

# ABSTRACTS

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**Review the Effect of Classification Algorithm of Satellite Images  
on the Runoff Curve Number and Maximum Flood Discharge  
by the Assistance of GIS and RS**

Land use is an important feature in run off process, which affects on permeation, erosion, evaporation and transpiration. In this study, the effect of classification algorithm of satellite images of land use maps and run off curve number and also flood discharge with the help of GIS and RS have been reviewed. This study has been conducted on Mansourabad Birjand catchment area and with the assistance of land sat 7 (ETM+) satellite images. Land use map was determined by maximum probability algorithm, minimum distance and Mahalanobis distance by the use of satellite images. Then vegetation cover map was prepared by the help of NDVI index and the map of soil hydrology group by using soil, geology and topographic maps. Through incorporating the maps of land use, vegetation cover and soil hydrology group in GIS and by the use of SCS table, the maps of run off curve number for each of algorithms were determined.

Further, for evaluating the correctness of the obtained curve number from each algorithm, maximum flood discharged by the use of HEC-HMS modle was calculated and compared with the measured values.

The results showed that maximum probability algorithms and Mahalanobis distance with rating Kappa coefficient of 0.7 and 0.65 accordingly and discharge correctness of 80% and 72% with the measured results are the best methods for classifying the satellite images.

Also, this study showed that changing classification algorithm has a very high effect on the curve number and flood discharge.

**Key words:** Classification Algorithm, GIS, Land Sat (ETM+) Satellite Images, Run off Curve Number, HEC-HMS.

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**Presentation of Algorithm for Reconstruction of the Damaged Images Due to not Working the Scan Line Corrector (SLC) of Land Sat 7 Satellite, ETM+ Sensing and Use it in Preparing Land Use and Land Coverage Maps**  
*Case study: Zanjan Area*

Since the Scan line corrector (SLC) of land sat 7 satellite, ETM+ sensing was stopped on 31.05.2003, therefore the received images from this time forward has some disorders, so that in these images, only 36 kilometers (1200 pixels) at the central part of each pass has no defect and whatever closes to the pass margins, the hollow space or lost area between scan lines of the two surveying bands gradually increases, and reaches to 14 pixels which produces some difficulties in processing and using these images.

With respect to the wide and variety use of land sat satellite images in different fields of geosciences, numerous methods have been presented up to now for removing this problem, including the replacement method of lost Scan lines by using the data of other satellites, adapter and interpolation filters which each one, depending on their usage have some advantages and disadvantages.

In this paper, by the use of continuous survey method of land sat satellite data and the required statistical calculations, the damaged images were reconstructed. For ensuring the results of applying this algorithm, the maps of the land use and coverage of Zanjan area were prepared. The obtained results show the high accuracy of this method in comparing with pervious methods and through using this algorithm, in addition to reconstruct the defect images; it is possible to process them for different usages in geo science.

**Key words:** Scan Line Corrector, Land Sat, SLC, Land Use, Algorithm.

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### **Convergence Role of Pressure Systems on the Occurrence of Sand Storms in Khuzestan Province**

Today, one of the controversial climate phenomenons is the dust storms of west and south west part of Iran. In this study, through the review of horizon view of zero up to 1000m in six barometer stations of Khuzestan province during the years of 1995 up to 1999, the daily event of dust with id (6) was extracted. The first results represented the occurrence of 288 dust storms which all happened in the warm period of the year, i.e. from the end of April until September. From this group based on maximum durability and spatial spread, 10 index storms were determined, which through preparing and analyzing weather maps during dusty days, synoptic patterns of effective pressure systems in low and medium levels for the starting, peak and ending days of each storm were designed.

