An image-segmentation-based framework to detect oil slicks from moving vessels in the Southern African oceans using SAR imagery

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ABSTRACT:

Oil slick events caused due to bilge leakage/dumps from ships and from other anthropogenic sources pose a threat to the aquatic ecosystem and need to be monitored on a regular basis. An automatic image-segmentation-based framework to detect oil slick from moving vessels using spaceborne synthetic aperture radar (SAR) images over Southern African oceans was proposed. The study uses an automated threshold-based algorithm and a region-based algorithm to achieve a more efficient oil slick detection. The proposed framework consisted of two parts: First, a threshold-based method was used to detect areas with a high oil slick probability; second, a region-based method was used to extract the full extent of the detected oil slick. The proposed framework was tested on both real SAR and synthetic SAR images and was robust to intensity variations, weak boundaries, and was also more computationally efficient when compared to the region-based method without the threshold-based input.