



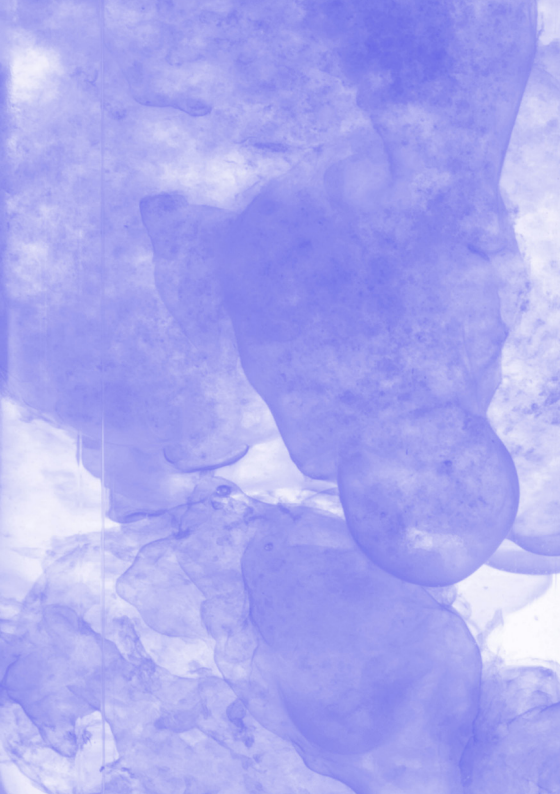
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# Section Earth Sciences



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# Selected Papers

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## Use of Machine Learning and Remote Sensing Techniques for Shoreline Monitoring: A Review of Recent Literature

**Authors:** Chrysovalantis-Antonios D. Tsiakos and Christos Chalkias

**Abstract:** Climate change and its effects (i.e., sea level rise, extreme weather events) as well as anthropogenic activities, determine pressures to the coastal environments and contribute to shoreline retreat and coastal erosion phenomena. Coastal zones are dynamic and complex environments consisting of heterogeneous and different geomorphological features, while exhibiting different scales and spectral responses. Thus, the monitoring of changes in the coastal land classes and the extraction of coastlines/shorelines can be a challenging task. Earth Observation data and the application of spatiotemporal analysis methods can facilitate shoreline change analysis and detection. Apart from remote sensing methods, the advent of machine learning-based techniques presents an emerging trend, being capable of supporting the monitoring and modeling of coastal ecosystems at large scales. In this context, this study aims to provide a review of the relevant literature falling within the period of 2015–2022, where different machine learning approaches were applied for cases of coast-line/shoreline extraction and change analysis, and/or coastal dynamic monitoring. Particular emphasis is given on the analysis of the selected studies, including details about their performances, as well as their advantages and weaknesses, and information about the different environmental data employed.

<https://doi.org/10.3390/app13053268>



## Seismic Exploration Methods for Structural Studies and for Active Fault Characterization: A Review

**Author:** Pier Paolo G. Bruno

**Abstract:** In this paper, seismic exploration methods are reviewed with a particular emphasis on the use of the reflection seismology to investigate the subsurface structures and characterize active faults. The paper provides a descriptive overview, intended for a non-specialist audience, of the methods and of their recent developments aimed at improving the resolution, accuracy, and computational efficiency of seismic imaging. Techniques such as seismic ray tomography, full-waveform inversion and pre-stack depth migration are briefly introduced, highlighting their potential applications in structural geology studies. The main seismic attributes that have become increasingly important in the interpretation of faults and fractures are also presented, along with some examples of application. Finally, some case studies of active fault characterization are discussed. From these examples, the crucial role played nowadays by the seismic exploration methods for structural studies and for active fault characterization is evident.

<https://doi.org/10.3390/app13169473>



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## Review of Photogrammetric and Lidar Applications of UAV

**Authors:** Ludovít Kovanič, Branislav Topitzer, Patrik Petovský, Peter Blišťan, Marcela Bindzárová Gergeľová and Monika Blišťanová

**Abstract:** Using Unmanned Aerial Vehicles (UAVs) combined with various sensors brings the benefits associated with fast, automatic, and contactless spatial data collection with high resolution and accuracy. The most frequent application is the possibility of effectively creating spatial models based on photogrammetric and lidar data. This review analyzes the current possibilities of UAVs. It provides an overview of the current state of the art and research on selected parameters regarding their history and development, classification, regulation, and application in surveying with creating spatial models. Classification and regulation are based on national sources. The importance and usability of this review are also carried out by analyzing the UAV application with selected photogrammetric and lidar sensors. The study explores and discusses results achieved by many authors in recent years, synthesizing essential facts. By analyzing the network of co-occurring High-Frequency Words, in addition, we visualized the importance of the primary keyword UAV in the context of other keywords in the literary sources processed.

<https://doi.org/10.3390/app13116732>



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## Identifying Original and Restoration Materials through Spectroscopic Analyses on Saturnino Gatti Mural Paintings: How Far a Noninvasive Approach Can Go

**Authors:** Letizia Bonizzoni, Simone Caglio, Anna Galli, Chiara Germinario, Francesco Izzo and Donata Magrini

**Abstract:** This paper presents the results obtained for the mural paintings (XV century CE) in the church of San Panfilo in Villagrande di Tornimparte (AQ, Italy) by means of noninvasive spectroscopic techniques; this research is a part of the project on the Saturnino Gatti pictorial cycle, promoted and coordinated by the AIAr (the Italian Archaeometry Association). Digital optical microscopy (OM), X-ray fluorescence spectroscopy (XRF), fiber optics reflectance spectroscopy in the UV-Vis-NIR range (FORS), Fourier transform infrared spectroscopy in the external reflection mode (ER-FTIR), and Raman spectroscopy were performed on the points selected based on the image analysis results and the few available records on previous intervention, with the aim of characterizing both the original and restoration organic and inorganic materials. The synergic application of complementary techniques allowed us to obtain a complete picture of the palette and the main alteration products and organic substances (of rather ubiquitous lipid materials and less widespread resin and proteinaceous materials in specific points). The identification of modern compounds permitted the individuation of restoration areas; this was confirmed by the comparison with multiband imaging results, as in the case of specific green and blue pigments, strictly related to the presence of high signals of zinc.

<https://doi.org/10.3390/app13116638>

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Guest Editors: Prof. Dr. Wen Nie, Prof. Dr. Yanlong Chen and

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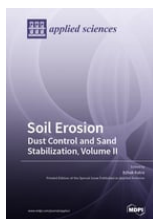
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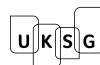
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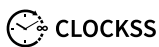
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