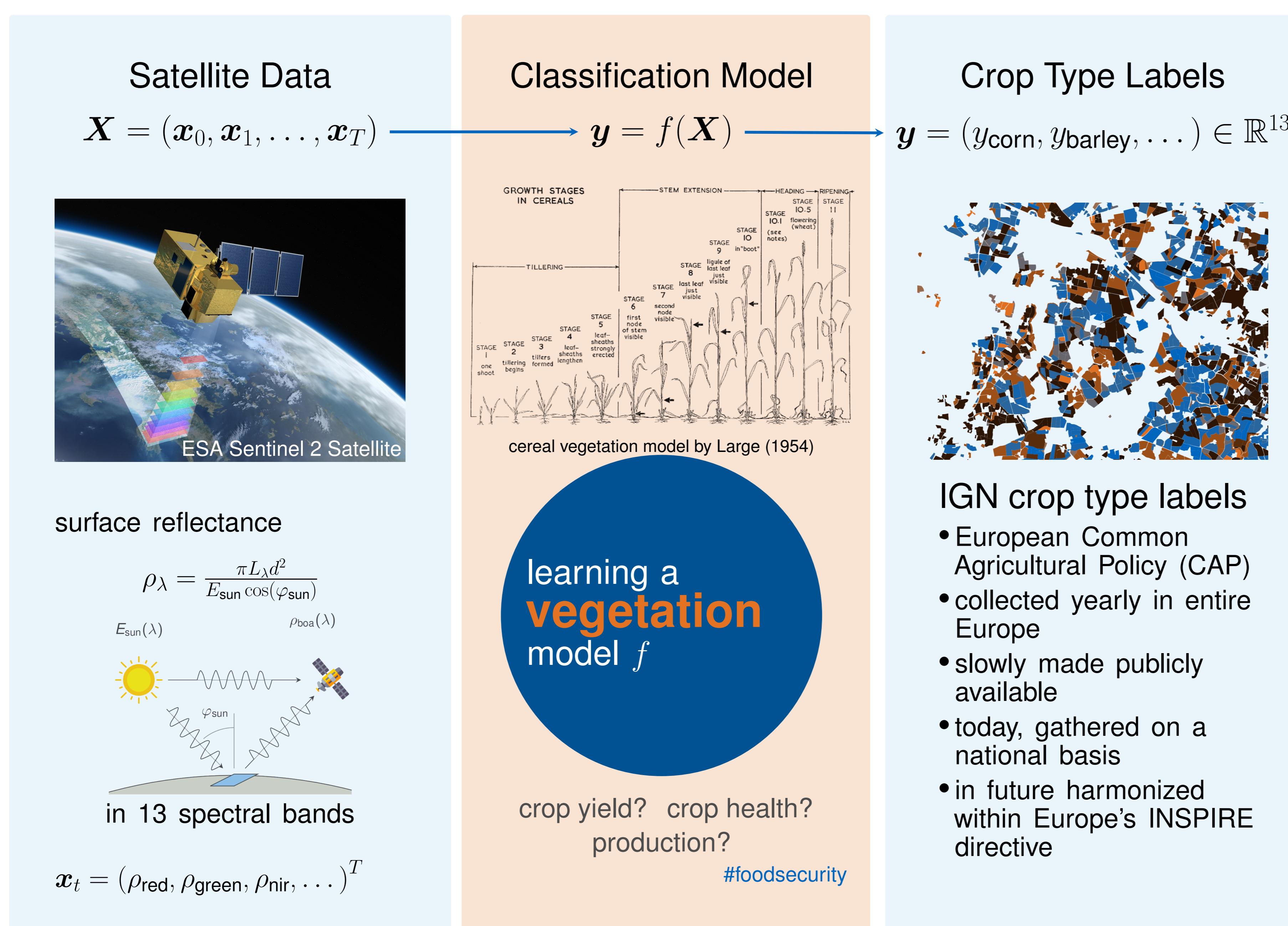


BreizhCrops: A Satellite Time Series Dataset for Crop Type Identification

