyses, Sarvian mine is modeled with the goal of iron exploration in other parts of the study area. First of all, this modeling has been performed with using pixels of mine satellite image as a dependent variable and pixels of other parts as independent variables. Then the relationships between variables has been recognized with the mathematical concepts of regression analyses. Finally, the best fitted model for skarn mineralization in the study area has been recognized for exploration of new iron outcrops.

- The study area and geological background, you have write more about the origin and mode of occurrences of the iron zones, what are the common geological structures, trends and their effect in iron zone distributions as shown the geological map? Answer: This paragraph added to study area: A set of crystallized limestones- dolomites are the oldest geological units with the ages of Permian and Triassic in the study area. Sedimentation of limestone – marl of Qom formation occurred concurrent with continental sedimentation at the Oligocene. Most of tectonic activities in the study area were in the form of vertical movements which causes instability of the basin and changes depth of the sea. Vertical movements at the beginning of Miocene cause volcanic activities which was impressive in the study area. An important magmatism was occurred at the late of Miocene which causes skarn mineralization in the contact of carbonate units

C2

of Qom formation. The main fault of the study area is Bidehend. The Bidehend is a strike-slip fault with a length of 43 kilometers. The Bidehend fault is 10 kilometers away from the study area. The effect of this major fault to the study area is limited to creation of parallel faults and fractures with the same direction of Bidehend fault. There is no relationship between the skarn mineralization and faults in the Sarvian area because no mineralization has been reported in faults and fractures

- In RS Data, Which spectral bands (channels) of ASTER are used? State the wavelength range. What is the temporal resolution of ASTER images? Which dates of images are used? State the spatial resolution of ASTER image used. Also, you have clear the kinds of image correction which are applied before the processing analysis such as Atmospheric Correction (FLAASH), and mosaicking images, radiometric corrections. Answer: The information about the bands, wave lengths and resolution of satellite images are mentioned in 3.1. REMOTE SENSING DATA (INDEPENDENT VARIABLES) and Table1. We added dates of images as you mentioned nicely. In addition the information about image corrections are removed due to dear reviewer comment. - Comments in the attached file: Answer: All comments of SC1 corrected. - In comments part, reviewer asked us to add the unit for Figs 4, 5 and 6. Answer: These images are exports of regression formula. Therefore there isn't any special unit for the results of this formula in export maps. In fact, the values of intervals are depend on similarity rate of dependent pixels to independent pixels. Regards Faranak Feizi

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2017-25>, 2017.