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remote sensing

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Editorial

Special Issue "Remote Sensing in Applied Geophysics"

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The Special Issue "Remote Sensing in Applied Geophysics" is focused on recent and upcoming advances in the combined application of remote sensing and applied geophysics techniques, sharing the advantages of being non-invasive research methods, suitable for surface and near-surface high-resolution investigations of even wide and remote areas.

Applied geophysics analyzes the distribution of physical properties in the subsurface for a wide range of geological, engineering and environmental applications at different scales. Geophysical surveys are usually carried out deploying or moving the appropriate instrumentation directly on the ground surface. However, recent technological advances have brought to the development of innovative acquisition systems more typical of the remote sensing community (e.g., airborne surveys and unmanned aerial vehicle systems). At the same time, while applied geophysics mainly focuses on the subsurface, typical remote sensing techniques have the ability to accurately image the Earth's surface with high-resolution investigations carried out by means of terrestrial, airborne, or satellite-based platforms. The integration of surface and subsurface information is often crucial for several purposes, including the georeferencing and processing of geophysical data, the characterization and time-lapse monitoring of surface and near-surface targets, and the reconstruction of highly detailed and comprehensive 3D models of the investigated areas.

Contributions to the issue showing the added value of surface reconstruction and/or monitoring in the processing and interpretation of geophysical data, integration and cross-comparison of geophysical and remote sensing techniques were required to the research community. Contributions discussing the results of pioneering geophysical acquisitions by means of innovative remote systems were also addressed as interesting topics.

The Special Issue received great attention in the combined community of applied geophysicists and remote sensing researchers. A total of 15 papers are included in the Special Issue, covering a wide range of applications. This is one of the highest number of papers among the *Remote Sensing* Special Issues, showing great interest in the proposed topic. The relevant number of contributions also highlights the relevance and increasing need for integration between remote sensing and ground-based geophysical exploration or monitoring methods.

In particular, one of the main fields of research showing the potential integration of the geophysical and remote sensing techniques is archaeological exploration. Indeed, archaeologists often use near-surface geophysics or remote sensing in their research. However, these surface and near-surface data are rarely integrated to offer a robust understanding of the complex historical setting characterizing archaeological sites. Several research efforts need therefore to be addressed to reach a more efficient integration of the techniques in the archaeological field. In this Special Issue, research efforts are particularly related to: integrating aerial and terrestrial remote sensing programs to identify different uses of archaeological sites through time and across space [1]; building high-resolution maps of electrical resistivity using computer-assisted and remote sensed acquisition tools [2]; multidisciplinary

integration of remote sensing and archaeological data with electric resistivity tomography and frequency domain electromagnetic measurements to provide new useful and interesting information for archaeologists [3].

Several research efforts were also devoted to the development of innovative acquisition systems integrating remote sensing and geophysical techniques with a precise georeferencing of the acquired data. These contributions are related to: the development of innovative low-cost autonomous vehicles for geological/geophysical studies of shallow water environments [4]; efficient acquisition of frequency domain electromagnetic data with a specifically designed georeferenced wooden carriage to allow for integration with other remote sensing data [5]; automated resistivity profiling with constant GPS referencing and combined Digital Terrain Model to obtain correct data positioning and topographic reconstruction [2].

The integration of remote sensing and applied geophysics techniques has also been applied in environmental and geomorphological conditions of test sites requiring special attention. This can be the case of wide research areas, where the integration of localized geophysical data and wide remote sensing imagery is essential for a more accurate reconstruction of the environment, particularly in the hydrogeological framework [6,7], or in remote areas where acquisition and interpretation of geophysical measurements is challenging and feasible only with the help of remote sensing approaches. This is particularly true for the cryosphere, e.g., inland glaciers [8] and Antarctic ice sheet [9], or for the exploration of other planets and satellites [10]. In this last context, remote sensing techniques clearly play a major role in the effective acquisition of geophysical data.

The abovementioned applications appear to be the research fields where an effort in the integration of remote sensing and geophysical methodologies can be more successful, resulting in an increased comprehension of the investigated sites and in the improved efficiency of the combined surveys. Other papers in the Special Issue could nevertheless suggest additional interesting development topics; this is the case for papers focusing on the combination of geodetic and seismological observations for an increased understanding of local subsidence events [11] or wider scale post-seismic deformations [12].