Comparing the pattern of starting days of most of dust storms with peak day of each storm at the level of open sea, indicates the simultaneous approaching of the two low pressure systems of Iran-Pakistan and high pressure system of Azor respectively from east and west of the under study area. Attainment of this approaching at high levels including 850 & 700 Hecto pascal at the southeast of Iran which its results were the increase of pressure gradient and consequently atmospheric instability on Khuzestan, was coordinated with decreasing the horizon of view in most of the under study cities during the peak days. Also, extracting the wind direction from NCEP maps at elevation of 700 Hecto pascal and open level, confirms the occurrence of north west air flows from east of Iraq and west air flows from north of Arabistan and thereby transferring dust from surface of naked deserts of this area.

**Key words:** Iran-Pakistan Low Pressure, Azor High Pressure, Dust Storm, Khuzestan.

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### **Zoning the Skirts Sensitivity to Instability (Slippage) at Javanrood Catchment Area by the Use of Two Variables Statistical Model of Surface Compaction**

Mass displacement of materials such as land slid is one of the problematic skirt processes in Javanrood catchment area located at the north west of folded Zagros, because this phenomenon makes the degradation of forest lands, agriculture lands and pastures of this region, and deemed to be a threat for road traffic. Therefore, identification of the zones sensitive to land slide has a great importance for the habitants of the area. The present study has been performed in this regard and for this Purpose, the two variables statistical method of the surface compaction has been used.

To this end. firstly, transmittal layer of the happened 31 sliding points at the catchment area were prepared as dependent variable and 8 layers influencing on the sliding occurrence like litho logy, slope, distance from road, distance from drainage, distance from habitats, skirt direction, skirt's morphology and land uses were prepared as independent variables. After wards, through over lapping and one by one cutting of agent maps with land slide distribution map dependently and separately, the land slide surface density at each class or category of the above factors were calculated. Then by combining and integrating the weight values of all layers with the assumption of the existence of a minimum correlation between each variable with the other, zoning map of land slide potential at 4 levels, zone with very high risk, zone with high risk, zone with medium risk and the zone with low risk were obtained. The results has shown that from the view point of lithology, the highest occurance of land slide have been on Goorpei and Radiolarit. In terms of slope, the slope level of %6- %18, from the view point of the skirts orientation, the skirts towards north east and from the view point of the skirt's form and land use, hill dale lands with convex, regular skirts covered by destructed chestnut forest, have allocated the greatest amount of land slide to themselves. But the most important result has been the following of the most density of sliding points up to radios 200m far from the road and drainage bed. Based on these results, about %65 of the lands of Javanrood catchment area has the potential of sliding with high and very high risk.

**Key words:** Zoning, Mass Movements, Two Variables Statistical Modle of Surface Compaction, Javanrood Catchment Area.

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### **Forecasting the Inundation of Kermanshah Plain by the Use of Geomorphology Maps**

In different floods, Special parts of Kermanshah plain goes under the water. Topography has the main role in this kind of inundation. In addition to this fact that the floods itself has played a role in production of such topography. It seems that the special changes made in this plain, has played a role in forming the effective topography in inundation. In this study, based on the field study and Arc JIS software, the geomorphology map was prepared in order to while understanding the role of changing processes in flood occurrence, a basis to be provided for preparing the forecast map. The results showed that in Kermanshah plain, parallel mounds, back lagoons and slots play a great role in flood absorption. But sedimentation which has occurred during rainy period of Pleistocene due to mud flows and channel erosion which shaped them later as mounds, are the main and important factor in distribution of waters at the time of flood occurrence. On this basis, for preparing flood forecasting maps, firstly the return period of floods were obtained by Hyfa software and then through questionnaires the areas covered by the water in different eras were extracted. Comparing these results together in Arc JIS shows the flood areas in different times. The results showed that in different flood return periods, the plains and hill sides does not go equally under water and at the river back shore, different flood lines distances from the river as heterogeneous.

