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УДК 551.4

USING GIS FOR MONITORING LACUSTRINE ECOSYSTEM: A CASE STUDY OF LAGUNA DE GALLOCANTA, SPAIN

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Current research presents study of the hydrological characteristics in the surroundings of the Laguna de Gallocanta (Spain) using remote sensing methods and combination of two GIS: ArcGIS and Idrisi GIS. The methodology includes following workflow: 1) selection of the multi-temporal Landsat images and creating color composites; 2) Masking and overlaying study area out of the whole image; 3) Calculation of the direction and length of stream flow in the lake basin; 4) assessment of possible risks of floods and stability of coastal slopes. The research has aim of hydrological assessment testing GIS tools for environmental monitoring.

МОНИТОРИНГ ОЗЕРНЫХ ЭКОСИСТЕМ МЕТОДАМИ ГИС НА ПРИМЕРЕ ЛАГУНЫ ДЕ ГАЛЛОКАНТА, ИСПАНИЯ

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Работа представляет собой опыт изучения и моделирование гидрологических характеристик в окрестностях Лагуна-де-Галлоканта (Испания) с использованием данных дистанционного зондирования и комбинации ГИС: ArcGIS и Idrisi. Методология включает следующие работы этапы 1) выбор разновременных снимков Landsat и составление цветных композитов; 2) вырезание нужного района методом маскирования и перекрытия; 3) вычисление направления и длины водотоков в бассейне озера; 4) оценка возможных рисков наводнений и устойчивости береговых склонов. Работа имеет эколого-гидрологическую направленность и демонстрирует тестирование методов ГИС для целей природоохранного мониторинга.

Four Landsat images with a spatial resolution of 30 m were used in this study.

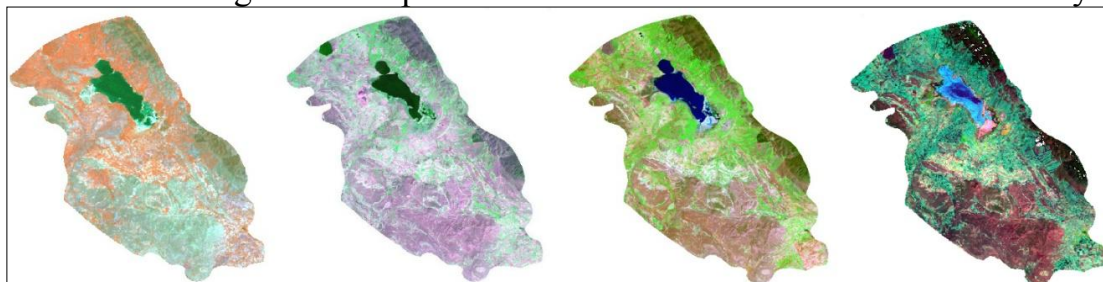


Fig.1. Color composites of the satellite images of the study area: laguna de Gallocanta. From left to right: 1) Landsat MSS Earth SAT (channels 2-1-4),

06/06/1976; 2) Landsat TM Earth SAT (channels 5-4-7), True colors, 14/04/87; 3) Landsat TM (channels 2-4-7), 20/04/92; Landsat ETM+ (channels 2-4-7) 30/07/2000.

The images are presented by Landsat ETM+, MSS and TM scenes acquired on years 1976, 1987, 1992 and 2000, respectively, with a cloud cover of 0% (Fig.1). The images were georeferenced in ArcGIS and rectified to the Grid Coordinate System using available vector layers.

