EXPLORING THE SYNERGIES BETWEEN DECAMETRIC CROP/LAND COVER CLASSIFICATION AND BIOPHYSICAL VARIABLE RETRIEVAL

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INTRODUCTION

In the context of increasing pressures on cropland, the G20 has recognized the importance of timely, accurate and transparent information to address food price volatility and quality of data on agricultural market. Remote sensing appears as a key tool in providing forecasts on crop production. Accurate within season crop specific masks and biophysical variables are required to improve the production forecasts. This research aims at exploring the synergies between land cover classification and biophysical variable retrieval at the decametric scale. This research focuses on the improvements prior land cover/ crop type information knowledge on biophysical variable retrieval and reciprocally, the improvements on land cover/ crop type classification with prior biophysical variable information.
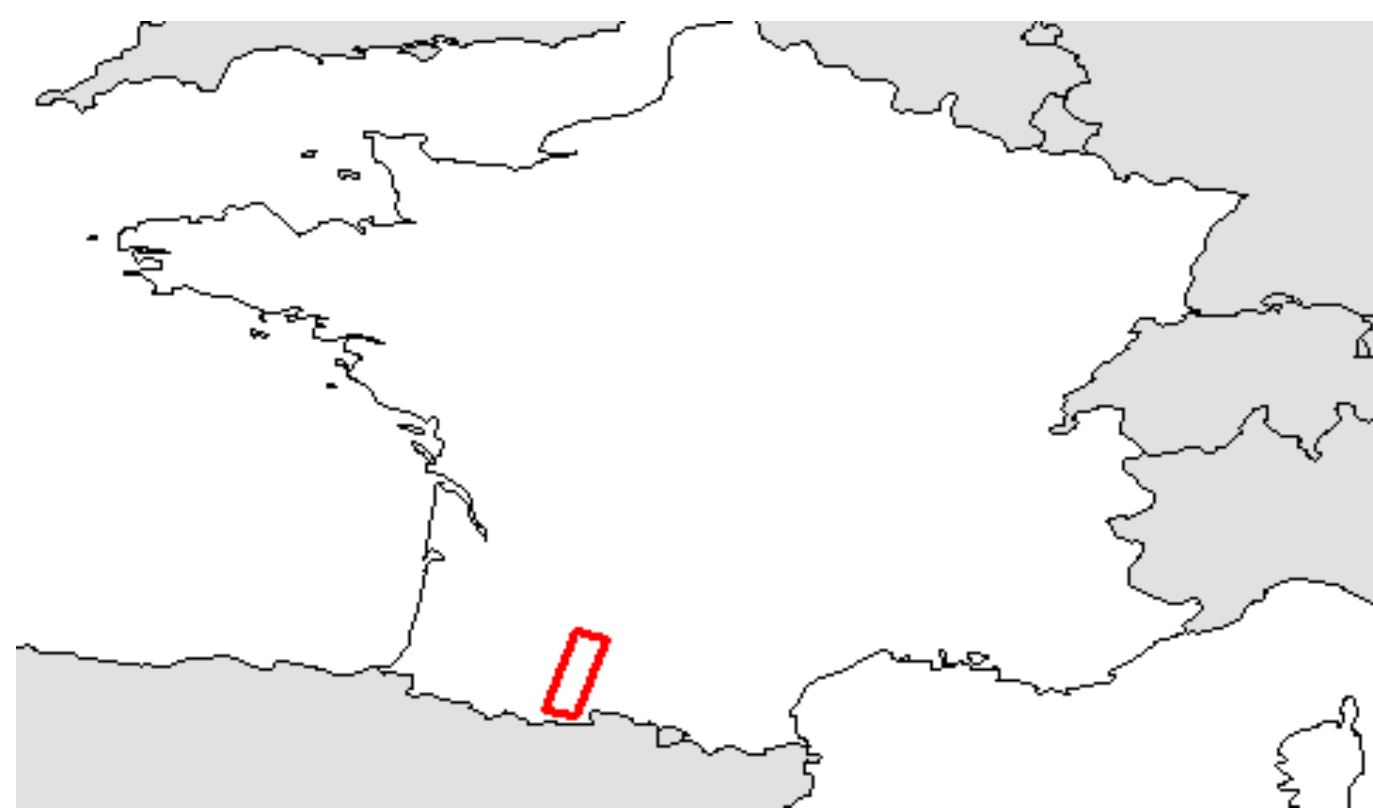
MATERIAL AND METHODS

