

The use of Remote Sensing data for Monitoring the changes of Marshes Environment, in (Al-Dalmaj and Al-Nahrawan)

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Abstract :

Synoptic view, multitemporal, and repetitive coverage were the main Landsat characteristics used in this study for monitoring the water surface area in Al-Nahrawan and Dalmaj marshes (Haur) which are effecting the environment activities.

Introduction:

The Landsat multitemporal data for two different periods were used to study the change of the surface water for two selected water depressions (marshes) in the area : Haur Al- Dalmaj and Haur Al-Nahrawan (plate 1). Because of the satellite repetitive nature and large area coverage (synoptic view) images, the data can be used effectively to monitor the dynamic changes in surface water parameters. The multitemporal images of band 7 reflected infrared (wavelength 0.8-1.1 μm) were used, because the delineation of spatial extent of surface water is most successfully carried out by using data acquired in the near infrared or microwave wavelengths (SALOMONSON, 1983) .

Environmental Setting and Location :

Haur Al-Nahrawan located to the east of Suwairah city to the left side of Nahrawan ancient canal lies in centre point of latitude $33^{\circ} 20' N$ and longitude $44^{\circ} 56' E$. The haur affected by the floods water from the high lands in the eastern part near to Iranian border , the shallow parts becomes dry and strongly

