

# Land Products Validation and Characterisation in support to Proba-V, Sentinel-2 and Sentinel-3 missions

Katarzyna Dabrowska-Zielinska<sup>1</sup>, Fabrizio Niro<sup>2</sup>, Martyna Gatkowska<sup>1</sup>, Zbigniew Bochenek<sup>1</sup>, Maciej Bartold<sup>1</sup>



<sup>1</sup> Institute of Geodesy and Cartography, Remote Sensing Centre Warsaw  
<sup>2</sup> ESA - Sensor Performance, Products and Algorithms Section

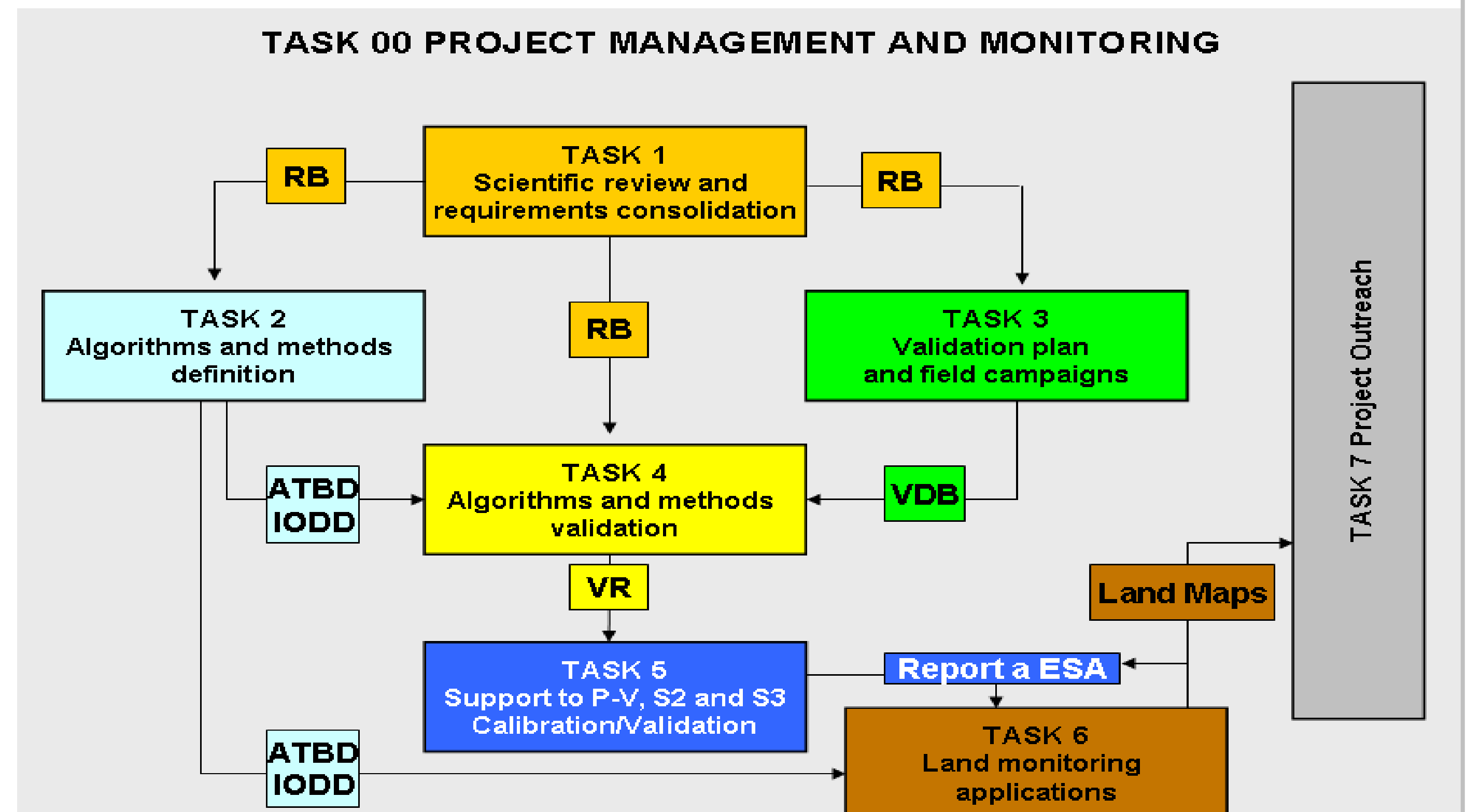


## INTRODUCTION

The ESA Express Procurement Plus – EXPRO+ Project has been launched to develop and test the methodology for deriving biophysical variables from the synergetic exploitation of current and future ESA optical sensor missions as Proba-V, Sentinel-2 and Sentinel-3.

