

ANNUAL MAPPING OF WATER SURFACES AT 25 CM IN A REGIONAL MONITORING CONTEXT

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ABSTRACT:

Annual monitoring of the surface water bodies regionally is capital for natural resource management and as their spatial patterns have a major impact on the local biodiversity conservation. The objective of this research is to map annually the water bodies automatically at 25-cm resolution over a large region (the Walloon Region in the South of Belgium has an area of 16 844 km²).

The paper proposes a combined pixel and object based approach applied on an annual aerial coverage in the red, green, blue and near infra-red channels. Due to the very fine resolution of the imagery (25 cm), classical method based on indices are not sufficient as the water bodies are frequently spectrally similar to shadows caused by topography and anthropic or natural features. Pixel based indices (NDVI, NDWI) have to be coupled with morphological techniques to benefit from local contrast features. Indeed, at this scale a confusion with features not problematic at lower resolution could lead to false detection. The proposed method is thus further combined with a segmentation to remove the shadows and takes advantage of previous year water bodies' dataset to derive an apriority water probability map that is iteratively refined. This allows obtaining a purer training dataset then used as input for classification.

The paper presents the results of an enhanced method for water bodies detection dedicated to a 25-cm resolution and describes the advantages, the limitations and the challenges related to the water bodies detection' at this scale.

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