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

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Title of PhD project: Application of LiDAR point clouds in modeling geomorphological processes and landforms – change detection, reconstruction and assessment of geohazards.

The leading unit: University of Silesia in Katowice

Requirements:

1. Completed second level studies (Master's degree) in physical geography, geology, geophysics, environmental hazard engineering, environmental protection or related. Knowledge of research topics related to geomorphological processes and laser scanning from a drone (UAV – unmanned aerial vehicle).

2. Knowledge of issues related to spatial data, and typical tools and methods used in geomorphology and environmental remote sensing.

3. Knowledge of English enabling communication, reading and writing scientific papers.

Tasks description:

1. Analysis of LiDAR point clouds for terrain changes detection;
2. Acquisition, processing and analysis of point clouds from a drone (UAV);
3. Preparation, organization and conduct of field and office research;
4. Preparation of scientific articles and conference presentations;
5. Regular reporting of work progress;
6. Assistance in the daily scientific and didactic tasks of the unit, including joint care of measurement equipment.

Summary of a doctoral project:

LiDAR scanning using UAV allows for obtaining dense point clouds with known coordinates and height above sea level. This type of spatial data is the basis for high-resolution terrain models and a source of precise information on ground vegetation cover. In many aspects of geomorphological research, accurate spatial information characterizing the configuration of the earth's surface in a continuous manner is essential for formulating correct conclusions and constructing models of the evolution of various landforms. The proposed doctoral project focuses on the problem of optimizing spatial data from LiDAR scanning in order to solve the problem of geomorphological mapping of landforms on large spatial scales. The primary goal of the project will be to develop various scenarios of optimal laser scanning features and digital height models allowing for the reconstruction, detection of changes and assessment of the dynamics of changes and evolution of landforms. The work will focus on microforms of landforms in forested and non-forested areas, landslide and fluvial forms. The person implementing

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Instytut Oceanologii
Polskiej Akademii Nauk
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the project will rely on proprietary data sets obtained during scanning from a drone. During the project implementation, the expected research results will include the methodological aspect related to the optimization of scanning and point cloud features in various environmental conditions and the cognitive aspect related to the modeling of changes in selected terrain forms over time.

Other information:

The work will be carried out under supervision of:
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