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Editorial note

Advancements in Applied Geoinformatics

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Benefiting from continuous advances in measurement techniques, multi-sensor coupling, and data accessibility, geoinformatics methods are playing an increasingly important role in earth and environmental studies. With further advancements in data processing algorithms and hardware's computational efficiency, new opportunities for geospatial data and products have been yielded. These, in turn, stimulate the creation of new markets and spur the scientific community to compete in further innovations. Considering the GNSS technology as an example, even with low-cost sensors, it is now achievable to provide precise positioning to support a broad scope of applications ranging from personal navigation through transportation to mapping, surveying, and geohazard monitoring.

A recurring *International Symposium on Applied Geoinformatics* conference serves as a focus for the scientific community to disseminate scientific developments and novel applications in the field. The most recent meeting was held on December 2–3, 2021, at the University of Latvia in Riga. The Symposium provided an international forum for exchanging ideas and generating knowledge on the latest developments in all aspects of geoinformatics theory and applications. With such background, this topical collection was designed to foster a discussion on the recent progress in applied geodesy, remote sensing, geomatics, and related applications.

This topical collection gathers eight papers approaching a wide range of geomatics applications, such as data processing algorithms, structural health and seismicity studies, monitoring of water storage variations, GNSS positioning, simplification of the object's geometry in map generalization, and UAV photogrammetry (Fig. 1). After a comprehensive review process, all the accepted articles exhibit high novelty with an emphasis on employing geoinformatics methods and data.

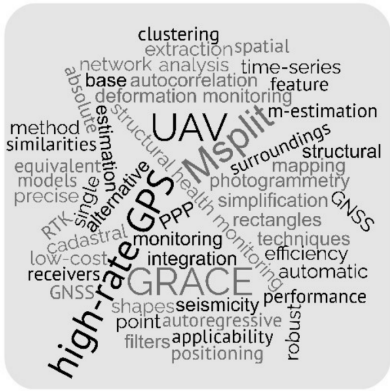

Fig. 1. Word cloud of the topics of this Special Collection

Two collection papers discussed selected aspects of robust estimation employed in geodetic and geospatial data processing. As a result, further advances to the well-known Msplit estimation method are provided. Duchnowski and Wyszkowska (2022) introduce the absolute Msplit estimation and prove its effectiveness in outlying observation handling, which is especially beneficial in measurement techniques, such as high-rate GNSS or LiDAR, providing a lot of data for deformation monitoring applications. In Wyszkowska and Duchnowski (2022), the novel approach has been confronted with the squared Msplit estimation, considered the first and basic variant.

In Kwinta and Bac-Bronowicz (2022), the authors present a novel solution to address the problems of map generalization in cartography. Specifically, based on three case studies, methods for replacing real-world objects with equivalent rectangles have been proposed and evaluated.

The other two papers address the problems of geohazard and structural health monitoring. Regarding the former research area, the goal of the study by Perihanoglu et al. (2022) is to analyze the spatial patterns of high-energy earthquakes that occurred in the Van province of Iran. The latter subject has, in turn, been investigated in Topal and Akpinar (2022), where the performance of single baseline and network GNSS RTK positioning has been assessed. The authors show that RTK techniques can effectively characterize structural behavior and detect natural frequencies of dynamic displacements through designed experiments based on shake-table simulations.

Karabulut et al. (2022) aim to fill a gap in Precise Point Positioning and assess the method performance based on GNSS observations acquired by selected low-cost receivers. The authors conclude that the current low-cost GNSS receivers might offer positioning performance close to that of the high-grade ones.

A novel application area of integrated Unmanned Aerial Vehicle (UAV) photogrammetry supported with automatic feature extraction has been presented by Ajayi and Oruma (2022). The authors verify the applicability of UAV photogrammetry for cadastral mapping and prove that it offers considerable benefits in terms of time and cost of data collection and processing.

Lastly, an article by Gunes and Aydin (2022) tackles the challenging task of modeling the noise in an Equivalent Water Thicknesses (EWT) time series derived from the Gravity Recovery and Climate Experiment (GRACE) mascon. In particular, the authors employed autoregressive noise modeling and showed its advantages compared to the typical GRACE EWT time series analysis approaches.

We offer special thanks to the authors who contributed to this topical collection of Advances in Geodesy and Geoinformation. We anticipate their contributions will lead to significant innovations in geomatics applications and spark further journal development. We also express our gratitude to the distinguished referees who guided the authors to enhance their manuscripts with their professional reviews. Lastly, we are grateful to the Editor-in-Chief, Thematic Editors, and the International Advisory Board of Advances in Geodesy and Geoinformation for their professional support while editing this topical collection.

Author contributions

Writing – original draft: J.P.; writing – review and editing: D.U.S., J.P.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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References

Ajayi, O.G., and Oruma, E. (2022). On the applicability of integrated UAV photogrammetry and automatic feature extraction for cadastral mapping. *Advances in Geodesy and Geoinformation*, 71(1), e19. DOI: 10.24425/GAC.2022.141172.

Duchnowski, R., and Wyszkowska, P. (2022). Absolute Msplit estimation as an alternative for robust M-estimation. *Advances in Geodesy and Geoinformation*, 71(1), e17. DOI: 10.24425/GAC.2022.141170.

Gunes, O., and Aydin, C. (2022). Applying autoregressive models in analysis of GRACE-Mascon time-series. *Advances in Geodesy and Geoinformation*, 71(2), e25. DOI: 10.24425/AGG.2022.141299.

Karabulut, M.F., Aykut, N.O., Akpınar, B. et al. (2022). The positioning performance of low-cost GNSS receivers in the Precise Point Positioning method. *Advances in Geodesy and Geoinformation*, 71(2), e29. DOI: 10.24425/AGG.2022.141916.

Kwinta, A., and Bac-Bronowicz, J. (2022). Simplification of 2D shapes with equivalent rectangles. *Advances in Geodesy and Geoinformation*, 71(1), e14. DOI: 10.24425/GAC.2022.141167.

Perihanoglu, G.M., Bilginer, Ö., and Akyel, E. (2022). Clustering analysis of the seismicity of Van Province and its surroundings via spatial autocorrelation techniques filters. *Advances in Geodesy and Geoinformation*, 71(2), e24. DOI: 10.24425/AGG.2022.141298.

Topal, G.O., and Akpinar, B. (2022). The efficiency of single base and network RTK for Structural Health Monitoring. *Advances in Geodesy and Geoinformation*, 71(2), e28. DOI: 10.24425/AGG.2022.141302.

Wyszkowska, P., and Duchnowski, R. (2022). Two variants of Msplit estimation – similarities and differences. *Advances in Geodesy and Geoinformation*, 71(1), e22. DOI: 10.24425/GAC.2022.141175.