Preface

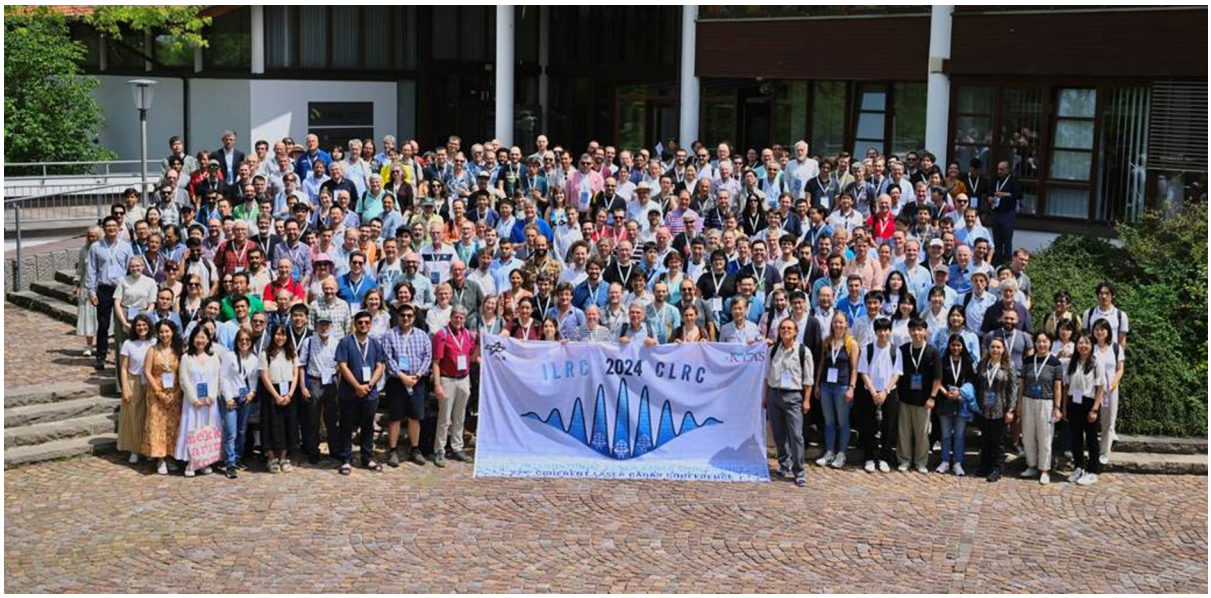
Proceedings of the 31st International Laser Radar Conference (ILRC 31) / 22nd Coherent Laser Radar Conference (CLRC 22)

The 31st International Laser Radar Conference (ILRC 31) was held jointly with the 22nd Coherent Laser Radar Conference (CLRC 22). in Landshut, Bavaria, Germany, from June 23 to 28, 2024, The meeting was hosted by the German Aerospace Center (DLR).

Light Detection and Ranging (Lidar) technologies are at the forefront of active remote sensing and atmospheric profiling. These techniques offer unique advantages, including high spatial and temporal resolution, day- and nighttime operation, and sensitivity to polarization and frequency. Today, lidars are operating on ground, onboard aircraft, and in space. Lidar networks are expanding, and lidar instruments are operated all over the world for the benefit of Earth system science and society. Beyond stand-alone lidar applications, the integration of lidar measurements with other passive and active sensing systems—such as visible/near-infrared and microwave radiometry, as well as radar—has enabled the development of enhanced, value-added remote sensing products.

The International Laser Radar Conference (ILRC), organized under the auspices of the International Coordination Group on Laser Atmospheric Studies (ICLAS) is dedicated exclusively to all aspects of laser radar, encompassing the development of lidar instrumentation, measurement techniques, and the scientific and practical applications derived from these observations. ILRC meetings traditionally bring together leading experts from academia, government laboratories, and industry worldwide.

Coherent Laser Radar Conference (CLRC) emphasizes the development and application of coherent lidar systems, including theory, modeling, instrumentation, system design, calibration, signal processing, and operational deployment. The conference highlights advances in Doppler and heterodyne detection methods. Together with the International Laser Radar Conference (ILRC), CLRC forms a complementary conference series covering the full spectrum of lidar science and technology. While ILRC broadly addresses all lidar methodologies, CLRC provides a specialized focus on coherent techniques.



The joint ILRC 31 / CLRC 22 meeting was attended by more than 340 scientists, engineers, and students. The scientific program included 115 oral presentations and 175 poster presentations. This volume contains 207 contributions presented at the conference.

The ILRC and CLRC sessions were organized as parallel and joint sessions, covering the following topics:

ILRC Sessions

1. New lidar technologies and methods
2. Lidar measurements of clouds and aerosol
3. Atmospheric transport and mixing
4. Lidar measurements in the stratosphere
5. Lidar techniques and observations: Oceans, biosphere, and ecosystems
6. Current and future space lidar missions
7. Lidar measurements of trace gases
8. Airborne lidar and large-scale field measurements

CLRC Sessions

1. Lidar systems I
2. Lidar systems II
3. Differential absorption Lidar (DIAL) systems
4. Comparison, validation, and calibration
5. Wind energy and Frequency-Modulated Continuous Wave (FMCW) lidar
6. Technology
7. Signal processing and turbulence

Joint Sessions

- New lidar technologies and methods
- Flux measurements and boundary layer dynamics
- Aeolus, status and outlook
- Joint keynote: Coupling water, energy, and carbon through circulation

---

The Editors gratefully acknowledge the invaluable contributions of the members of the Technical Program Committees.

ILRC Technical Committee (alphabetical order)

Achtert, Peggy (Germany); Amiridis, Vassilis (Greece); Apituley, Arnoud (Netherlands); Armandillo, Errico (Netherlands); Baars, Holger (Germany); Balis, Dimitris (Greece); Behrendt, Andreas (Germany); Bencherif, Hassan (France)*; Brydegaard, Mikkel (Sweden); Chen, Weibiao (China); Chouza, Fernando (USA); Chu, Xinzhao (USA); Comeron, Adolfo (Spain); Dherbecourt, Jean-Baptiste (France); Di Girolamo, Paolo (Italy); Donovan, Dave (Netherlands)*; Édouart, Dimitri (France); Eloranta, Ed (USA); Flentje, Harald (Germany); Freudenthaler, Volker (Germany); Gardiner, Tom (UK); Geiß, Alexander (Germany); Gibert, Fabien (France); Gimmestad, Gary (USA); Groß, Silke (Germany); Hair, John (USA); Heese,

The Editors:

Fix, Andreas, Co-Chair ILRC, German Aerospace Center (DLR), Oberpfaffenhofen, Germany

Rahm, Stephan, Co-Chair CLRC, German Aerospace Center (DLR), Oberpfaffenhofen, Germany

Moshary, Fred, ICLAS President, City College of New York, USA