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Ship Detection Requirements Analysis for Different Sea States: Validation on Real SAR Data

Authors : Jaime Martín-de-Nicolás, David Mata-Moya, Nerea del-Rey-Maestre, Pedro Gómez-del-Hoyo, María-Pilar Jarabo-Amores

Abstract : Ship detection is nowadays quite an important issue in tasks related to sea traffic control, fishery management and ship search and rescue. Although it has traditionally been carried out by patrol ships or aircrafts, coverage and weather conditions and sea state can become a problem. Synthetic aperture radars can surpass these coverage limitations and work under any climatological condition. A fast CFAR ship detector based on a robust statistical modeling of sea clutter with respect to sea states in SAR images is used. In this paper, the minimum SNR required to obtain a given detection probability with a given false alarm rate for any sea state is determined. A Gaussian target model using real SAR data is considered. Results show that SNR does not depend heavily on the class considered. Provided there is some variation in the backscattering of targets in SAR imagery, the detection probability is limited and a post-processing stage based on morphology would be suitable.

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