

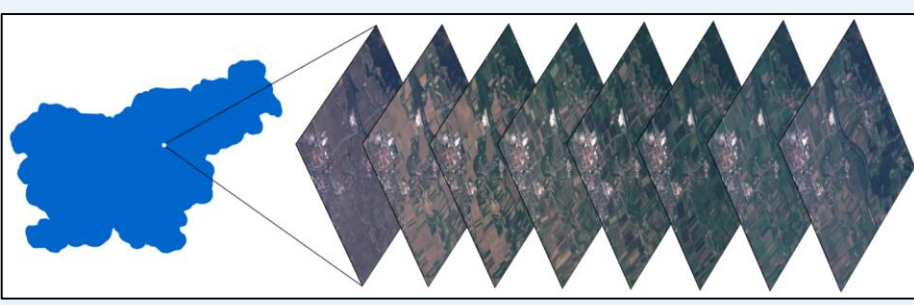
# To what extent can EnMAP data differentiate between similar winter cereal species? A case study in Wallonia (Belgium)

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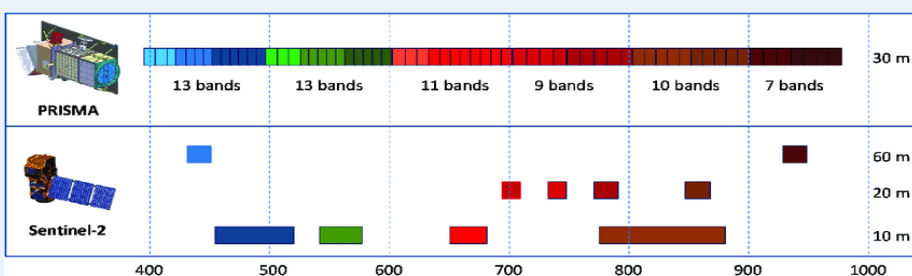
## Can we improve crop mapping with Hyperspectral Imagery?

Crop mapping with temporal MSI



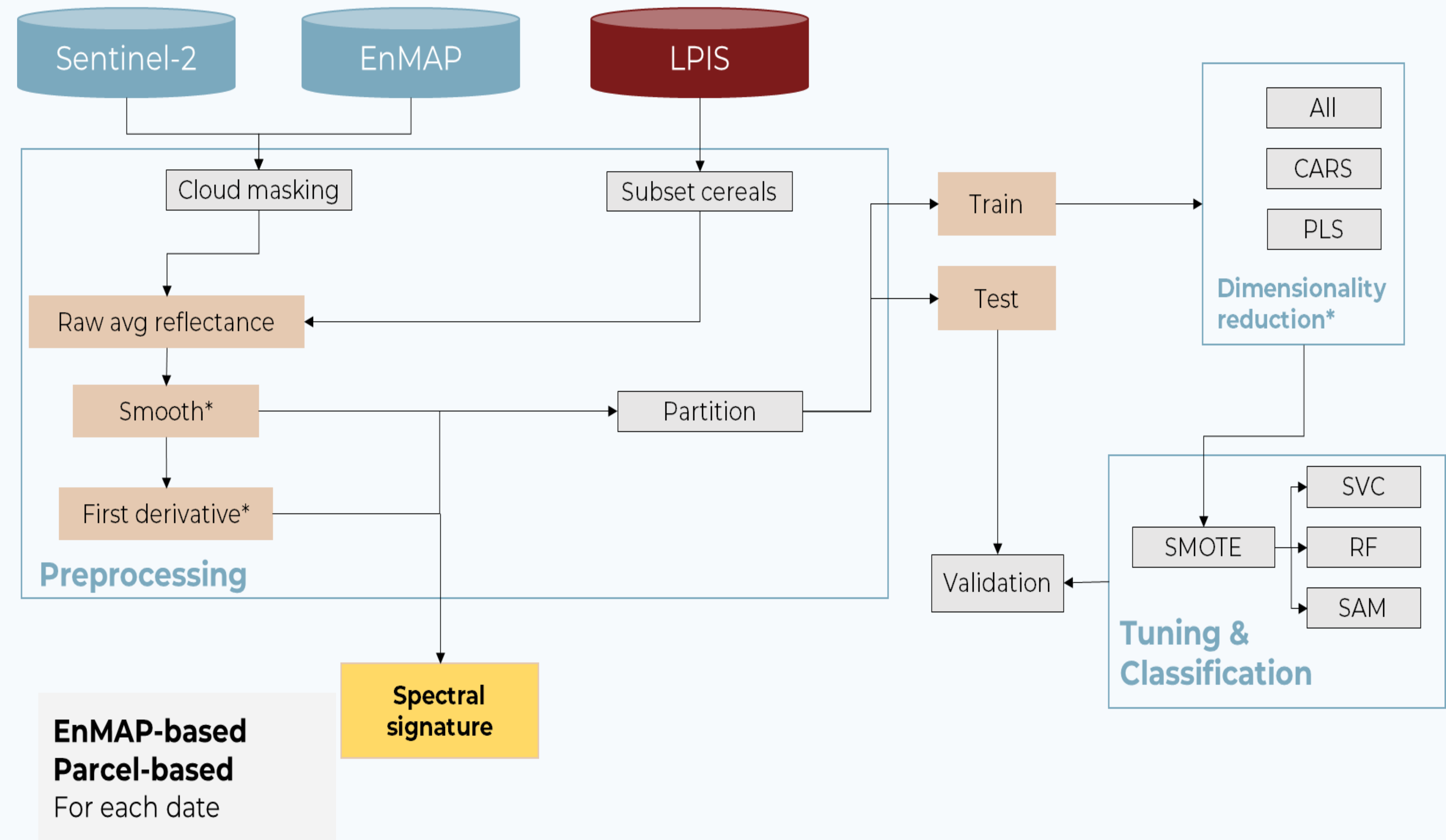
- Temporal-based approaches
- Significant processing needed

