

# Proceedings

IJCAI-ECAI Workshop

CDCEO 2022

*Second Workshop on Complex Data Challenges  
in Earth Observation*

*July 25, 2022, Vienna, Austria*

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<https://www.iarai.ac.at/cdceo2022>

## Preface

The present volume collects the proceedings of the CDCEO'22 - 2nd Workshop on Complex Data Challenge in Earth Observation which was held in conjunction with IJCAI-ECAI 2022, the 31st International Joint Conference on Artificial Intelligence and the 25th European Conference on Artificial Intelligence on the 25th of July 2022 in Vienna, Austria. The aim of the CDCEO workshop series is to bring together a range of domain experts from AI, big data, remote sensing, computer vision, spatio-temporal data processing, geographic information systems, and weather and climate modelling, as well as other scientists or engineers with a general interest in the application of modern data analysis methods within the Earth observation (EO) domain. CDCEO is the first workshop that is fully dedicated to all relevant aspects of AI in the EO community whose scopes are comprehensive and not bound to a specific application or a specific type of EO data.

The big data accumulating from remote sensing technology in ground, aerial, and satellite-based Earth observation has radically changed how we monitor the state of our planet. Advanced EO sensors nowadays generate rich streams of data around the clock. Using recent techniques from signal processing and machine learning allows for an effective interpretation of such complex datasets. The ever-growing availability of high-resolution remote sensing data increasingly confronts researchers with the unique machine learning challenges posed by characteristic heterogeneity and correlation structures in these data. Data collections are typically multi-source, multi-scale, and have isometric representations. The multi-dimensional measurements over time reflect dynamic states with complex interdependencies. A better understanding of these will aid both short- and long-term progress in Earth system research. The latest generation of optical sensors features high spatial resolution and high temporal collection frequencies, allowing the application of modern data-hungry methods characteristic of AI. CDCEO'22 thus covers advances in both method development and applications in a wide range of related areas, including satellite image processing, super-resolution, gap-filling, high-resolution prediction of spatio-temporal features, and detection of rules underlying the observed state transitions and causal relationships.

This year the CDCEO'22 workshop was also hosting the Landslide4sense data analysis competition. The competition introduced a large-scale multi-modal globally distributed benchmark dataset with more than 5000 patches on landslide detection and organised a data analysis competition around it. The competition aimed to promote innovative algorithms and ideas for automatic landslide detection using globally distributed remotely sensed images, as well as to provide objective and fair comparisons among different methods.

The CDCEO'22 workshop attracted authors from 15 different countries around the world who submitted contributed papers presenting a broad range of topics related to data analysis challenges in Earth observation. The review process was carried out by a multidisciplinary

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team of 17 members of the Programme Committee with the help of external reviewers. Each paper was subjected to at least two independent reviews. After the peer-review process 12 high quality papers were selected for publication in the regular track of the CDCEO'22 proceedings and 4 papers were selected for publication in the Landslide4sense competition track of the CDCEO'22 proceedings. We here express our deepest gratitude to all members of the Programme Committee and the Associate Reviewers for their time, effort, and invaluable contribution to the success of the conference, ensuring that the excellence of the scientific programme is maintained. We further acknowledge all those who contributed to the organisation of the conference, and we are particularly grateful to the members of the Steering Committee and Organising Committee for their dedication, support, and the time that they devoted to making this event a success.

Special thanks goes to our distinguished keynote speakers who enriched the workshop with their inspiring talks presenting the latest advances and developments in the application of AI and ML methods to the field of Earth observation.

Finally, we thank all the authors for submitting their high-quality work, and we wish to express our appreciation to the workshop participants for their valuable contributions to the fruitful and inspiring discussions during the workshop. We are delighted that participants took full advantage of the opportunity to interact, network, and connect with members of the community.

July, 2022

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