**Key words:** Kermanshah Plain, Geomorphology, Ghare Soo River, Zoning, Flood.

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**Assessment of Geomorphologic Techniques for Identification of the Old and New Alluvial Cone for the Purpose of Specifying Susceptible Areas to Flood in Four Alluvial Cones in Folded Zagros**

In this study, in order to separate active and inactive parts of alluvial cones, four alluvial cones were studied in folded Zagros. Separation of active and inactive parts of alluvial cones from the view point of flooding has been conducted by simple indices of geomorphologic such as drainage pattern, morphology of the cone surface and serration index, color of cones in satellite images, maximum depth of cone shear and weathering indices such as the rate of alluvials weathering, pitting of time cobblestones. In order to specify the roughness and maximum shearing depth of cones' surface, by using surveying camera, two sections of each alluvial cones surface were prepared.

Separation of new and old parts of alluvial cones were conducted based on the colour of images and also specifying the drainage pattern of channels in new and old cones was performed based on the quick board satellite images. Also the study of weathering indices of the cones surfaces was carried out based on the field studies. The results obtained from this study show that the old or inactive cones often have convergence drainage pattern or tree network, while the new cones have mostly divergence, ramified and crossover drainage pattern. Inactive parts of cones have a darker color tone in comparing with the new cones in satellite images.

Morphology of the old cones surface (due to the dominance of aback erosion and spread of Bad Lands toward the upstream) is more roughness and has more serration in comparing with the ones. Generally, maximum rate of shear in old cones is more than the new cones. Also weathering indices including pittings in time particles are completely different in old and new cones, so that the inactive parts have more weathering and soluble features and therefore have a thicker soil in relation with the new cones. The recent study shows that geomorphologic indices are a proper tool for separation of active and inactive areas of alluvial cones from flooding point of view. Nonetheless due to the effect of factors such as tectonic, climatic changes, lithology of the cones' upstream catchment areas and area of the cones, it is not possible to use all the indices in each cone.

**Key words:** Alluvial Cone, Drainage Pattern, Geomorphology Indices, Weathering, Folded Zagros.

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**Evaluating the Accuracy and Efficiency of EPM, MPSIAC, Geomorphology  
and Hydro Physical Models for Estimating the Erosion and Sedimentation  
(Kasilian Representative Catchment Area in Mazandaran Province)**

Each year, thousand of tonnes of fertilized soil from different lands of the country including forest lands, pasture and agricultural lands becomes out of access due to erosion and accumulates in sedimentation areas which cause considerable damages. For the purpose of preventing and inhibit such phenomenon, it is required to distinguish the areas which produce sedimentation (under erosion) together with their intensity and amount, in order to be able to prepare the required and proper planning in the from of projects including soil protection or water shed treatment in addition to specifying the critical points. This requires having proper tools means having the method or modle for estimation of erosion and sedimentation with acceptable accuracy and efficiency. In this study, by selecting 4 modles of erosion and sedimentation estimate including EPM, MPSIAC, hydro physical and geomorphologic which during the earlier research conducted, mainly they have not been reviewed and compared with each other as a combined modle with the aim of identifying and introducing a proper modle along with the limitations of its use, has evaluated the modles at Kasilian catchment area. The results obtained from comparing the amount of sediments estimated or observed through comparing the amounts of absolute and relative difference show that the morphologic modle in spite of having some limitations from the view point of the volume of calculations which is due to the necessity of performing modle in homogenous working units, has a considerable accuracy and efficiency in comparing with the other three under testing models, so that geomorphologic modle with relative difference %3.36 (711.25 tones in a year) with respect to the average annual amount of observed sediment in comparing with the results of EPM/ MPSIAC and hydro physical modles with the average annual amount of observed sediment of %44.70, %7 and %30 respectively, would be the most appropriate modle with considerable accuracy and efficiency.

**Key words:** Soil Erosion, Sediment Production, EPM Modle, MPSIAC Modle, Geomorphologic Modle, Hydro Physical, Kasilian Catchment Area.

