ECOPROPHET

Improved **ECO**system **PRO**ductivity Modeling by Innovative Algorithms and Remotely Sensed **PHE**nology Indicators

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Background

Terrestrial ecosystems provide food, animal-feed, fibre and energy. Biomass production = most important ecosystem service made to society.

➔ Important to monitor global ecosystem productivity & build better models.

➔ RS-based models (MOD17) & Land surface models do capture the global patterns as described by in-situ observations.

Both models depend on observations of surface greenness (NDVI, LAI).

➔ Huge uncertainty in global GPP & NPP estimates.

➔ Most RS-based NPP models fail at reproducign NPP variability.

NPP = GPP – Ra or NPP = GPP * (1 – Ra)

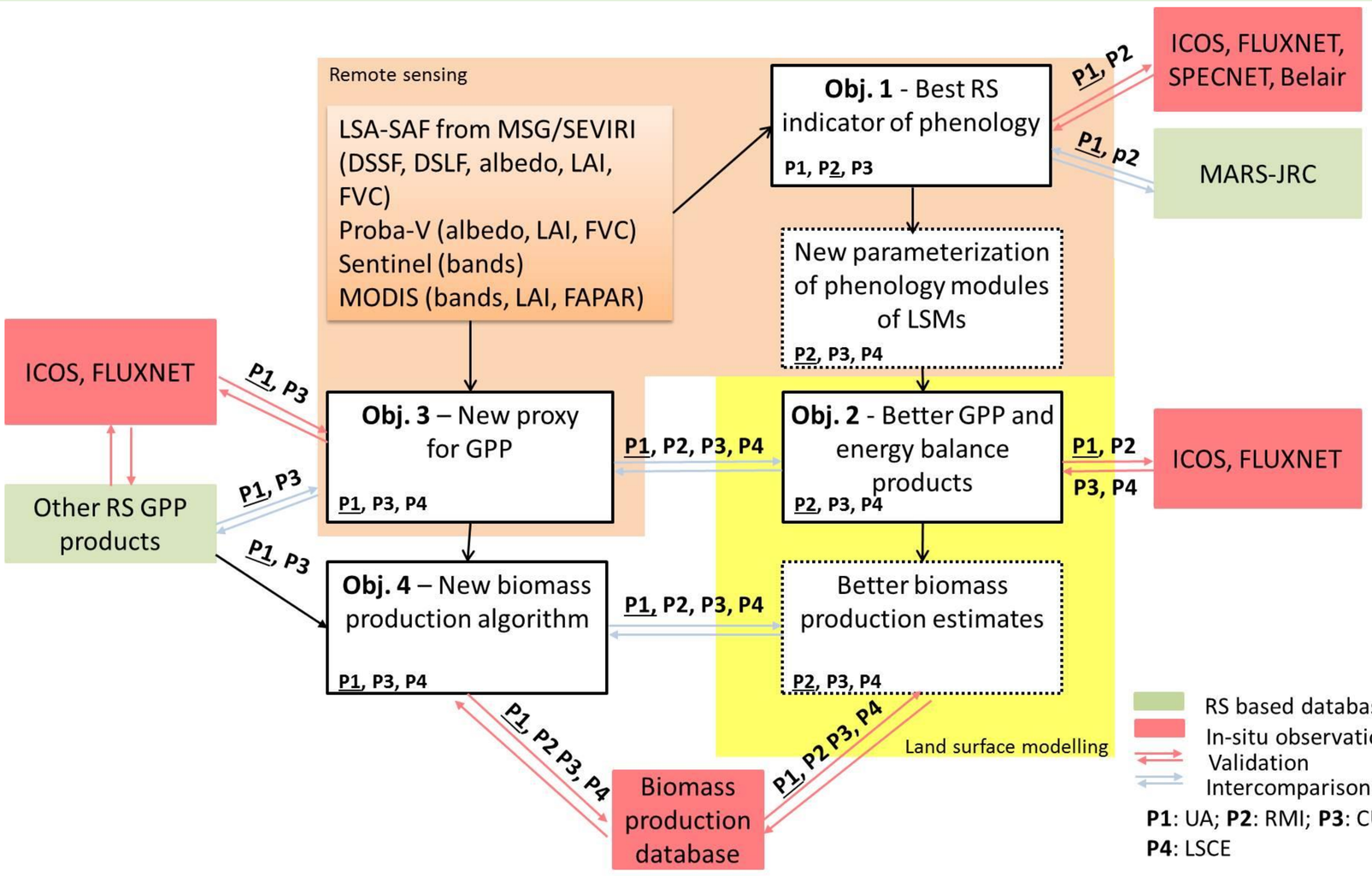
Overall objective = improve estimates and projections of GPP & NPP

➔ NDVI advanced our understanding of global GPP & NPP.

➔ But: NDVI ≠ GPP: e.g. boreal forests, senescence in deciduous forests and drought.

➔ Plants invest carbon in nutrient uptake (mycorrhizal symbionts & exudates). NPP models must take fertility into account.

Specific objectives



Obj. 1 - Test new RS products (Sentinel; PROBA-V): focus on "functional phenology indicators".

Obj. 2 - New product from Obj. #1 ➔ reparameterize phenology modules of Land surface models ➔ better estimates of GPP, evapotranspiration, energy balance.

Obj. 3 - New product from Obj. #1 ➔ new GPP product: e.g. GPP = f(new RS product); or GPP = f(new RS product)*PAR; or GPP = f(new RS product)*PAR*ε; or new approaches.

Obj. 4 - Alternative NPP model: NPP = new GPP * NPP/GPP ratio. New GPP from obj. 2 or 3 (or even NDVI-based GPP); NPP/GPP = function (management & site fertility).

Scientific outcomes

- Identification of RS-based indicators for functional phenology.
- Development of GPP & NPP algorithms that are independent from existing algorithms.
- The new RS phenology indicators will help the improvement of Land Surface models and result in reduced uncertainty in climate projections, thereby allowing better future climate-mitigation policies.

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