DATA

A combination of two sensors providing frequent high resolution observation over the entire growing season,
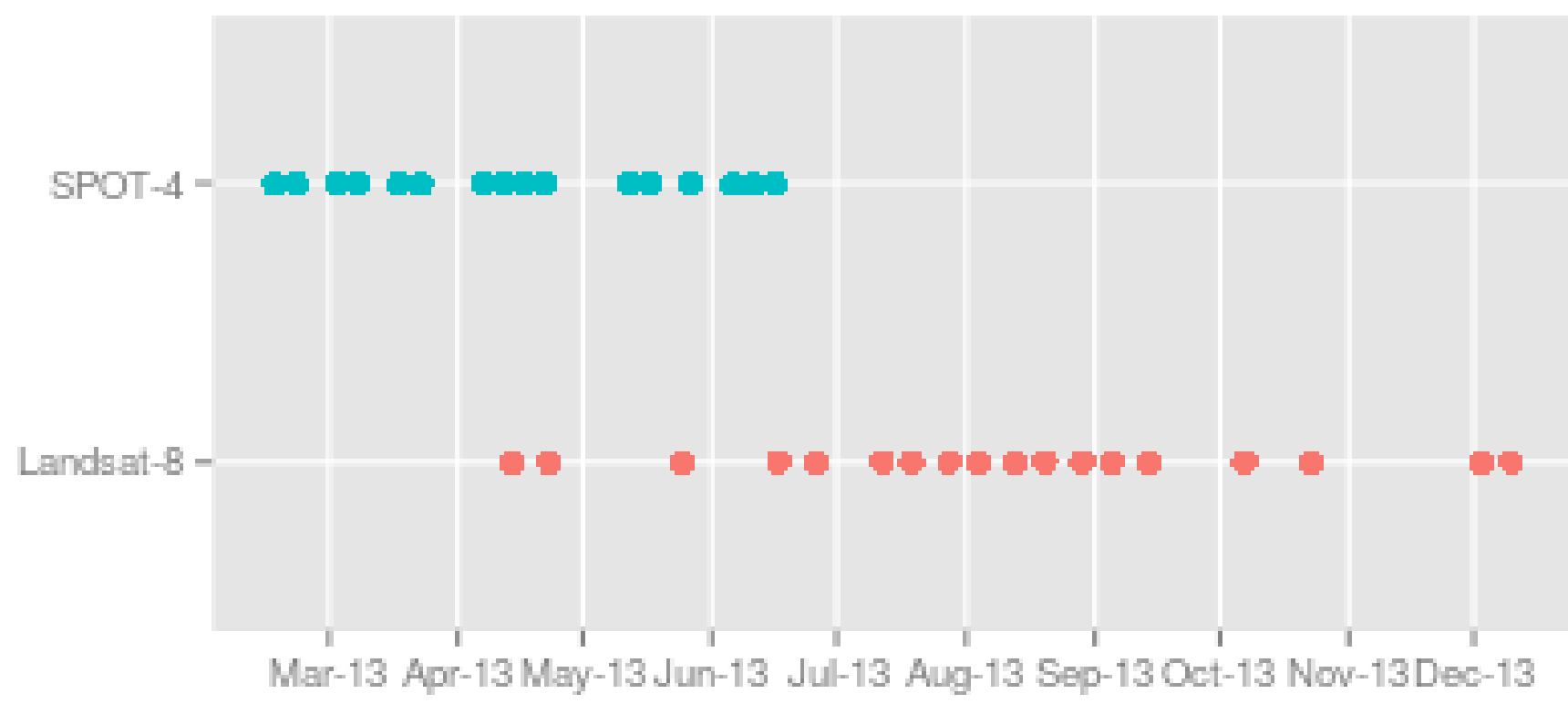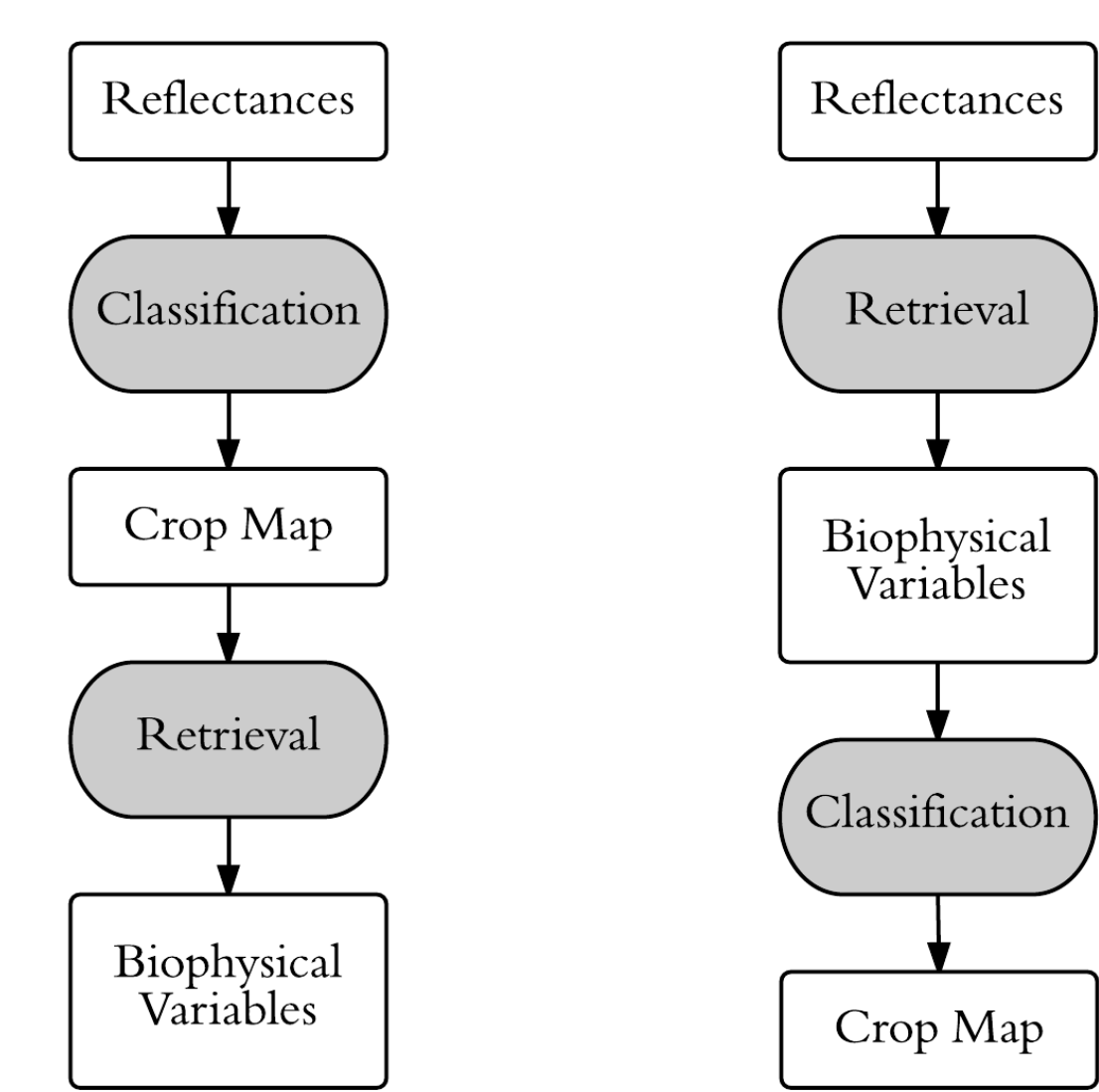

