

# Salt Lake Maharlu Monitoring by Multi-spectral Satellite Image Processing Techniques

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## Expanded Abstract

### Introduction

Monitoring of salt lake arid areas of sustainable development and environmental protection is an important parameter. Monitoring of this phenomenon, for extraction and thematic maps at different times is necessary. Remote Sensing is Powerful tool of the earth's different ecosystems, such as Playa environments to produce valuable and useful data. Such major causes of male widespread applications of remote sensing data are simple, fast and useful and valuable research done by the data in a variety of indoor environments. Despite the still images using geomorphological phenomena in a variety of fields Such Playa salt lakes in arid and semiarid areas are very limited. Limitations on the use of satellite data to map the areas affected by the salts depends on the spatial distribution of salts on the surface, the changes in salinity, vegetation as a barrier and spectral mixing with other levels of the ground. Some compounds are mixed with saline Playa lakes of the problems that separate the salt basin using satellite images processing difficulties making. In low humidity conditions, the amount of land affected by salt range reflects more visible light and low reflectivity, especially water show takes place in the mid-infrared bands. In order to reduce the adverse effects on salt and increasing information about them, at least two bands of the sensor can be combined to create the composition and formulation. In order to reduce the adverse effects on salt and increasing information about them, at least two bands of the sensor can be combined to create the composition and formulation. The simplest way to interpret the results of visual computing is the threshold. The boundary threshold below which the spectral space of a few pixels is supposed to enter a class and the class of the pixels are assigned to unknown or non-categorized The main purpose of this study was to assess common methods and provide a novel method for extracting the salt lakes in the satellite images to monitor the occurrence of spatial extent of Playa. Given the importance of salt Playa lakes in this area of research, monitoring salt Maharlu the ASTER images using TERRA satellite was placed in 2010.

### Materials and Methods

The ASTER image data used in this study is 2010. According to a study that evaluates conventional separation methods Salt Lake Maharlu and thematic mapping using satellite image processing, the proposed method in this paper include visual interpretation of false color composition, the ratio between the band and threshold on the histogram of the image. Due to the complex interaction of a range of other phenomena in Salt Lake Playa Maharlu and requires high precision in the final output, the performance of each of the above methods were proposed. Primary method of generating pseudo-color composition (FCC) with the optimal combination of bands (OIF) and its visual interpretation is done. By combining different bands of the ASTER software ILWIS, a large number of false-color image are that Salt Lake is the best color combination for the separation of the combined color bands 4,3,2(243RGB), while that between Salt Lake and other phenomena are better, Color combination is also very close to the true ground. After producing the best color combination, the different detection techniques developed by Linear histogram and edge detection filter, the contrast between Salt Lake and other phenomena, increased range, and images were suitable for visual interpretation And then using the basic elements of visual interpretation (such as texture, tone, shape, color, function, shadows, location, etc.) Salt Lake boundaries were determined visually using the image. The second way to distinguish the threshold on Runway 5 Salt Lake takes advantage of other phenomena. The Salt Lake monitoring with satellite imagery of where the pixels of pure salt must be separated from the other pixels in different bands, so the images were used for the

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resolution. Given that most of the other bands in the visible bands due to salt lakes are affected by the surface properties of salt, pure salt to separate the pixels do not seem very good. But mid-infrared bands of the area more sensitive than salt water and salts are absorbed by water molecules rapidly than the visible bands are influenced by the surface properties of salt in the dry areas, so the bands of pure salt isolation of pixels from other pixels are better. Thus the separation of pure salts pixels from other pixels, the area of salt as they are not as Playa non salt, so the ASTER band 5 was chosen as the runway for extracting salt lake. In the third method of operation rating the ASTER spectral bands were used to extract the salt lake. The spectral characteristics of salt lakes with mean brightness values of image pixels can be mapped spectral reflection curves of the salt lakes and the formulas obtained and the desired parameters can be extracted. . Most bands that define the parameters used are salt lakes, in the range of visible and infrared bands are intermediate. The reason salt lake reflects the strong absorption in the visible and mid-infrared portion of the electromagnetic spectrum is so severe they had to be able to provide information parameters to increase the salt lakes. In this study, two of the indicators, new indicators of lake salt ratio (RSCI) and indicators of lake salt differential normalized (NDSCI) the characteristics of the ASTER dry and arid desert to distinguish this phenomenon from satellite images are presented, each characteristic, weaknesses and special abilities of their own. To evaluate the resulting maps, as a ground truth map for the semi-automatic method for measuring the accuracy of the map was produced, thus creating a ground truth image, the overall accuracy of the map was generated calculated. This accurately reflects accurately defined threshold for regional-scale studies of salt.

### Discussion and Conclusions

The results showed that, depending on the satellite image of the imaging phenomena, the spatial resolution is less possible in mixed pixels increases, Therefore, the high spatial resolution of the image can be more accurately position the salt lakes in arid regions can be extracted reliably and accurately. Method of visual interpretation of satellite images, especially color composite images using different bands will be a quick and comprehensive view, In this way an accurate depiction of salt lakes, especially in the border areas with varying combinations of vegetation and soil types are difficult and complex And identify the precise location of the boundary line of salt lakes are typically associated with errors. One of the fundamental problems with this approach, the boundary pixels are correctly detected This can be a major cause of medium or low spatial resolution sensors are used, as this would lead to mixed pixels. Threshold on the histogram using the methods is that can be extracted from satellite imagery of the salt lakes. This is a reflection of the salt compared to other phenomena in the mid-infrared bands, and very small allotment is close to zero; therefore to extract the salt lakes, on the threshold of the action takes place in the middle infrared bands. Although this method has high accuracy, but it can be easily extracted automatically and quickly raised. Use the bands to extract the salt lakes is also difficult because of the different coatings than in places where the ground does not have an acceptable result. Due to the complex nature of this study provide a new way to Playa Maharlu and tested. This method is based on the combination of the two thresholds and ratio between the bands. The results clearly show that by using simple visual computing easily is extracted useful information from satellite images.

This study detected Salt Lake Playa Maharlu with the ASTER 2010 images were processed, It was found that both the band and threshold rating range of the resulting image histogram for monitoring and mapping of salt lakes in arid areas is practiced. The results also showed that the overall accuracy indices NDSCI & RSCI and respectively 0.87 and 0.92 in saline lakes in arid and monitor resolution satellite imagery are effective.

**Keywords:** Maharlu Salt Lake, satellite images, threshold.