APPLICATION OF REMOTE SENSING DATA TO MONITOR THE THERMAL POLLUTION FROM WASTE DISPOSAL SITES

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INTRODUCTION

The present work examines the case of the unregulated landfill, which is located on the territory of the city of Sofia, in close proximity to the residential districts of Mladost 4 and Gorublyane. The area on which an unregulated landfill is located is on groundwater, which can cause various environmental problems. Dumping of earth masses, construction and household waste has been observed for several months. According to the project, the surveyed territory was intended for a park. Inspections were carried out by the metropolitan municipality, but to date no measures have been taken.

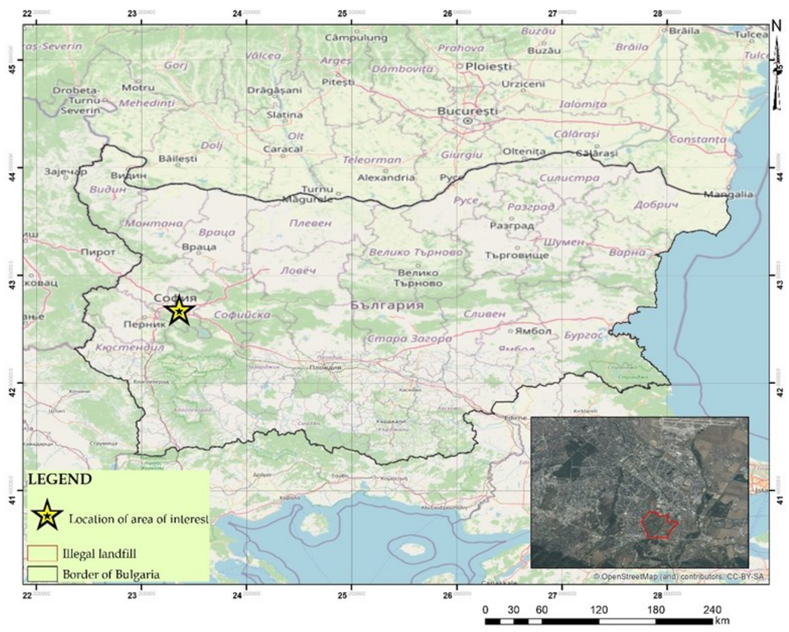

Fig.1 Location of area of interest, ESRI Open street map.

METHODS

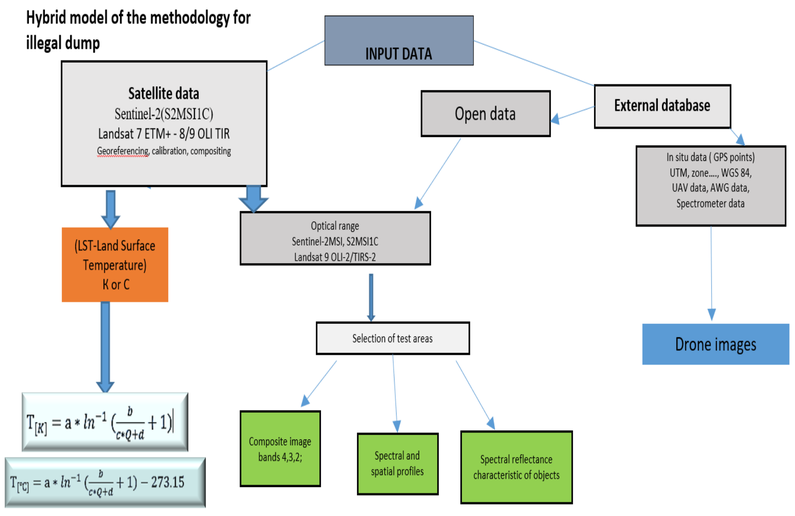

Fig. 2 Model methodology for heat island and heat pollution monitoring

RESULTS

The thermal radiation from an unregulated landfill is monitored. From the research done, it is noticed that the terrain was used for disposal of waste of different composition and origin already in 2012, when the construction of this part of the Mladost 4 district began (Fig. 3). Different satellite data from different years and seasons were used to process the images

Fig. 3 Illegal dump of Mladost 4, Source: Google earth, orthophoto from 2012

Sentinel 2 images used were transformed by tasseled cap. This model proves to be very effective in recognizing specific types of vegetation and their change over time. The unitary matrix of the Tasseled Cap transformation is fixed for each sensor. The use of TCT for satellite images results in a pure rotation and translation, thus the results obtained have a changed structure compared to the primary data, which allows for a clearer and more precise recognition and classification of the different components (soils, vegetation, water) from the land cover. After the segmentation of the satellite images, homogeneous clusters are obtained, which are clearly defined - brightness, greenness and wetness

Fig. 4 Different interpretation of illegal dump of 28.08.2015

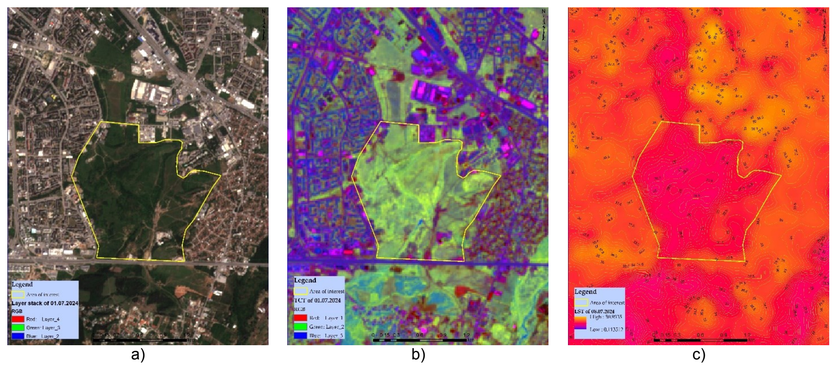

Fig. 5 Different interpretation of illegal dump for July, 2024

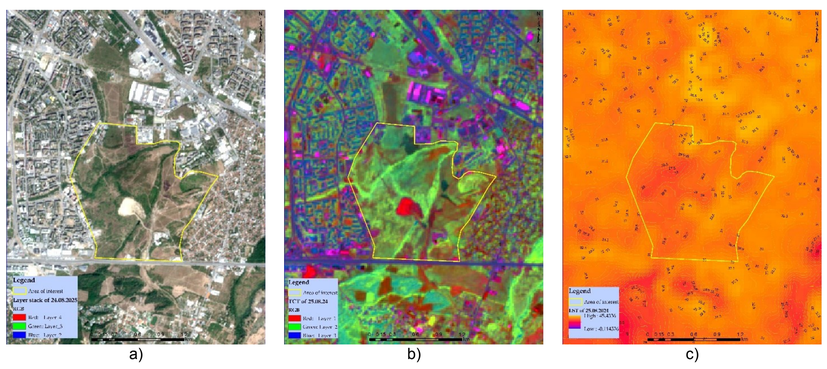

Fig. 6 Different interpretation of illegal dump of 25.08.2024

Fig. 7 Drone images

CONCLUSIONS

Analysis of LST data from Copernicus and Landsat shows an increase in temperature around the illegal dump, as well as an expansion of its boundaries as a local heat island. From the spectral profiles made, the optical indices (TCT) used and composite optical images in good and clear weather are a reliable source of information. From the methodology developed and the use of so many different sources of open data, correct and informed decisions can be made in environmental monitoring as well as management decisions at the local or regional level.