HSI: finer spectral resolution



- Spectral-based approaches
- High dimensionality handling required

## Methodology



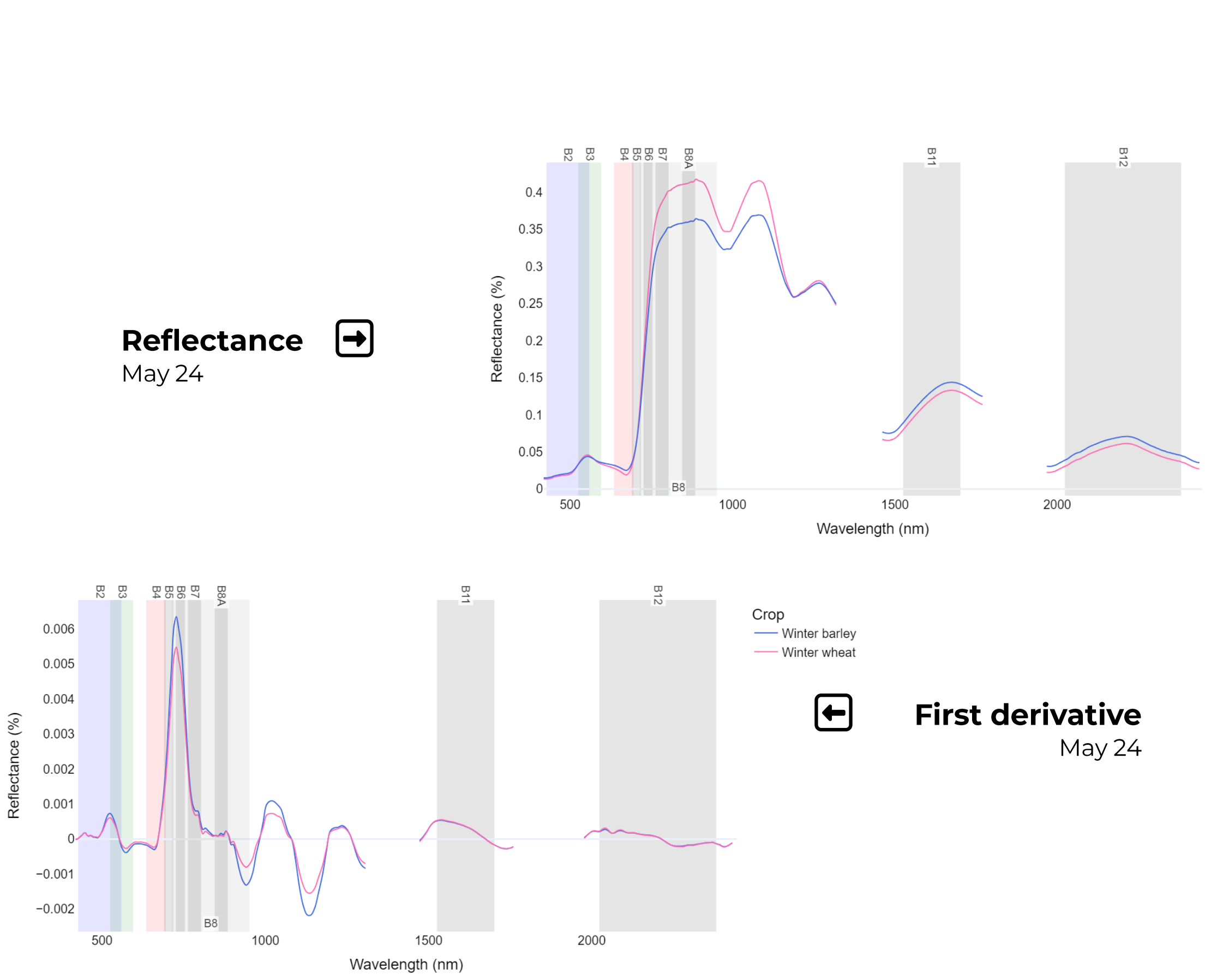
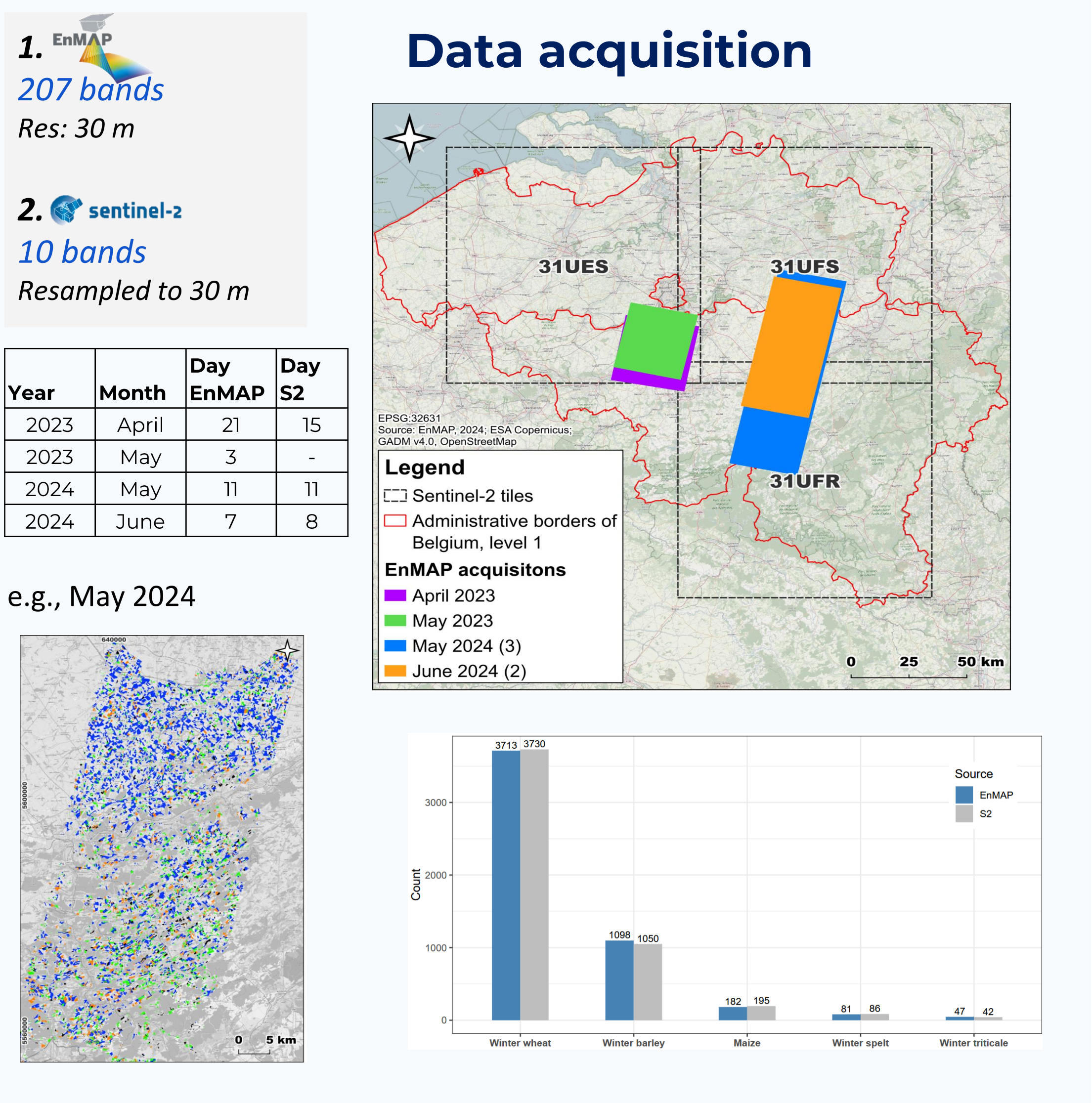
## Single date: EnMAP outperforms Sentinel-2

e.g., May 2024

| Source | Classifier | SMOTE | Predictor    | Features | F1-M        | BAcc       | F1-W        | Acc         | Kappa       |
|--------|------------|-------|--------------|----------|-------------|------------|-------------|-------------|-------------|
| EnMAP  | SVC        | NO    | Reflectances | All      | <b>0.78</b> | <b>0.8</b> | <b>0.96</b> | <b>0.95</b> | <b>0.90</b> |
| S2     |            |       |              |          | 0.51        | 0.52       | 0.89        | 0.88        | 0.73        |

