Cyprus University of Technology
Faculty of Engineering and Technology

Master's Thesis

Artificial farm lake detection using spectroradiometric and satellite data

Michalakis Christoforou

Limassol, March 2020

CYPRUS UNIVERSITY OF TECHNOLOGY

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING AND GEOMATICS

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Approval Form

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Presented by

Michalakis Christoforou

Supervisor: Dr. Diofantos Hadjimitsis, Professor

Signature _____

Member of the committee: Dr. Christos Danezis, Assistant Professor

Signature _____

Member of the committee: Dr. Phaedon Kyriakides, Professor

Signature _____

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ABSTRACT

Slurry lakes are increasing in Cyprus due to the increase of livestock farming especially those intended for meat production such as Pig farming. It is well known that Pig Slurry lakes have a huge environmental impact in the atmosphere and the ecosystem by releasing greenhouse gas and polluting nearby habitats with human and animal pathogens, heavy metals, biogenic elements and pharmaceuticals, respectively. Therefore, the detection, record and mapping of slurry lakes is essential for the environmental authorities as also the monitoring of fullness and / or the leaking of each lake especially during the raining season. Through this study we were able to detect pig slurry lakes using Sentinel-2 images processed into the Sentinel Application Platform (Snap). Slurry lake positions and areas similar to slurry lakes, such as Dams and Mine lakes, were detected, pined and analyzed using satellite and ground spectral signatures. Data revealed the ability to detect and distinguish slurry lakes using the vegetation index TSAVI. Due to their small size, irrigation lakes where not detectable as the images from Landsat and Sentinel have 30- and 20-meter spatial resolution. Furthermore, the use of Sentinel Hub EO browser allowed the instant monitoring of slurry lakes but also the elevation level of the slurry lakes during time, using time-lapse images and comparison of images, in combination with the false color Agriculture index. Our observation can be used by the state authorities for the real-time remote sensing monitoring of Slurry lakes.

Keywords: Slurry lakes, Sentinel-2, image processing, vegetation indices, Snap