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**Exploration of Flood Zones and Physiographic and Quantitative  
Features of Daman Catchment Area by the Use of Geographic  
Information and Remote Sensing**

Daman catchment area with an area of 3437 km<sup>2</sup> is located in the south east part of Iran in Sistan & Baluchestan province. In this study, in order to determine and specify the specifications of Daman catchment area such as number of sub-catchment areas and their type, area circumference, shape, slope and focus time, while benefiting from a new method, by using GIS analytical functions and digit elevation modle (DEM) has been compared with traditional methods. ETM sensing images with having band information in the range of visible wave length separates the areas subject to flooding for having weak vegetation cover and also new sediments in river terraces. In this study, different band combinations from land sat ETM+ images for Daman catchment area and river was prepared. For this purpose, different hybrid methods (uncontrolled and visual) were studied. The results of the research indicate this fact that using satellite images is so useful for the areas with insufficient information and statistios about flood phenomenon, and by interpreting the images with high resolution, it is possible to identify and classify the vulnerable zone from flood.

**Key words:** GIS, RS Flood Zone, Daman Catchment Area, Sistan & Baluchestan.

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**Review the Efficiency Indices Resulting from Remote Sensing Technology  
in Evaluation of Meteorological Drought *Case study: Sefidroud Catchment area***

During the recent years, the drought with destructive effects in management of water resources, environmental, and ecology is considered as a serious crisis. Planning and preventive measures against the drought has a high importance in reducing its effects. In this respect, implementing the proper method of monitoring and drought forecasting can have a substantial effect to deal with this phenomenon. In this study, the information obtained from MODIS sensing images in extracting NDVI, NDWI,  $\frac{LST}{NDVI}$ , DSI, and VTCI indices have been used for

drought monitoring. The objective would be the selection of base index according to the factors associated with causing drought in Sefidroud catchment area for the review and study of drought and its effects.

The average defect obtained from the calculations of the earth surface temperature by the use of extended separate window algorithm developed by Price has been 3.84. The highest correlation coefficient between monthly rainfall with the under study indices is related to VTCI index. Also other under study indices except VTCI index has a time delay in comparing with the time of rain fall occurrence. The lowest value of correlation coefficient is related to NDVI index which can be due to the type of dominant vegetation cover in the area under study. Therefore, VTCI index because of incorporation thermal features (earth surface temperature) and the obtained information from spectral reflection (vegetation cover index) in the form of proper formulation can be more effective for determining the drought conditions (real time).

**Key words:** Drought, VTCI Index, Separate Window Algorithm, Sefidroud Catchment Area.

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### **Synoptic Analysis of Farin Colds of Iran**

One of the main branches of synoptic climatology is the identifying Farin modes, environmental specifications and determining their inducement circulation patterns.

The main objective of this research is the analysis of Farin colds in Iran. For this purpose, the daily statistics of the temperature related to 663 climatic and synoptic stations in the under study area, during the statistical period of 21, March 1962 up to 20 March 2003 (15701 days) were used. Then by the use of Keriking interpolation method with  $18 \times 18$  Km cells, a  $15701 \times 5214$  matrix was provided. The average of daily temperature for the given zone (5214 cells) was calculated during the understudy period. The days during which Farin colds has been occurred were recognized by Fomiyaki index. Then the data were ordered based on the cold severity and under cover spectrum. Among the days with Farin colds, the first 500 days were selected as the sample. The selected days were nearly as much as 2 standard deviations lower than their average long term based on Fomiyaki index. The amount of sea level pressure with time- location segregate of  $2.5 \times 2.5$  degree and 6 hours for 500 sample days were derived from Meteorology Organization and Oceanography of the United States of America. By cluster analyzing on Oglidos distances, the amount of sea level for 500 were selected which showed that Farin colds of Iran are the result of 5 circular patterns including: 1-high pressure pattern of Siberia- Europe, 2-High pressure pattern of Siberia, Low pressure pattern of Iceland, 3-High pressure pattern of Siberia, 4-High pressure pattern of North Caspian sea- Siberia, 5-High pressure pattern of Caspian Sea.

**Key words:** Synoptic Analysis, Farin Clods, Cluster Analysis, Iran.