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Objective

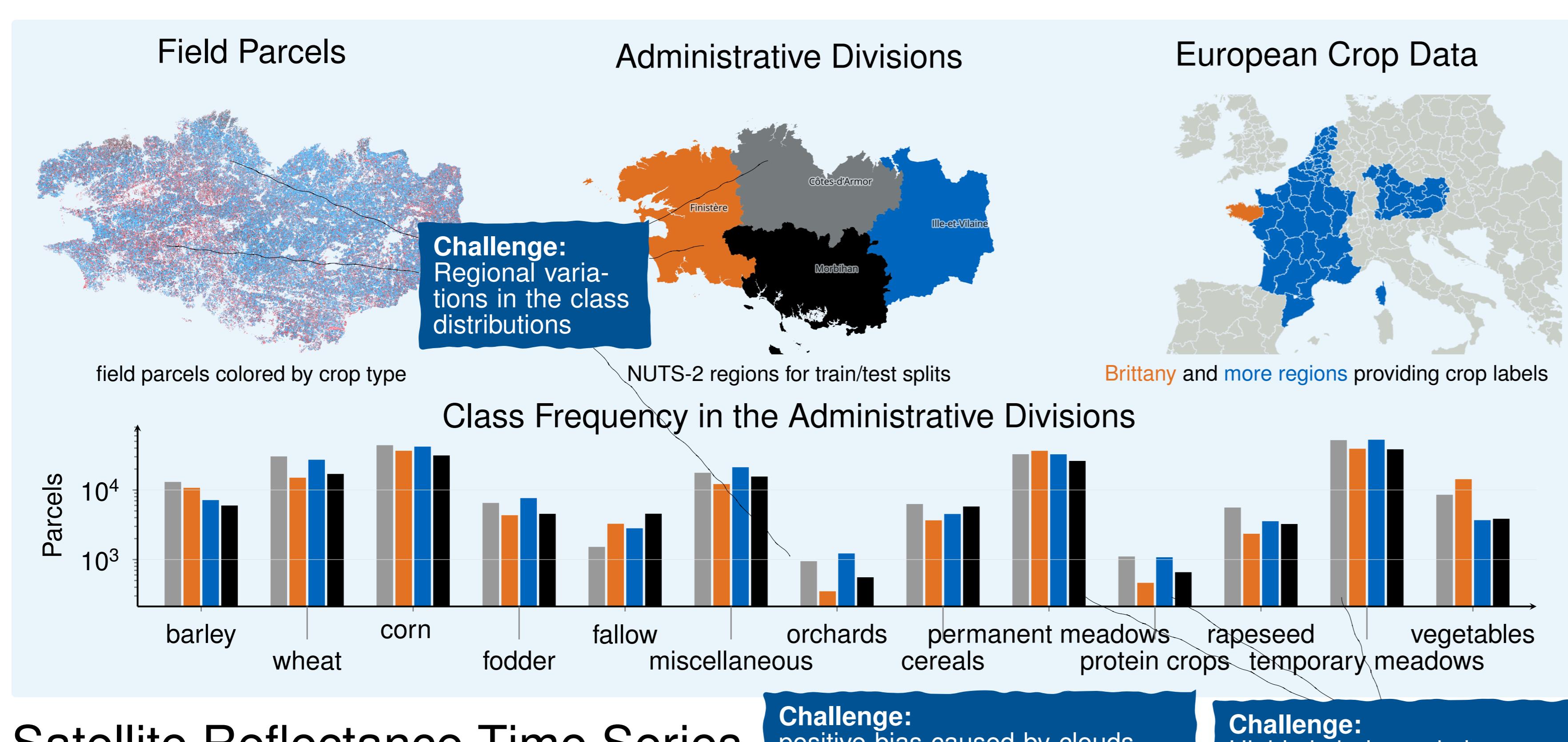


Data