The research within the project supports activity of ESA's Sensor Performances, Products and Algorithm (SPPA) section which is responsible for mission end-to-end performances assessment, algorithm evolution and Calibration-Validation activities.

## PROJECT WORKFLOW

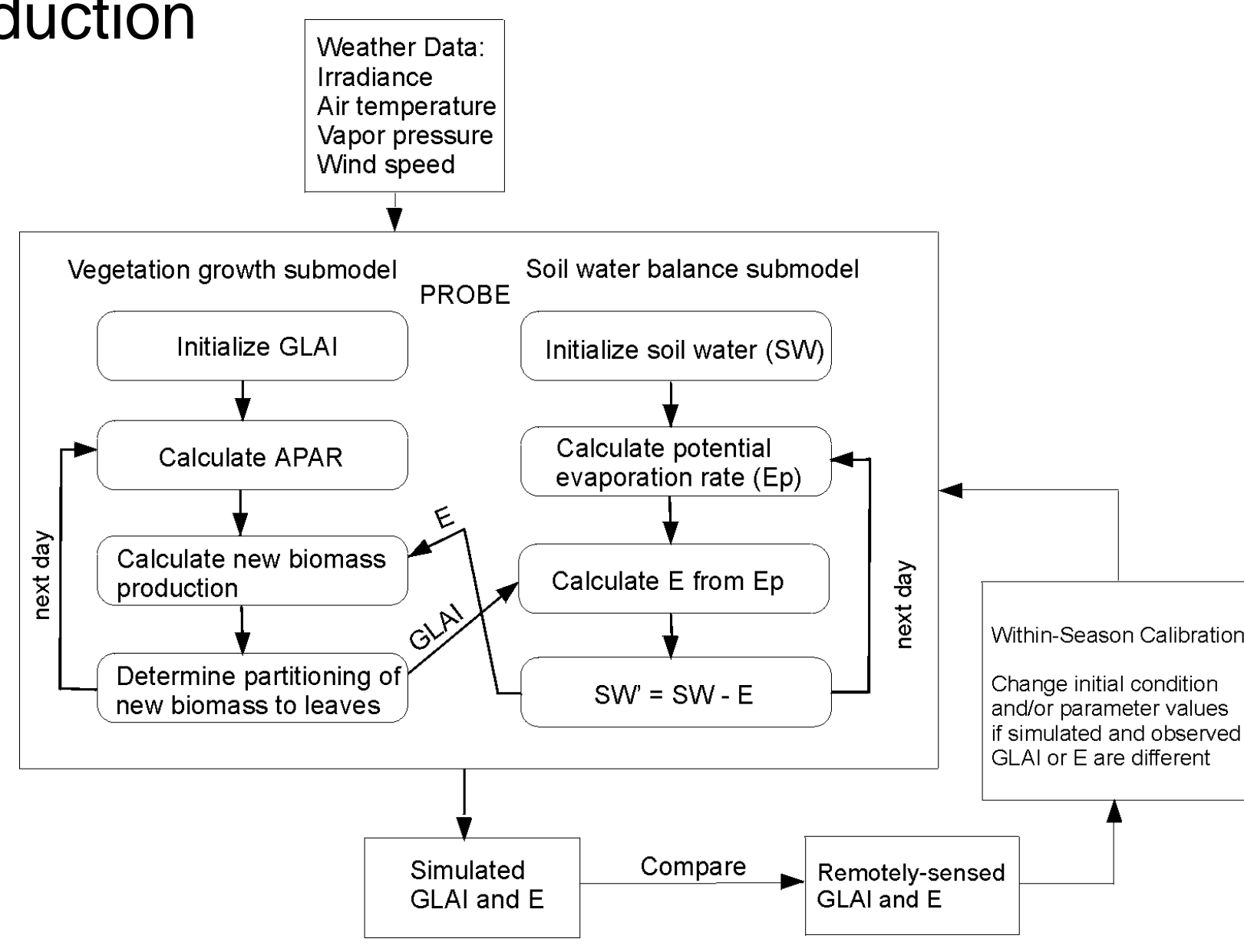


## ALGORITHMS AND METHODS

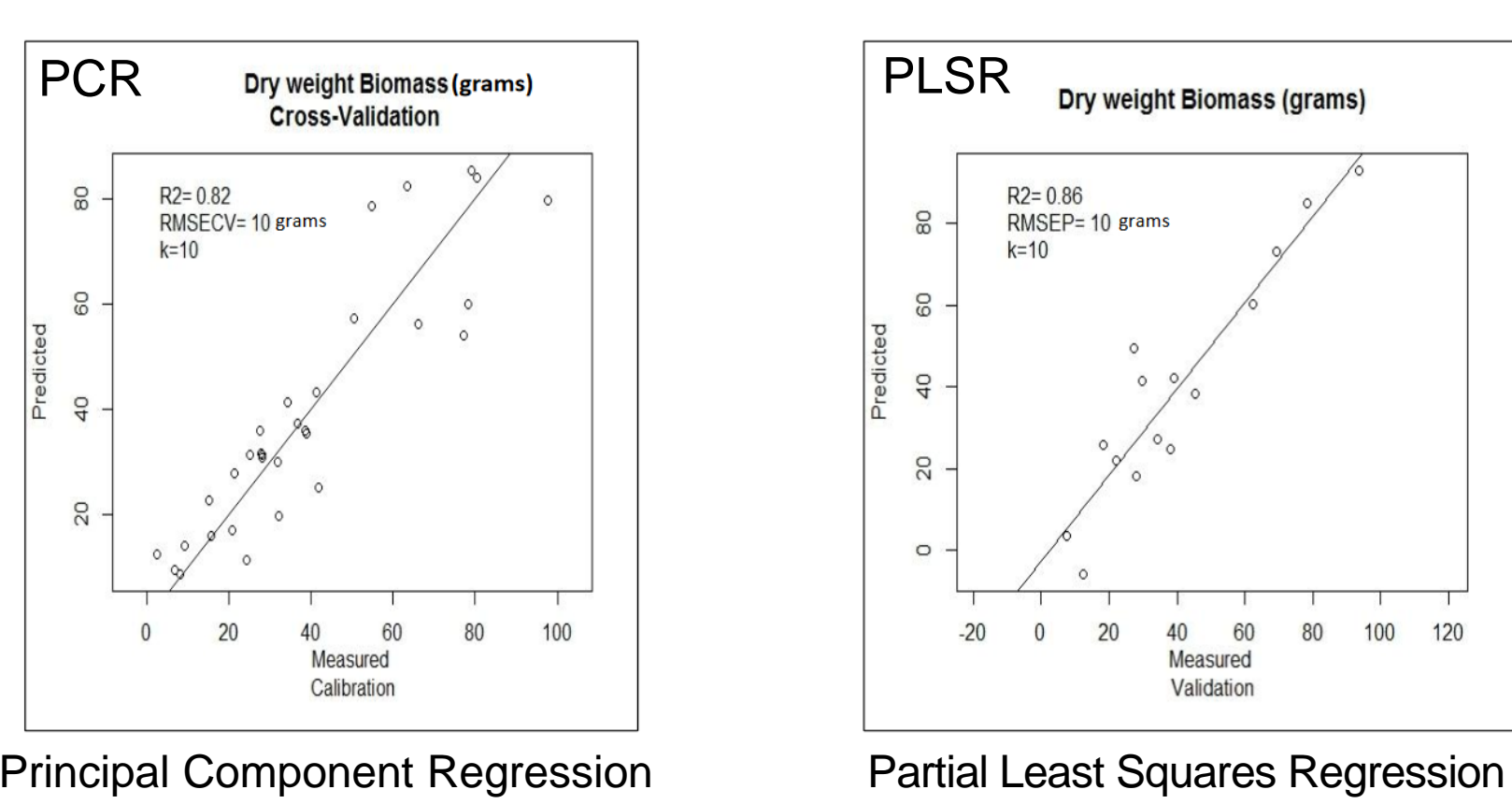
Development of algorithms and methods optimally adjusted to derive biophysical parameters (LAI, FAPAR, FCOVER, Carbon Balance, Vegetation Indices) needed for monitoring phenology conditions at agricultural areas and wetlands. The methods will be based on EO data collected from Proba-V, Sentinel-2 and Sentinel-3 satellites.