As a conclusion, we can foresee a growing interest in the collaboration between the research communities of remote sensing and applied geophysics, with many potential overlapping research topics and undeniable benefits in the integration of different research approaches. Particularly, remote sensing data and data acquisition approaches are still of great interest and support for applied geophysics researchers since they can further help in the correct georeferencing of the acquired geophysical data and in a better comprehension of the test site settings, which could significantly improve the interpretation of geophysical evidence.

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References

1. Henry, E.R.; Wright, A.P.; Sherwood, S.C.; Carmody, S.B.; Barrier, C.R.; Van de Ven, C. Beyond Never-Never Land: Integrating LiDAR and Geophysical Surveys at the Johnston Site, Pinson Mounds State Archaeological Park, Tennessee, USA. *Remote Sens.* **2020**, *12*, 2364. [CrossRef]
2. Piroddi, L.; Calcina, S.V.; Trogu, A.; Ranieri, G. Automated Resistivity Profiling (ARP) to Explore Wide Archaeological Areas: The Prehistoric Site of Mont'e Prama, Sardinia, Italy. *Remote Sens.* **2020**, *12*, 461. [CrossRef]

3. Deiana, R.; Vicenzutto, D.; Deidda, G.P.; Boaga, J.; Cupitò, M. Remote Sensing, Archaeological, and Geophysical Data to Study the Terramare Settlements: The Case Study of Fondo Paviani (Northern Italy). *Remote Sens.* **2020**, *12*, 2617. [CrossRef]
4. Stanghellini, G.; Del Bianco, F.; Gasperini, L. OpenSWAP, an Open Architecture, Low Cost Class of Autonomous Surface Vehicles for Geophysical Surveys in the Shallow Water Environment. *Remote Sens.* **2020**, *12*, 2575. [CrossRef]
5. Cassiani, G.; Bellizia, E.; Fontana, A.; Boaga, J.; D'Alpaos, A.; Ghinassi, M. Geophysical and Sedimentological Investigations Integrate Remote-Sensing Data to Depict Geometry of Fluvial Sedimentary Bodies: An Example from Holocene Point-Bar Deposits of the Venetian Plain (Italy). *Remote Sens.* **2020**, *12*, 2568. [CrossRef]
6. Gaber, A.; Mohamed, A.K.; ElGalladi, A.; Abdelkareem, M.; Beshr, A.M.; Koch, M. Mapping the Groundwater Potentiality of West Qena Area, Egypt, Using Integrated Remote Sensing and Hydro-Geophysical Techniques. *Remote Sens.* **2020**, *12*, 1559. [CrossRef]
7. Vacilotto, A.; Deiana, R.; Mozzi, P. Understanding Ancient Landscapes in the Venetian Plain through an Integrated Geoarchaeological and Geophysical Approach. *Remote Sens.* **2020**, *12*, 2973. [CrossRef]
8. Colombero, C.; Comina, C.; De Toma, E.; Franco, D.; Godio, A. Ice Thickness Estimation from Geophysical Investigations on the Terminal Lobes of Belvedere Glacier (NW Italian Alps). *Remote Sens.* **2019**, *11*, 805. [CrossRef]
9. Cui, X.; Greenbaum, J.S.; Lang, S.; Zhao, X.; Li, L.; Guo, J.; Sun, B. The Scientific Operations of Snow Eagle 601 in Antarctica in the Past Five Austral Seasons. *Remote Sens.* **2020**, *12*, 2994. [CrossRef]
10. Dong, Z.; Feng, X.; Zhou, H.; Liu, C.; Zeng, Z.; Li, J.; Liang, W. Properties Analysis of Lunar Regolith at Chang'E-4 Landing Site Based on 3D Velocity Spectrum of Lunar Penetrating Radar. *Remote Sens.* **2020**, *12*, 629. [CrossRef]
11. Ilieva, M.; Rudziński, Ł.; Pawłuszek-Filipiak, K.; Lizurek, G.; Kudłacik, I.; Tondaś, D.; Olszewska, D. Combined Study of a Significant Mine Collapse Based on Seismological and Geodetic Data— 29 January 2019, Rudna Mine, Poland. *Remote Sens.* **2020**, *12*, 1570. [CrossRef]
12. Lv, X.; Amelung, F.; Shao, Y.; Ye, S.; Liu, M.; Xie, C. Rheology of the Zagros Lithosphere from Post-Seismic Deformation of the 2017 Mw7.3 Kermanshah, Iraq, Earthquake. *Remote Sens.* **2020**, *12*, 2032. [CrossRef]

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