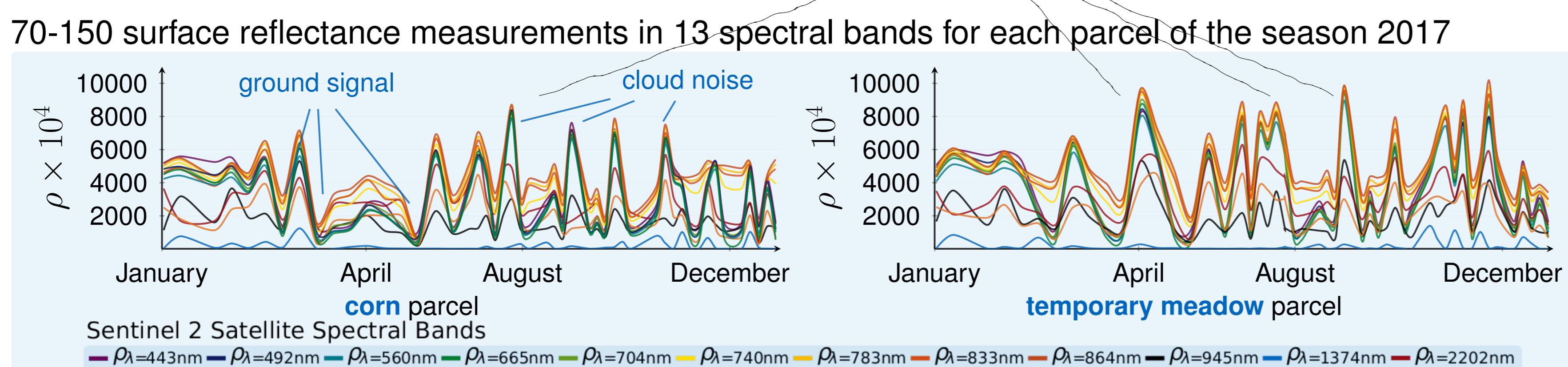
Data gathered in Brittany, France (*Breizh*) in 2017 covering 27,206 km².

