Testing PROBA-V and VEGETATION data for agricultural applications in Bulgaria and Romania

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The current VEGETATION 1 & 2 instruments onboard the French SPOT 4 and SPOT 5 satellites will only be available until 2012. For more than 10 years now, these instruments have monitored and mapped the worldwide vegetation every 10 days, thus providing essential information on crop yields, droughts, desertification, changes in the type of vegetation, deforestation, etc. to an ever extending user community. ESA is currently building the Sentinel 3 satellites in view of the European GMES programme. These satellites will contribute to the continuation of the availability of Vegetation type data but will not be operational in due time, thus creating a major time gap in the data continuity. Therefore, Belgium has decided to build a small satellite mission called PROBA-V ("V" standing for Vegetation). In that way, it will be a complement to the Sentinel 3 satellites to be launched after PROBA-V. The paper will present the main objective, methodology and expected results of the project "Testing PROBA-V and VEGETATION data for agricultural applications in Bulgaria and Romania" under the PROBA-V PREPARATORY PROGRAMME, financed by BELSPO (Belgian Science Policy Office).

The main objective of the project is to assess the quality of the PROBA-V mission as a continuity mission to VEGETATION 1 & 2 by comparison and validation of SPOT-VEGETATION and PROBA-V simulated data for assessing crop condition on chosen test areas for the territory of Bulgaria and Romania. This objective will be achieved by an interdisciplinary team of researchers from the two countries. The team comprises experts in remote sensing of the Earth and GIS technologies, as well as in agrometeorology and agroforecasts. This team will be supported by the VITO SPS team which will provide a simulated PROBA-V dataset prepared based on hyperspectral EO-1/Hyperion data.

A methodology to validate simulated PROBA-V and SPOT-VEGETATION data for agricultural applications will be developed. It will encompass three work tasks: building geo-data base; conducting sub-satellite experiments; and combined analysis of satellite and ground-based data. Three sub-satellite experiments collecting meteorological data for each of the two test areas will evaluate and measure winter crop status during the growing season. Common methodology will be applied on the two sites to measure fraction of intercepted photosynthetic active radiation (FIPAR), leaf area index (LAI), soil moisture, canopy cover. Field data will be used to assess winter crop status by crop growth models (WOFOST and DSSAT). All field data and PROBA-V simulation images along with SPOT-VEGETATION images for the growing season (2010–2011) will be organized in a geo-data base.

As a result of the analysis, the correlations between Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI) from the two sensors and the ground-assessed crop status, FIPAR and LAI will be established. The Project will show the potentials of using VEGETATION type satellite data in addition to ground-based measurements and crop growth simulation models. The results are expected to aid the objective comparison of the two sensors, their performance and potential for combined usage in this application field as well as to assess the enhanced spatial resolution of PROBA-V.