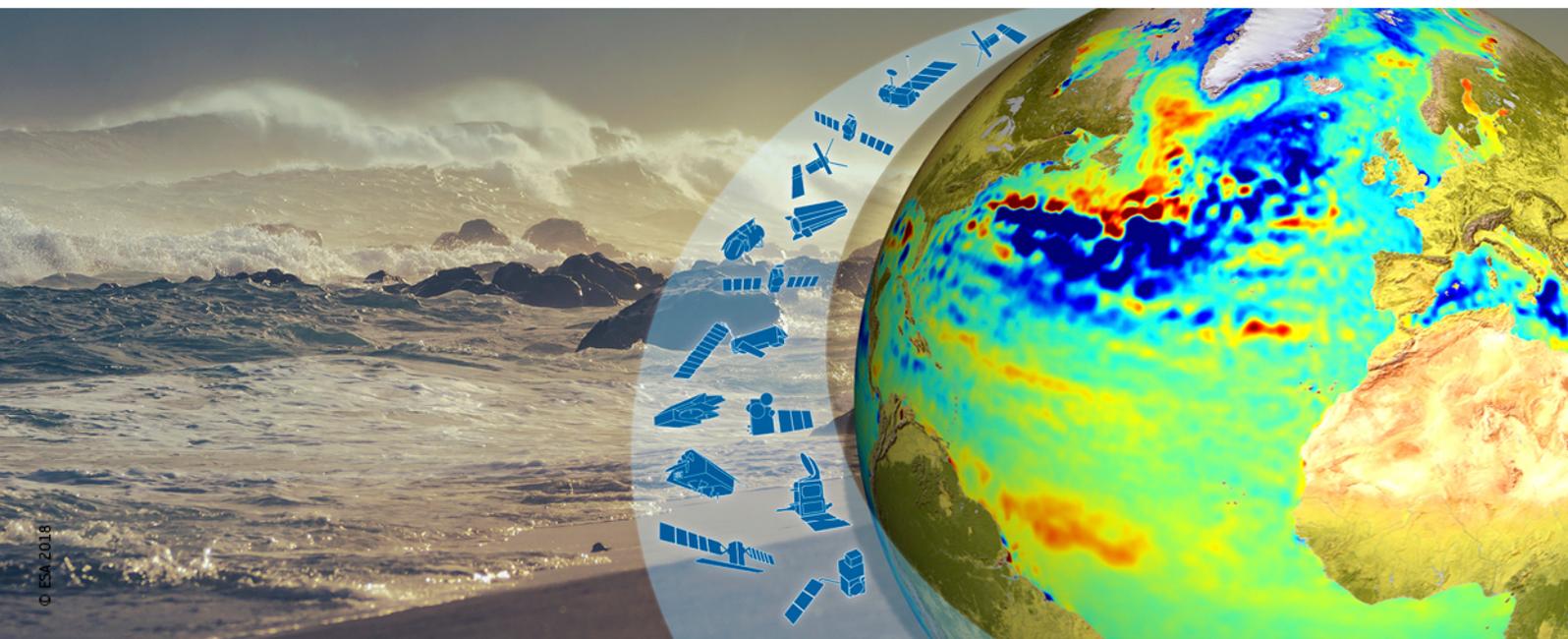


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ABSTRACT BOOK

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A new altimetry data validation approach based on Data Mining and Machine Learning techniques

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Data mining techniques allow scientists to extract and evaluate efficiently tendencies from large databases. In that context, the purpose of this study was to explore the potential of Data Mining and Machine Learning (ML) methods to assess the validity of altimetry measurements over ocean and compare their performances with the historical editing criteria.

Currently, the detection of spurious data in radar altimetry measurements relies on a legacy data editing method consisting in checking whether the value of several altimetric parameters is outside a validity domain defined by minimum and maximum thresholds. This historical editing method is described in the data user manuals and in the CALVAL reports of altimetric missions. It has been developed and used by the community of experts over the last 20 years.

Our study considered mainly clustering and classification techniques to assess the validity of 1 Hz SLA (Sea Level Anomalies) from 1 cycle of standard JASON-3 GDR data. A representative composite repeat cycle of data was created from data regularly sampled over one year, and the entire data set was manually annotated to produce a training and validation dataset. Unsupervised and supervised learning techniques were tested to compare their respective performances: PCA (Principal Component Analysis), Decision Trees, Random Forests, Logistic Regression, Support Vector Machines (SVM), and Naïve Bayes.

Filtering, standardization, principal component analysis and segmentation were applied to select discriminating parameters and to build reliable classifiers.

Finally, measurements validity was determined from their classification in specific groups. Confusion matrices, ROC curves and other performance indicators such as precision, recall, F-score were produced for validation purposes in order to compare the performances of the standard "editing" criterion with the ML methods. The first conclusions of our work highlight a correct classification with unsupervised learning models as well as the excellent performances of the supervised models. The best performance was obtained with the Random Forests, with 99.3% of data correctly classified

Remote Sensing as Data Source for a Generalized Micrometeorological Simulation and its Application in the Context of a Coastal River Basin Restoration

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We present results of a voxel-based micrometeorological model for urban environments that we developed coupling several simple simulations of atmospheric transmittance, cloud cover, atmospheric optics, heat transfer and a wind flow model based on lattice-Boltzmann methods with specially tailored boundary conditions. Joint use of available public local datasets and satellite data is demonstrated. The initial test case is for a volumetric 4 m grid covering the coastal city of Corunna (Spain) as mean to evaluate environmental comfort for pedestrians.

This model is being extended and runs are shown along with derived indices demonstrating the characterization of some aspects of the Monelos river's basin restoration.

The EO4Atlantic Pathfinder Regional Exploitation Platform

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In 2014, the European Space Agency (ESA) launched the Earth Observation (EO) Exploitation Platforms (EPs) initiative, a set of R&D activities that in the first phase aimed to create an ecosystem of interconnected Thematic Exploitation Platforms (TEPs). Each TEP addresses a particular stakeholder sector, such as forestry or hydrology. This initiative was extended in 2016 to include the development of Regional Exploitation Platforms (REPs), where each REP is concerned with the provision of multi-thematic information services focused on a particular geographic region. The EO4Atlantic REP was a pathfinder project tasked with the identification and assessment of requirements to support a full implementation of a REP focused on the Atlantic region.

EO4Atlantic addressed three canonical use case scenarios; access to and manipulation of large EO datasets, access to existing customized information services, and development of customized information services. Phase 1 began in November 2016, and was concerned with user requirements definition for an Atlantic REP, along with a review of current software