Labels

580k field parcels with 13 crop categories



Satellite Reflectance Time Series



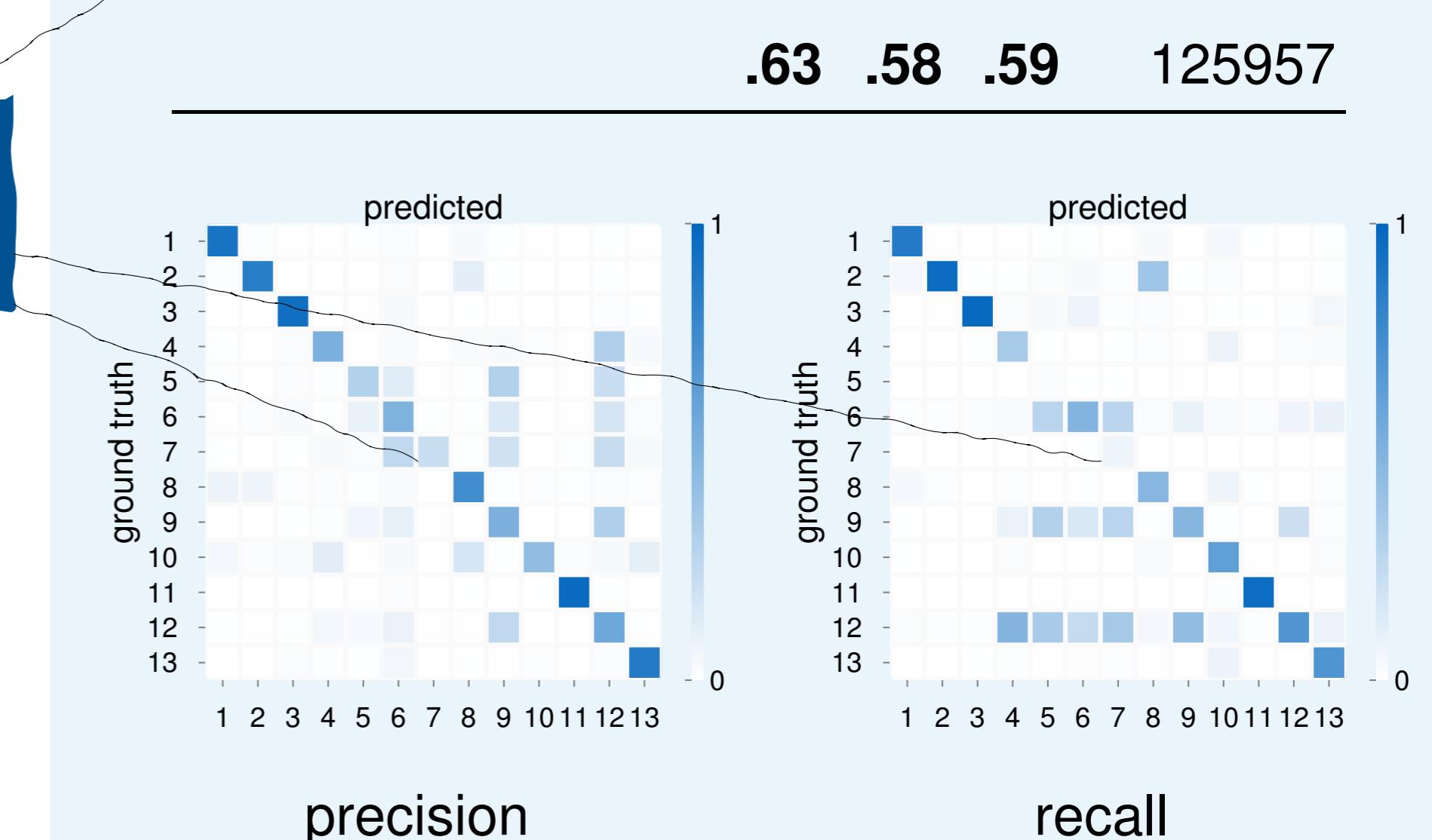
Results

We show the feasibility of classifying this dataset with **LSTM** (Hochreiter & Schmidhuber, 1997) and **Transformer** (Vaswani et al., 2017) baselines.

Comparison of baseline models					
method	accuracy	κ	f_1	prec.	rec.
Transformer	.69	.63	.57	.60	.56
LSTM	.68	.62	.59	.63	.58

Class-wise results of the LSTM model

# crop type	prec.	rec.	f_1	#samples
1 barley	.90	.86	.88	4982
2 wheat	.83	.95	.89	13850
3 corn	.93	.96	.94	25059
4 fodder	.51	.34	.41	3449
5 fallow	.30	.02	.04	3863
6 misc.	.50	.49	.49	12499
7 orchards	.21	.07	.10	391
8 cereals	.74	.47	.57	4645
9 perm. meadows	.51	.47	.49	20966
10 protein crops	.42	.61	.50	498
11 rapeseed	.96	.94	.95	2664
12 temp. meadows	.56	.68	.62	29977
13 vegetables	.86	.69	.76	3114



Outlook and Next Steps

- test generalization over **changing environmental conditions**. Problem of domain adaptation?
- pre-train a vegetation model on crop type labels and fine-tune related tasks with less labels (e.g., crop yield regression)
- include additional modalities (e.g., radar observations, precipitation, temperature, elevation)

References

- Hochreiter, S. and Schmidhuber, J. Long short-term memory. *Neural computation*, 9(8):1735–1780, 1997.
- Large, E. C. Growth stages in cereals illustration of the feekes scale. *Plant Pathology*, 3(4):128–129, 1954. ISSN 1365-3059. doi: 10.1111/j.1365-3059.1954.tb00716.x.
- Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, L., and Polosukhin, I. Attention is all you need. 2017.