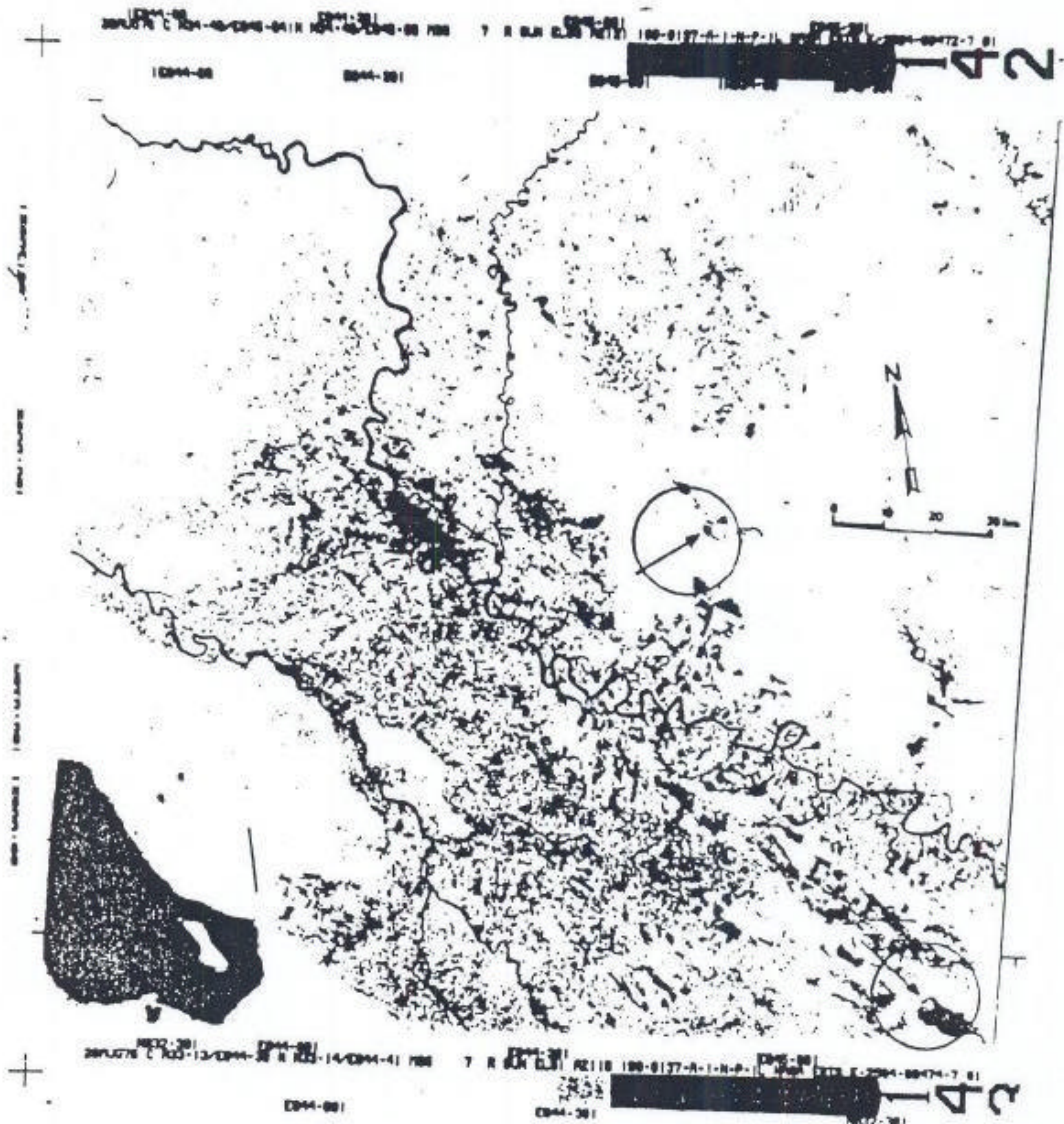


plate 1. Landsat band 7, 28 August 1976, showing the water depressions (marshes) mentioned by arrows. The upper is Haur Al-Nahrawan. The Lower is Haur Al-Dalmaj.

saline in the late summer months, while the deeper ones remain with water.

Haur Al-Dalmaj situated to the west of Kut city, covering a vast area and surrounded by strongly saline soils and sand dunes to the western direction of the Haur near to main river. Al-Dalmaj lies in latitude $32^{\circ} 15' N$ and longitude $45^{\circ} 20' E$.

Mostly all the permanent water depth in both Al-Nahrwan and Dalmaj are covered with a dense growth of reed plants.

Method and Analysis :

In the near infrared region of the spectrum, nearly all the incident energy is absorbed by water; therefore, water bodies have a lower reflectance than the terrestrial features throughout this portion of the spectrum, as illustrated in fig. 1.

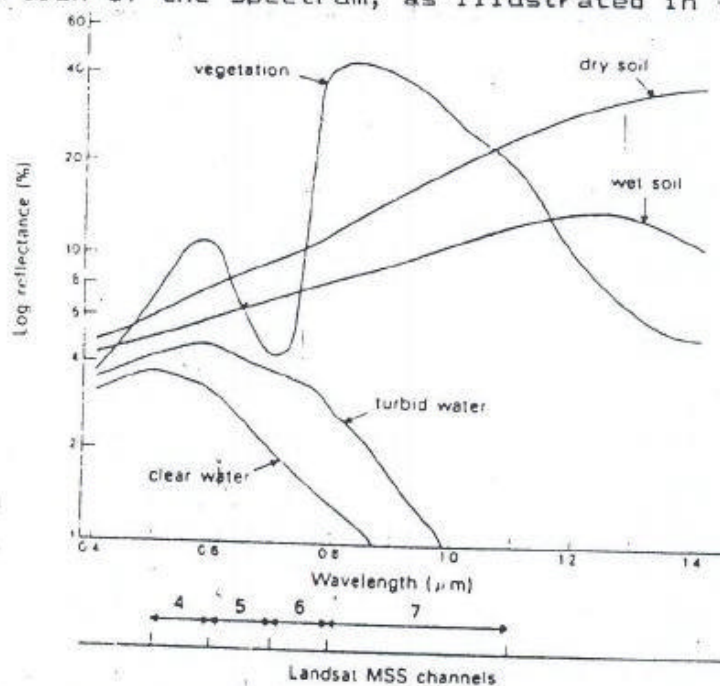


Fig 1. Reflectance values of different land cover types at different wavelengths in visible and near infrared. The low reflectance of vegetation is shown in the lower peak curve in band 5, and almost no reflectance of clear water in band 7, where the turbid water is still with more reflectance (after HARDY, 1981)

For the delineation of water surface fluctuations in these water depressions, two Landsat images of band 7 were used (17 July 1976 and 28 August 1976), enhanced and enlarged to scale 1/ 890 000 . The delineated water boundaries shown in fig.2 , the changing in water surface area for the two water depressions, which decrease on 28 August to about the half , because the water loss by the evaporation is very high in summer months (see the summer temperature of months of June, July and August in table 1), also partly some water drained through the soil.