### DEFINITION

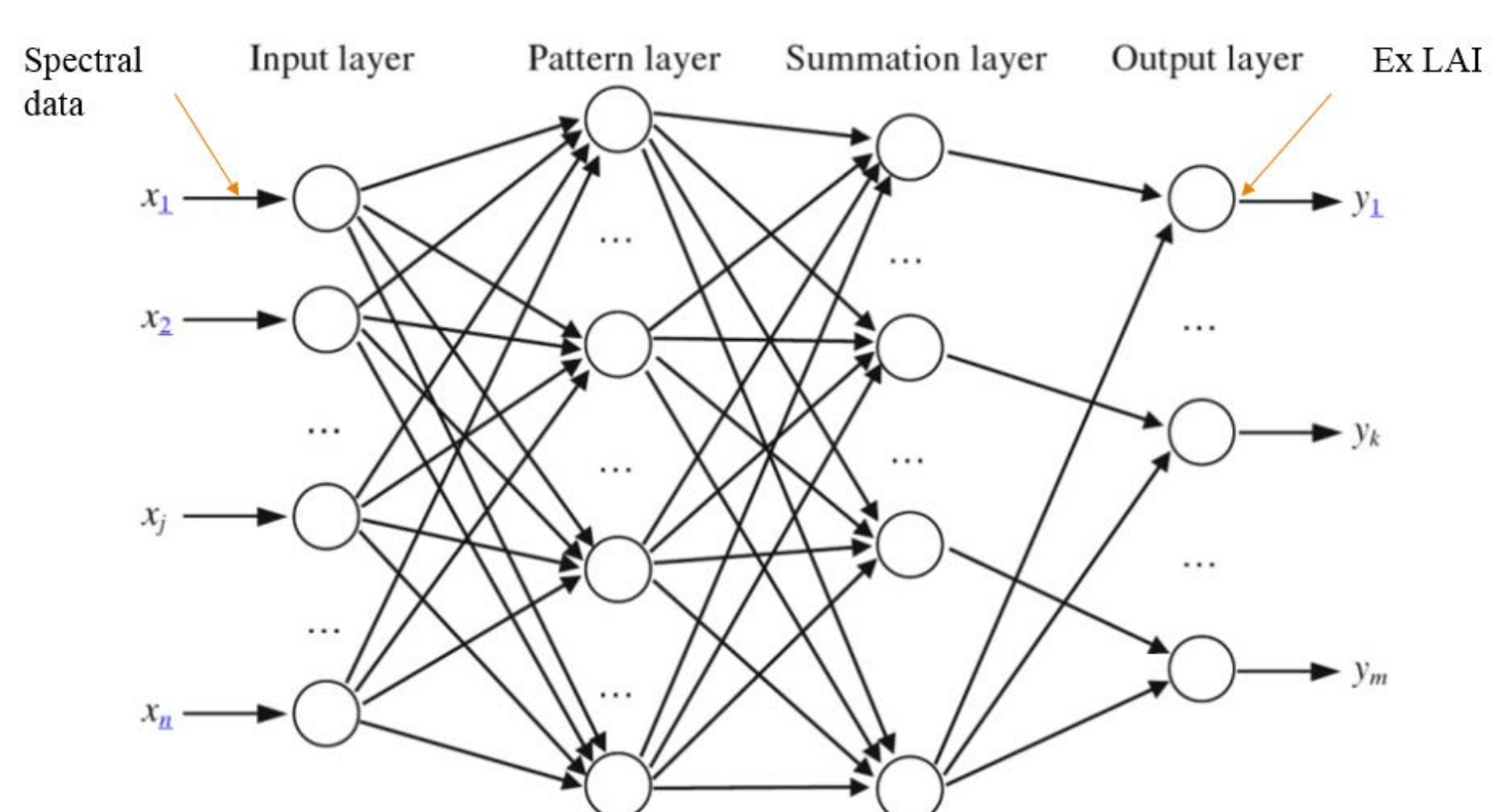
MODEL (I): Application of plant growth simulation model for estimating plant biomass production



