

# In situ fluorescence in support of airborne measurements

## Research questions

- Sun-induced vegetation fluorescence (SIF) is strongly linked to photosynthesis and acts as a constraint in vegetation model for GPP prediction (*Frankenberg et al, 2010; Bacour et al, 2019; Calvet et al., 2017, Mohammed et al., 2019*)
- Maps of SIF will be carried out with the Hyplant sensor on-board ATR-42 (CNRM, Juelich Z., Safire)
- In situ fluorescence for Cal/Val of airborne measurements
- Disentangle between Absorbed Photosynthetically Active Radiation (APAR) and photosynthesis efficiency contributions to the SIF signal

## Instruments and experimentation

- In situ remote sensing of SIF and reflectance on a reference field
  - 2 instruments (LMD, CESBIO), poss. 1 Univ. Milano
- Active fluorescence measurements at canopy and leaf level
  - Fluorescence yield at canopy level: *fluorescence micro-lidar* (LMD)
  - fluorescence quenching at leaf level : *Monitoring-PAM, PAM2000, FluorPEN*
- Biophysical parameters : Chlorophyll content,...
- Alfalfa field, La Cendrosa
- Continuous measurements during SOP

## Interactions with LIAISE partners

- Space and time coordination with ATR-42 flights (Safire, Juelich Z., CNRM)
- Integrate with surface/atmosphere exchanges measurements : EC, radiation budget, ...
- Possibility to add physiological measurements at plant level (C, H<sub>2</sub>O), biomass, soil status, ...
- Modellers to assimilate fluorescence (CNRM, LMD)

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### CESBIO

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Alfalfa field at La Cendrosa



SIF instrument



Fluorescence micro-lidar