



Międzynarodowa Środowiskowa Szkoła Doktorska
przy **Centrum Studiów Polarnych**
w Uniwersytecie Śląskim w Katowicach

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No. of PhD project: IEDS/2023/IGF/A

Title of PhD project: Complete aerosol profiles retrieved with synergy of remote sensing and UAV supported measurements

The leading unit: Institute of Geophysics Polish Academy of Sciences

Requirements:

1. He/She should have a Master of Science Degree or equivalent qualification in geophysics, geography, physics, environmental science or related engineering,
2. The candidate should have some expertise with atmospheric processes and be familiar with calculus and programming at at least intermediate level,
3. The ideal candidate should be familiar with atmospheric measurements including remote sensing techniques, UAV operation, statistical data analysis, and be efficient with programming (MATLAB, Python, R are the preferred languages).
4. Fluent English enabling the presentation of results at international conferences, communication, reading and writing scientific papers is required.

Tasks description:

1. Support of measurement campaigns, operation of UAV. Three campaigns, one per year at Belsk, Hel and Racibórz are planned;
2. UAV's data analysis with developed GRASP code, participation in code development with international team;
3. Statistical data analysis.
4. Preparation or contribution to publication of papers in international journals and conference presentations
5. Writing regular reports on progress and presentation of the results to the project management board according to the agreed schedule.

Summary of a doctoral project:

State of the art remote techniques can be merged together to obtain normalized profiles of aerosol parameters. Such a synergy allows for obtaining not only optical but also microphysical properties. A number of data integration techniques with sun-sky photometers and LIDARs have been developed, including LiRIC and GRASP algorithms. However, both suffer from the problem of high uncertainty of LIDAR profiles retrieved close to the instruments where high aerosol concentrations are often found.



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To breach the gap between columnar and ground-based measurements a synergy between multi-instrumental approach and data assimilation techniques is proposed. In particular, additional information provided by UAV measurements will be integrated to complete the vertical profile close to the ground.

The Ph.D. student will be responsible for development of data analysis and integration techniques. It will include participation in field campaigns and collaboration with international team of code developers.

Other information:

The work will be carried out under supervision of: dr hab. Aleksander Pietruczuk (alek@igf.edu.pl) and dr Artur Szkop (aszkop@igf.edu.pl), Institute of Geophysics Polish Academy of Sciences

Secretary of the IEDS Recruitment Committee: +48 32 3689 380, e-mail: polarknow@us.edu.pl
Information on the IEDS admissions: https://www.mssd.us.edu.pl/en/admission_2023_2024-proj/