MODEL (II):



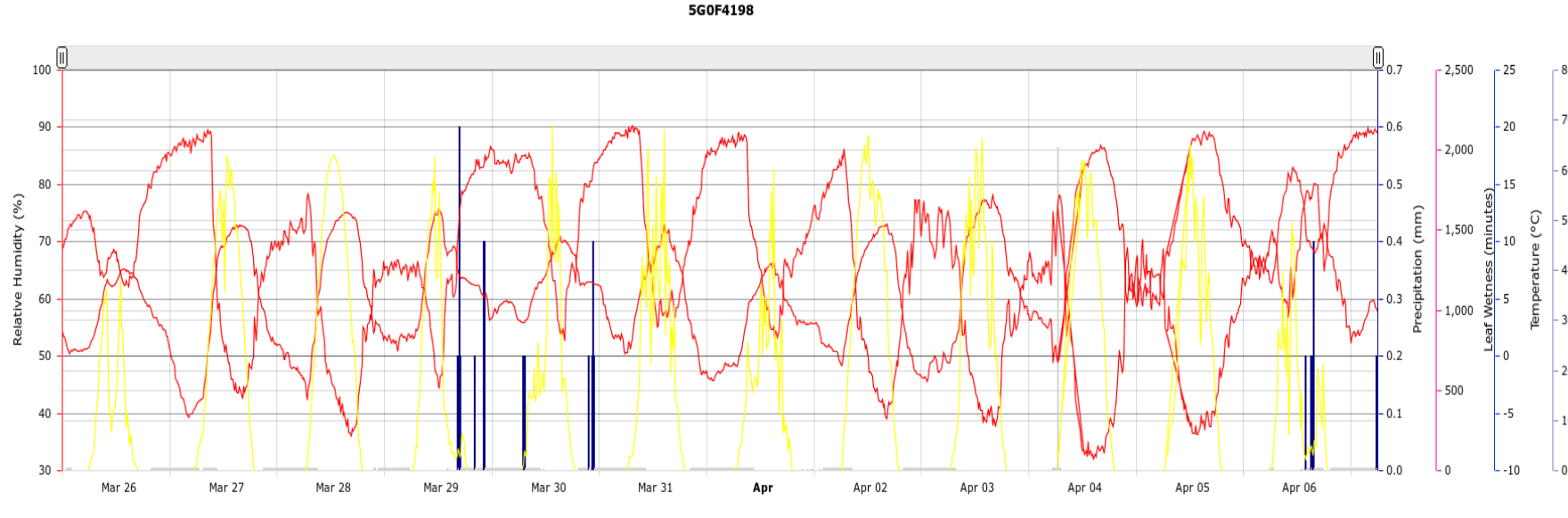