STUDY SITE

The method is first developed over one site in France and will be extended to 2 sites in the US and one in Ukraine.
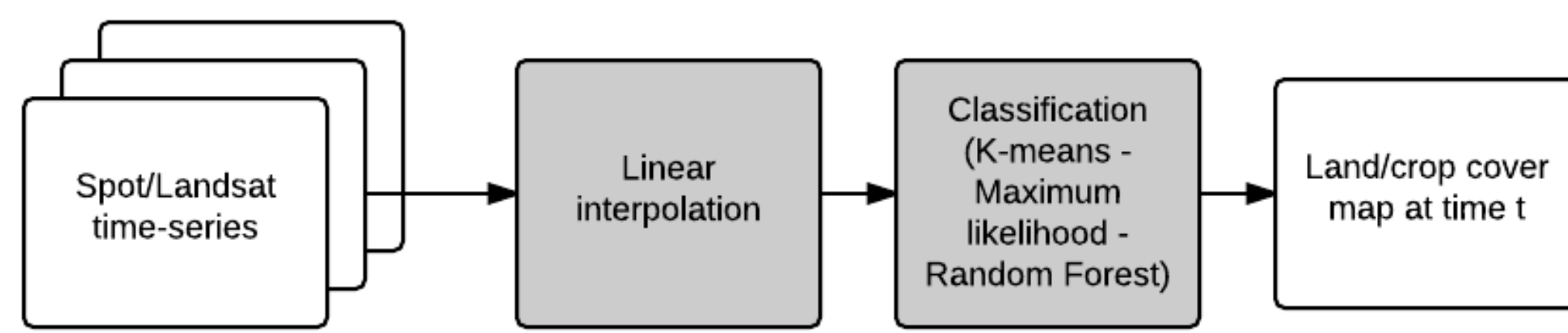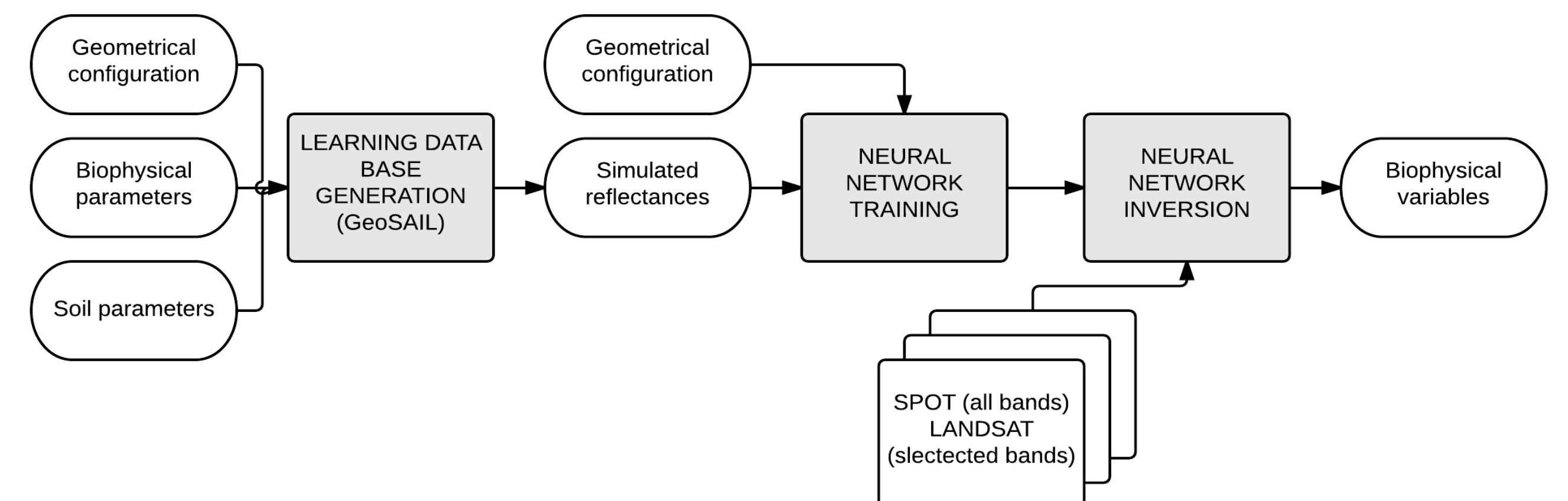

GENERAL SCHEME

CLASSIFICATION

Three algorithms of increasing complexity were tested at each new image acquisition along the season:

1. K-means on the NDVI
2. Maximum likelihood on the NDVI
3. Random Forest on the NDVI
4. Random Forest on all the bands
5. Random Forest on the biophysical variables

