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Abstract : The launch of satellites equipped with sensors in the optical range of the electromagnetic spectrum has greatly facilitated the mapping and monitoring of coastal areas for risk prediction. Thus, the frequent updating of information for monitoring purposes is possible. It is, therefore, a modern alternative to traditional methods, namely, photogrammetry and in situ investigation. The objective of this work is to define an efficient and validated method for the detection and extraction of shoreline indicators. It is the first indication of validation for a satellite image classification approach, based on a deep learning algorithm, optimized and adapted to the extraction, a hydrodynamic and biological indicator of the shoreline. The convolutional neural network (CNN) architecture was designed and adapted in order to extract the target shoreline indicators. A Pleiades image of very high resolution was used, sliced into sub-regions, and analyzed by a convolution kernel of size 3*3. The classification results have revealed a very high accuracy of 92%. A validation process was undertaken by comparing the results to field surveys (reference) acquired on the same day as the satellite image acquisition. With a run-up (horizontal wave excursion) of 0.6 m, the confidence interval for the deep learning method was estimated to be ± 0.42 m, which is quite small, revealing the good accuracy of the method tested. A large panel of users could reproduce these methods in an automatic and standard way, which should allow the updating of a possible database shared between involved parties in an efficient way.

Key words : Convolutional neural network (CNN) ; Deep learningShoreline detectionHigh ; water level ; Marine lichen

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