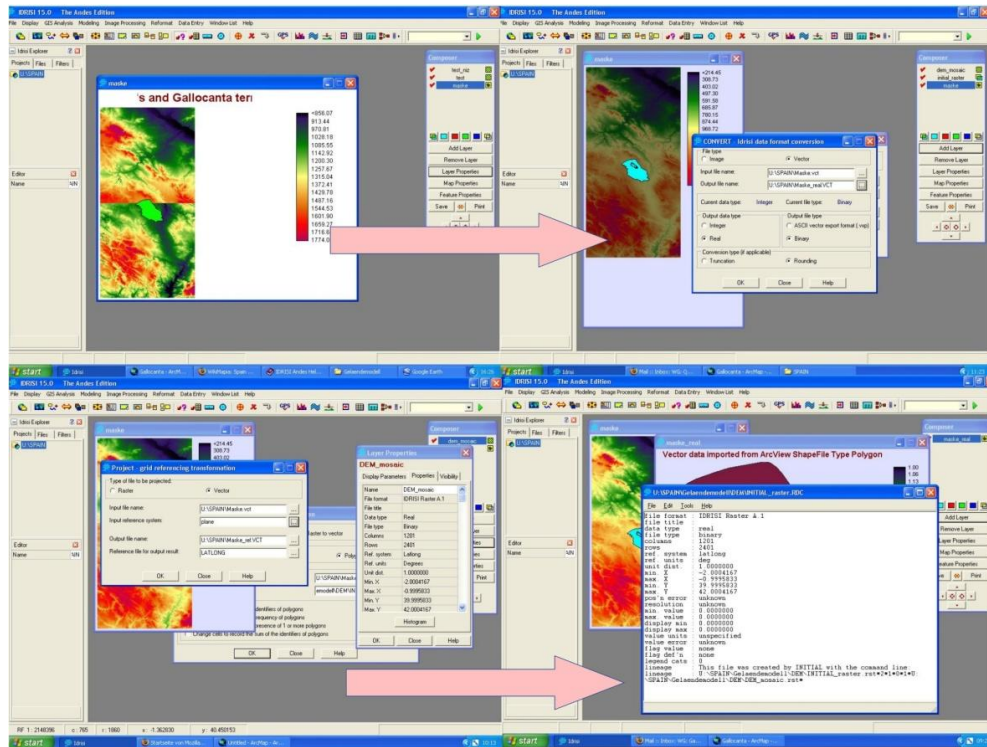


Fig. 2. Processing DEM Elevation Data in Idrisi GIS

The georeferenced rectified image was then re-projected to the UTM projection WGS84 datum. The combinations of various bands (channels 2-1-4, 5-4-7, and 2-4-7) were tested and visualized (Fig.1). Second step included processing DEM (Digital Elevation Model) Data acquired by the SRTM providing high quality elevation data (Fig.2). The pre-processing included mosaicing images and cutting out study area.

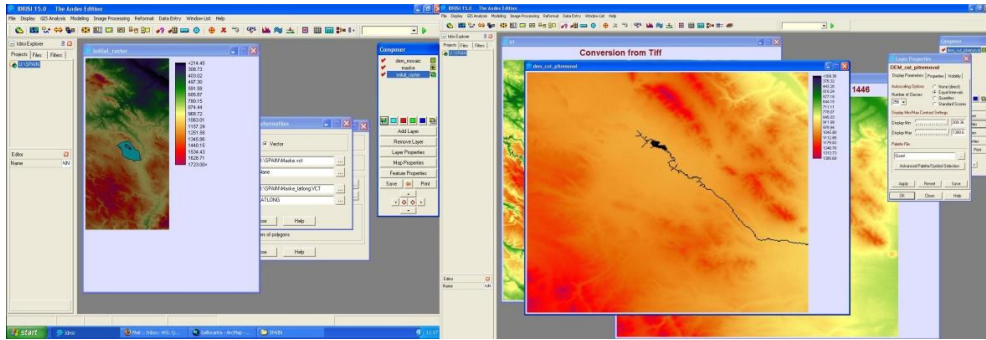


Fig. 3. Pit removal using Idrisi GIS

Furthermore, the hydrologically conditioning the DEM was performed: the elevations are modified in order to model flow directions. Modelling flow direction and flow accumulation was performed on the conditioned DEM using ArcGIS. The next step included extracting hydrologic features such as stream directions, length and basin extents from a DEM. The pit removal tool was used to remove error pits from a DEM (Fig.3). A pit is a sink, i.e. the lowest point of a depression with no water outlet. The used method of removing pits is the ArcGIS Fill tool which creates an adjusted DEM without depressions. The mosaic of the images was done using overlay and subtract one raster image using a mask of another (Fig.4).