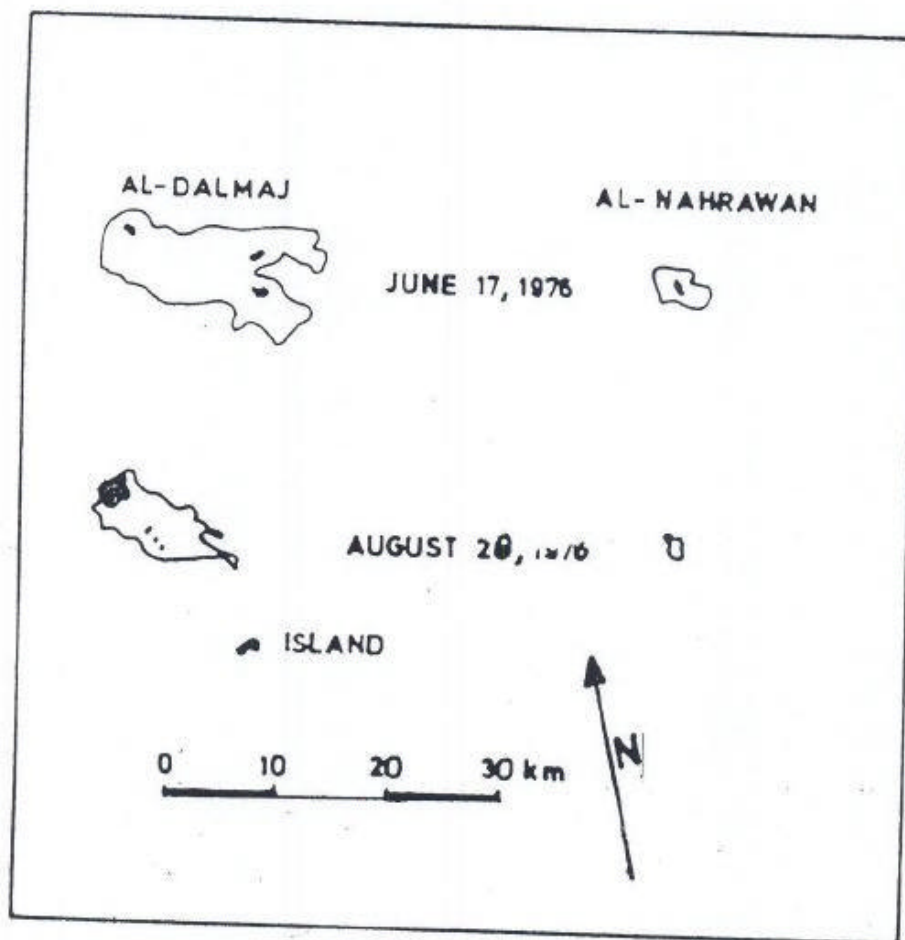


Fig. 2. Diagram showing the water fluctuation at Al-Dalamj and Al-Nahrawan , delineated from band 7 June and 28 August 1976.

Baghdad (C 1937 - 1967)			
	June	July	August
Mean max. temp.	40.0	43.5	43.5
Mean min. temp.	23.5	25.3	21.7
Basrah (C 1937 - 1960)			
	38.4	40.3	41.2
	27.1	27.6	26.1

Table 1 . The mean maximum and minimum temperature of two main locations in Iraq (Meteorological Department - Baghdad) .

Conclusion :

From this we can conclude that, because of the repetitive view (multidate) of satellite data coverage, Landsat imagery is particularly suited for monitoring dynamic changes in surface water parameter which are difficult to be surveyed in the field, especially in these two water depressions, where the dry-out parts became very saline soils.

Having some knowledge of the average depth of these two marshes, and combining it with measurements of surface area from Landsat image, it will be possible to estimate the approximate volume of water stored from June 1976 to August 1976, and also to calculate the evaporated water.

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