## Take home messages

- Single date HSI to classify crops ?
  - Scores above 90%**
- How to leverage HSI ?
  - SVC + Reflectance + All bands + No SMOTE**
- What HSI offers beyond MSI?
  - No need of multirate & low processing;**
  - HSI comparatively better >> minor crops**



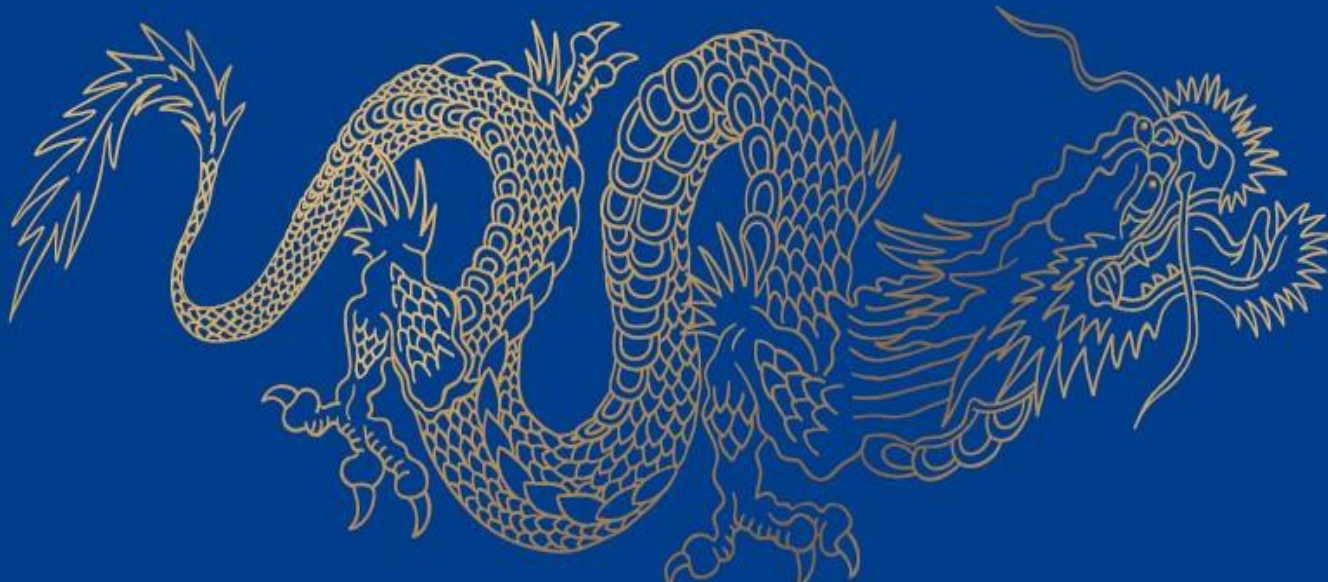
Find it online

|                    |       |               |              |                  |              |
|--------------------|-------|---------------|--------------|------------------|--------------|
| Maize -            | 12    | 4             | 2            | 5                | 1            |
| Winter barley -    | 3     | 321           | 0            | 0                | 6            |
| Winter spelt -     | 2     | 0             | 41           | 1                | 11           |
| Winter triticale - | 0     | 1             | 1            | 11               | 1            |
| Winter wheat -     | 1     | 8             | 22           | 1                | 1082         |
|                    | Maize | Winter barley | Winter spelt | Winter triticale | Winter wheat |

Predicted

|                    |       |               |              |                  |              |
|--------------------|-------|---------------|--------------|------------------|--------------|
| Maize -            | 9     | 6             | 6            | 2                | 3            |
| Winter barley -    | 9     | 273           | 7            | 9                | 17           |
| Winter spelt -     | 4     | 6             | 25           | 2                | 21           |
| Winter triticale - | 0     | 4             | 3            | 0                | 6            |
| Winter wheat -     | 14    | 22            | 21           | 16               | 1046         |
|                    | Maize | Winter barley | Winter spelt | Winter triticale | Winter wheat |

Predicted



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