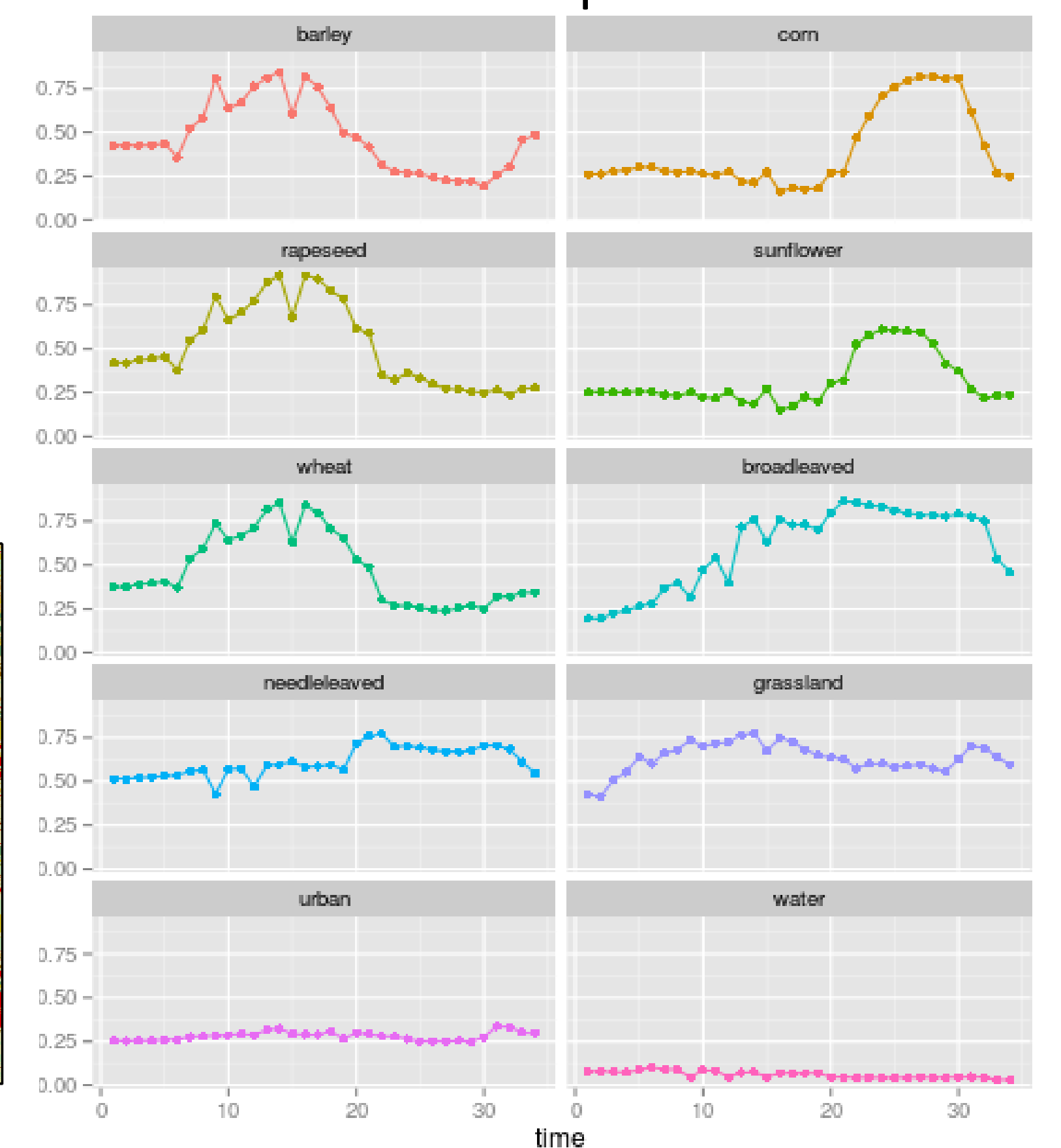### BIOPHYSICAL VARIBALE RETRIEVAL

RESULTS

- Good performance of the training of the neural network ($RMSE_{FAPAR} = 0.065$, $RMSE_{LAI} = 0.77$, $RMSE_{FCOVER} = 0.049$)
- The LAI, FCOVER and FAPAR match the