AVeReS (Assessment of Vegetation damages using Remote Sensing)

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Akronim: AVeReS
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(projekt inny)

The AVeReS is a project granted by The European Space Agency (ESA Contract No: 4000107684/13/NL/KML), devoted to assessment of the potential of satellite data for analysis and monitoring of vegetation with a special focus on vegetation mapping and condition investigation. We propose a study of vegetation based on Landsat and WorldViev-2 imagery analysis supported by a range of field remote sensing techniques and laboratory measurements within plant physiology. The following techniques will be employed:

hyperspectral field data acquisition (radiometric measurements, construction of spectral libraries of dominant vegetation communities using satellite imagery and field measurements),

investigation of plant condition using remote sensing field techniques and supportive techniques within plant physiology (including measurements of LAI, fAPAR, plant biometric properties, plant pigments content, fluorescence, fresh and dry biomass, plant and soil humidity, plant transpiration and evapotranspiration, soil-vegetation-atmosphere heat exchange),

GPS localisation,

analysis of microclimate conditions (sun radiation; air and soil temperature and humidity, TIR),

image classification,

integration of field and satellite data.

Information about the vegetation condition is needed for effective management of the natural resources and estimation of the effectiveness of nature conservation. Vegetation condition assessment is based on information about quality of plant pigments, cell structure and plant's vigour and indices, which are dedicated to analyse the plant condition.

During the researches the most valuable natural areas in Poland will be analysed (the Tatra National Park – TPN and Bialowieza Forest – BF, both are the M&B Reserves). Monitoring and early warning about bad condition of the plants is very important to minimize negative effects not only on protected areas. BNP and BF are good test polygons, because there is different level of anthropogenic impact on the environment (strict natural preserve and forestry), different damage (gradations of insects, windthrows, air pollution, changes in groundwater level). The validated algorithm and satellite images could be supporting tools for long-term monitoring on different types of vegetation and different topographic situations as well.

Specific scientific objectives:

- Evaluate the usefulness of satellite data for analysing the plant damages in different ecosystems,
- Develop an universal algorithm, that uses spectral properties and also structural features of the image,
- Identification of remote sensing indices, that are well correlated with vegetation parameters acquired from ground levels,
- Compare the usefulness of remote sensing data with different spatial and spectral resolution (comparing Landsat and WorldView-2),
- Explore possibilities of collecting information about individual trees in the forest with/or no pansharpened WorldView-2 image,
- Classification of damaged plants using various algorithm

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Collaborations:

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2. Białowieża National Park
3. Assoc. Prof. Anna Kozlowska - Institute of Geography and Spatial Management of Polish Academy of Sciences
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