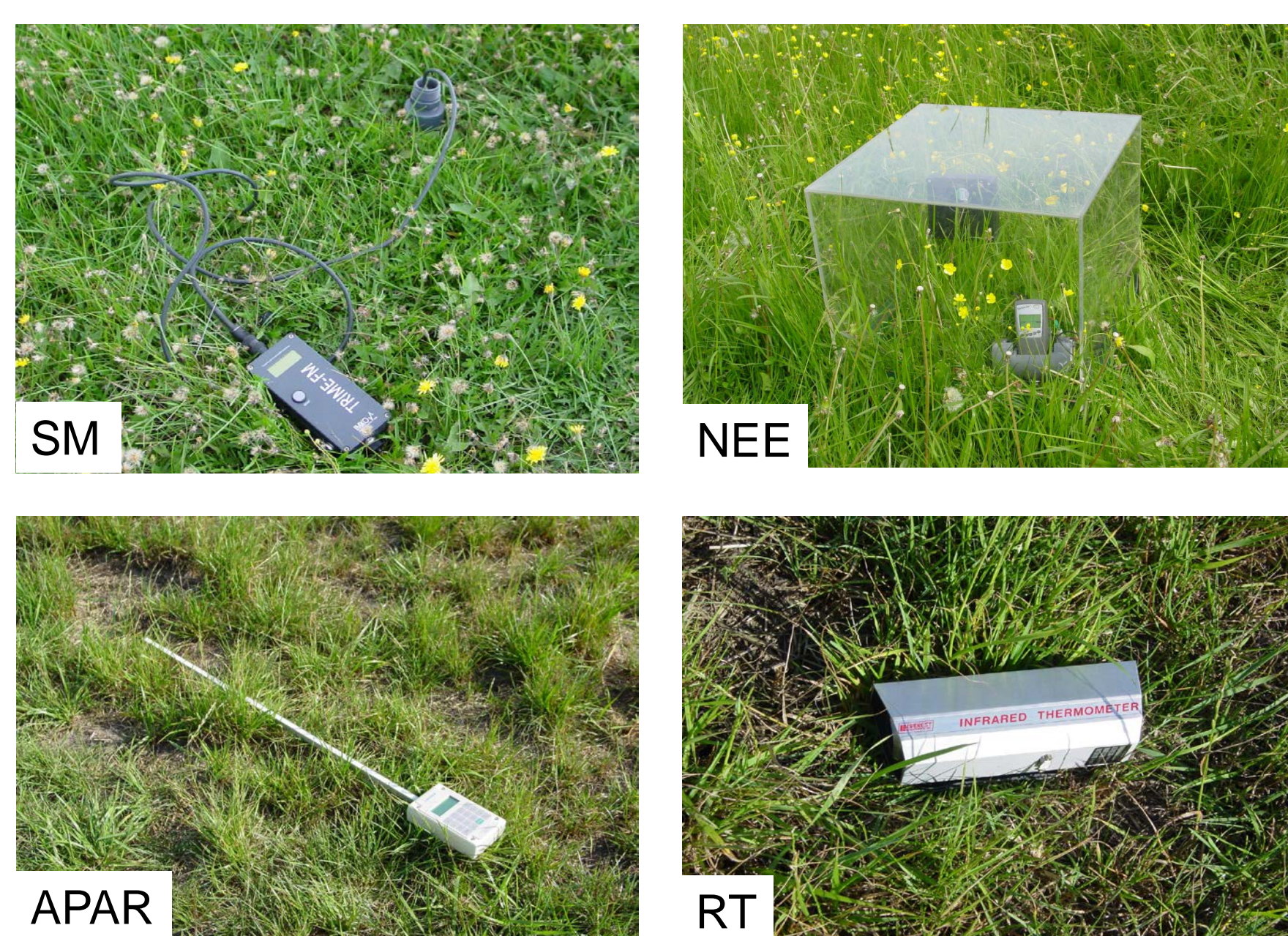
MODEL (III): Artificial Neural Networks (ANN)