expected temporal dynamics and exhibit a clear seasonal variation
- The Random Forest algorithm (on all the bands) outperform the others
- All biophysical variables give similar classification results and their combination slightly improve the accuracy
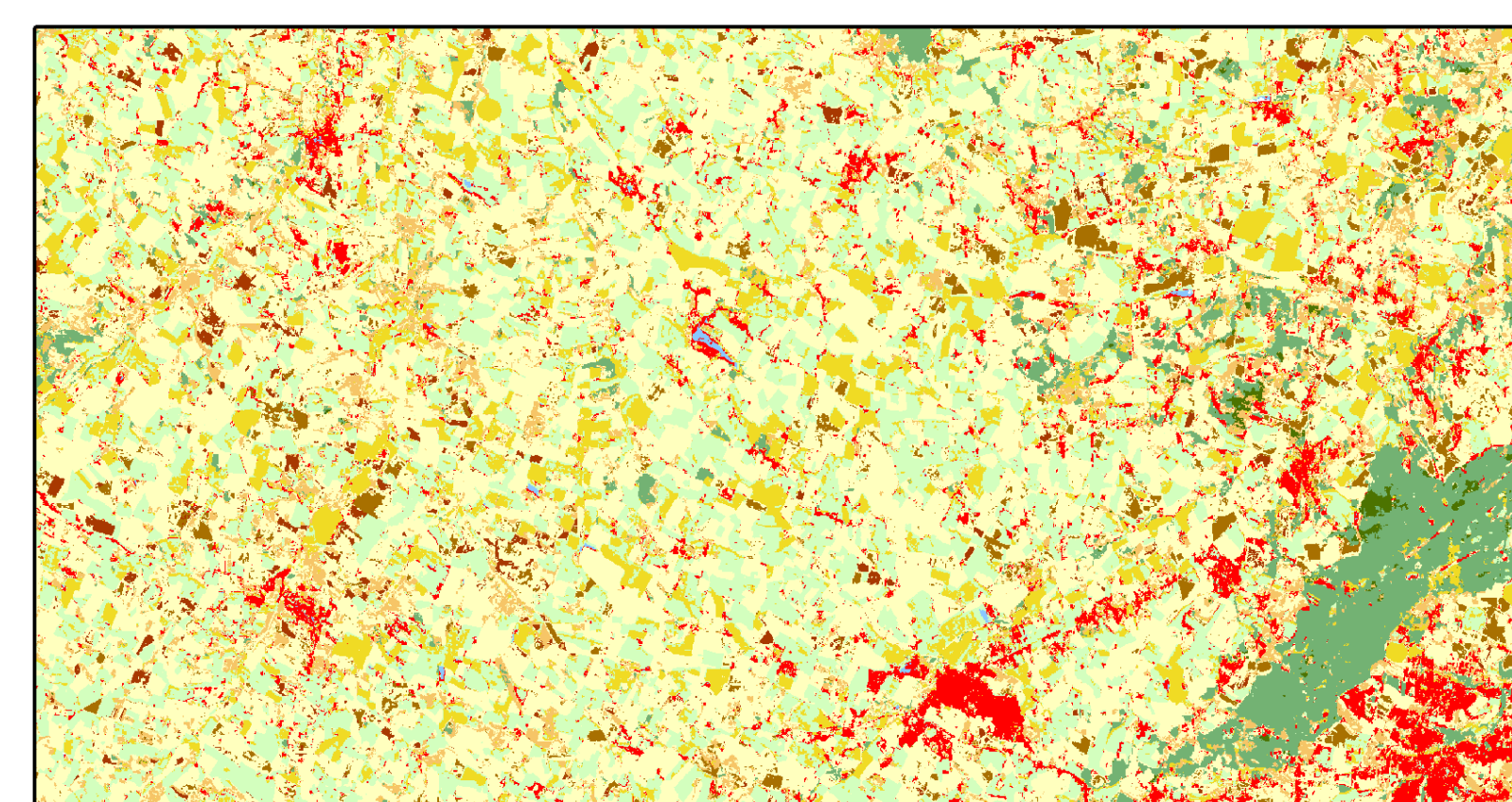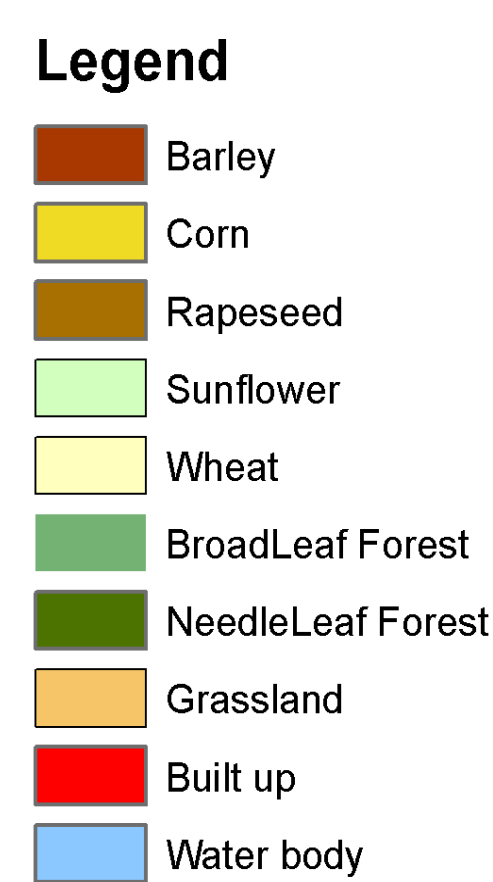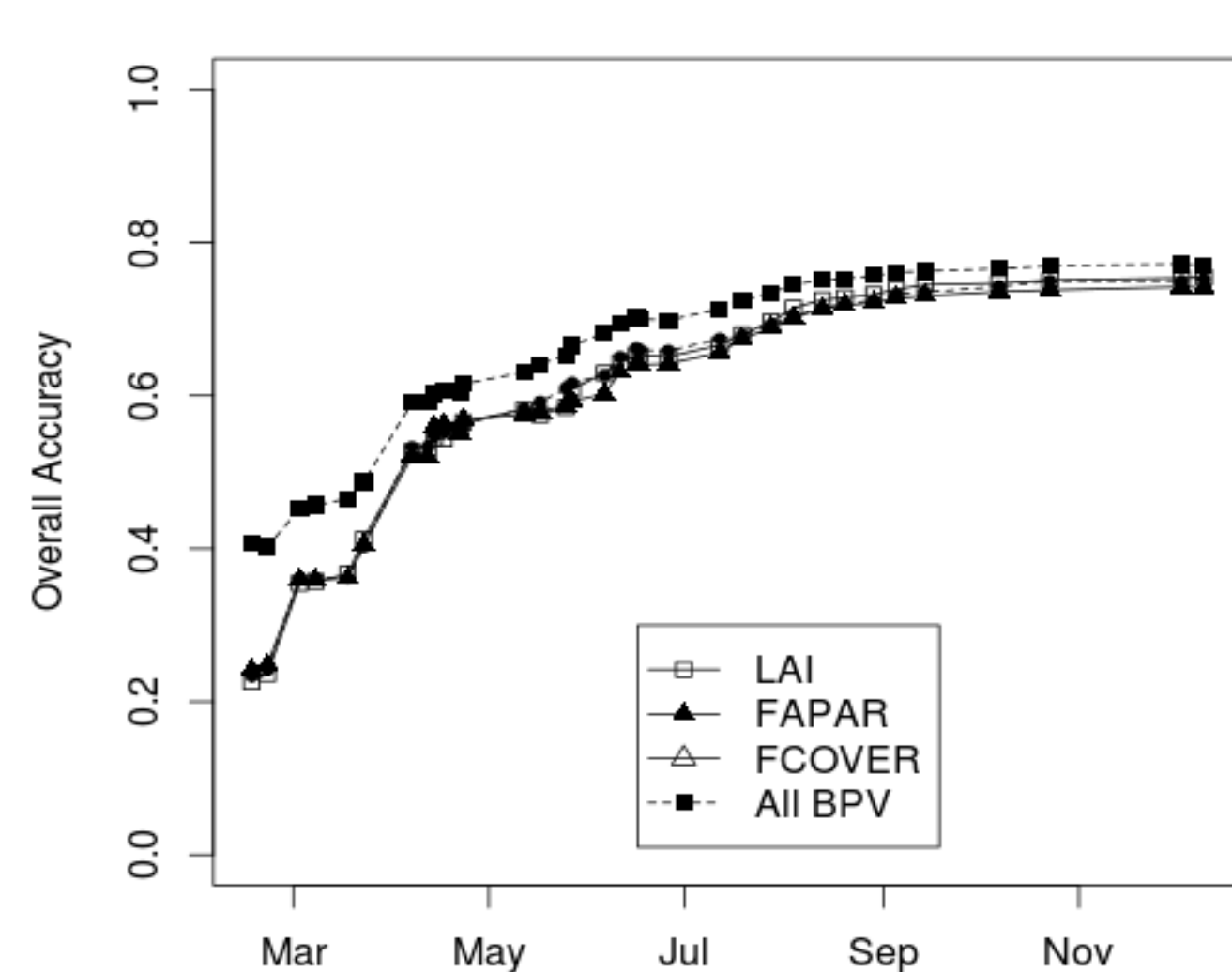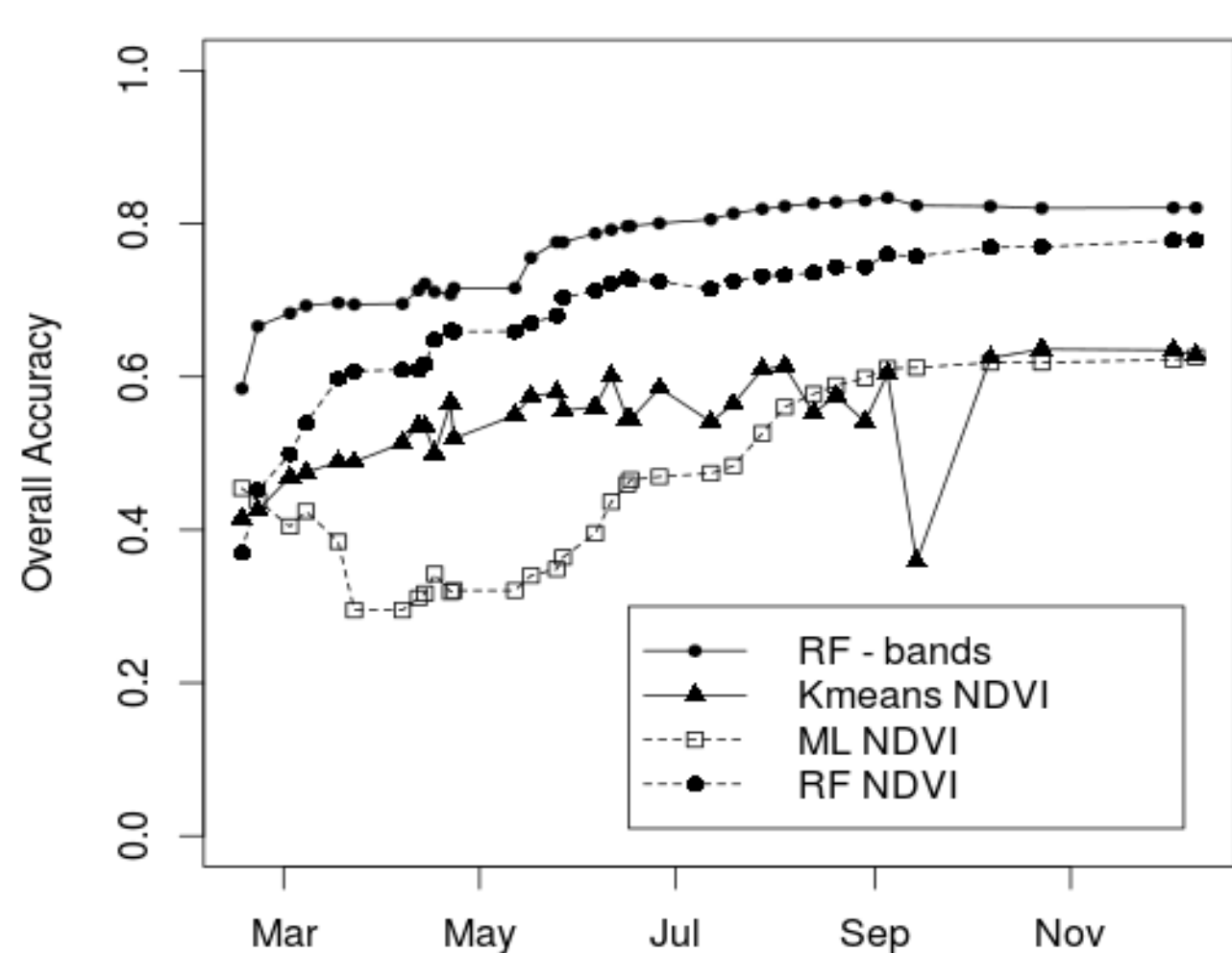
FCOVER profiles

CONCLUSIONS AND NEXT STEPS

- Accurate retrieval of the biophysical and good integration of the two sensors
- Best performance obtained with the Random Forest trained on all the spectral bands
- Equal performance of the three biophysical variables in the classification

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