Other Conference Item

How many small water reservoirs are there? A global survey using multi-spectral Imagery

Author(s):
Mady, Bassem; Lehmann, Peter; Or, Dani

Publication Date:
2018-04-09

Permanent Link:
https://doi.org/10.3929/ethz-b-000318917 →

Rights / License:
Creative Commons Attribution 4.0 International →

ETH Library

How many small water reservoirs are there? A global survey using multi-spectral Imagery

Bassem Mady, Peter Lehmann, and Dani Or
ETH Zurich, Environmental Systems Science, Switzerland (bassem.mady@usys.ethz.ch)

Climate variability and extreme droughts drive an increase in local water storage often too small to be accounted for in standard databases (>0.1 km3). In context of a study on evaporation suppression using floating covers, we seek to quantify the number and density of small water reservoir (1x10-6 to 1x10-3 km3) that would be prime candidates for such conservation method. Small-scale reservoirs have been contributing to securing water for local communities from the dawn of civilization in arid/ semi-arid regions and often used for irrigation, livestock and domestic use. The study employs remote sensing statistical sampling approach focusing on arid/semi-arid regions. We employed stratified sampling of 10% of the land using 10x10 km grid cells to identify water bodies in the ranges of 1000 to 20,000 m2 (identified automatically). The algorithm uses a normalized water index from surface reflectance of high-resolution (10m) multi-spectral Sentinel-2 satellite imagery immediately after the wet season for the region. The remote sensing algorithm was evaluated manually using Google Earth images for certain regions (e.g., Rajasthan, India). Preliminary results from various continents indicate that small scale reservoirs are used all over the globe with densities ranging between 10 and 80 reservoirs per 100 km2 and associates seasonal storage of 0.001 km3 per 100 km2 sampling cell (10 mm of equivalent "storage").