### GROUND MEASUREMENTS

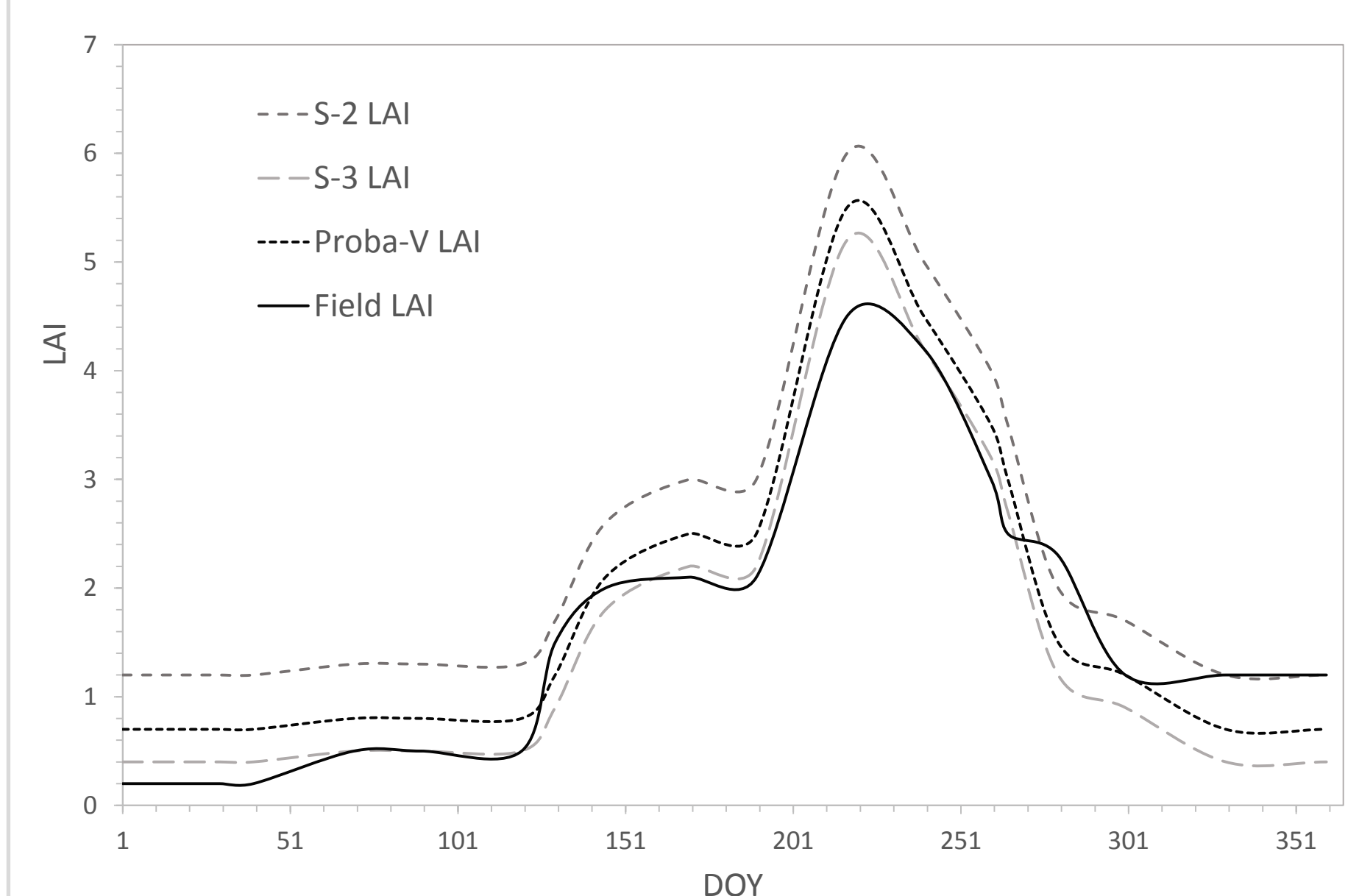
The plan for in-situ validation measurements will take into account both vegetation phenology and types of land monitoring products. Set of ground measurements will include:

- Leaf Area Index (LAI)
- soil moisture (SM)
- APAR
- wet and dry biomass
- radiation temperature of plant
- solar radiation
- carbon balance
- meteorological parameters



### VALIDATION

Comprehensive validation procedure of the land products derived from EO data distributed by ESA and ground measurements



In addition, the independent datasets derived from services such as:

- Copernicus Global Land Service
- On Line Validation Exercise (OLIVE)
- Benchmark Land Multisite Analysis and Intercomparison of Products (BELMANIP2)

will be used for cross-validation and for filling gaps in-situ measurements.



## LINK TO OTHER CAL/VAL ACTIVITIES

The output of the validation procedures will be used to contribute to the quality assessment of data from the relevant ESA optical sensors. The feedback on image quality and radiometric/geometric calibration will give support to the Cal/Val activities like radiometric calibration network **RadCalNet** for EO high resolution imaging systems.



## LAND MONITORING APPLICATIONS

The results will be essential for land monitoring applications in deriving biophysical parameters for wetland and agricultural areas in Poland, including vegetation status mapping, vegetation hazards (drought, floods) mapping, crop classification and crop yield estimation. The various users will participate in assessment of the results of the Project.