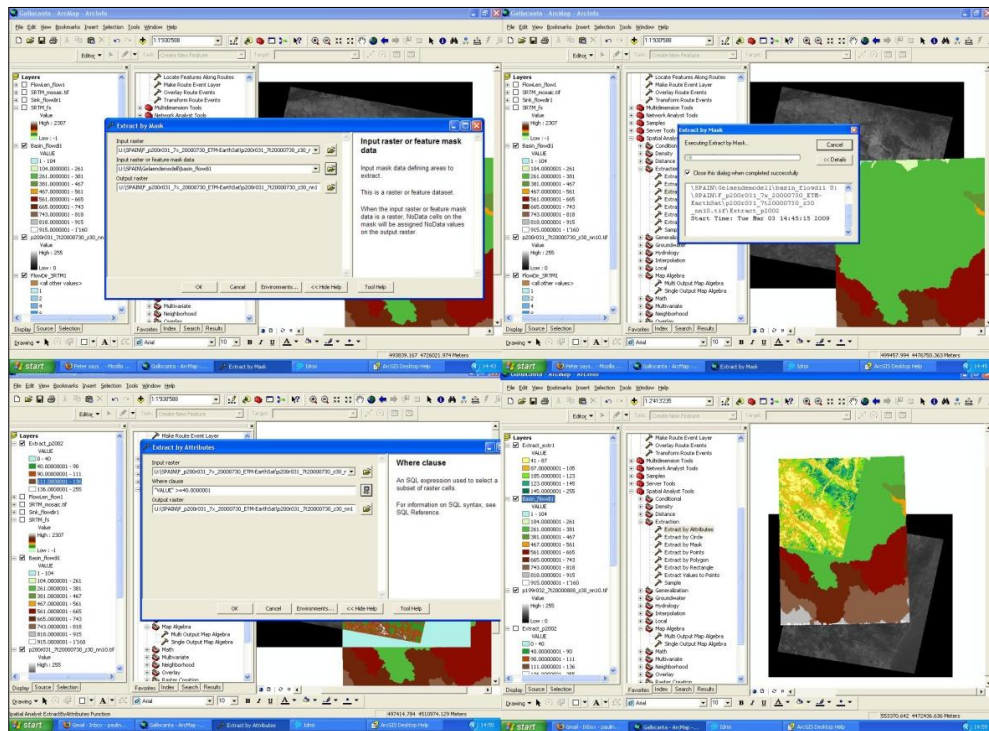


Fig. 4. Extracting necessary parts of the image using mask and Spatial Analysis.

Final step included calculations of the flow direction and flow length that demonstrate the direction of flow out of each cell. Finally, using Basin function all cells belonging to the watersheds of one or more target cells were calculated. The results shown that area has sensitive hydrological settings which explains its

prone to the environmental changes reported in various papers [1], [2], [3], [4]. The research demonstrated successful use of GIS for the purposes of hydrological modeling in the environmental studies.

The research has been done at the University of Basel, Institute of Geography using Swiss Government Excellence Scholarships for Foreign Scholars & Artists. Special thanks goes to Prof. N. J. Kuhn for his technical support during research.

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УДК 504.5:628.517

ЭКОЛОГИЧЕСКАЯ ОЦЕНКА ШУМОВОГО ЗАГРЯЗНЕНИЯ ПРИМАГИСТРАЛЬНЫХ И МЕЖМАГИСТРАЛЬНЫХ СЕЛИТЕБНЫХ ТЕРРИТОРИЙ Г. НОВОЧЕРКАССКА

**Луганская И.А., ФГБОУ ВО НИМИ имени А.К. Кортунова
Донской ГАУ, Новочеркасск, Россия**

Изложены результаты исследований по оценке шумового загрязнения селитебных территорий г. Новочеркаска, подвергающихся воздействию автотранспортного шума. На примагистральных и межмагистральных территориях выявлены зоны шумового дискомфорта.

ENVIRONMENTAL ASSESSMENT NOISE POLLUTION THE RESIDENTIAL AREAS ALONG THE STREET AND BETWEEN THE STREET OF NOVOCHERKASSK

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