TEAGASC RESEARCH INSIGHTS
LEADING RESEARCH FOR TOMORROW'S AGRI-FOOD SYSTEMS

What can satellites see?

Stuart Green, REDP

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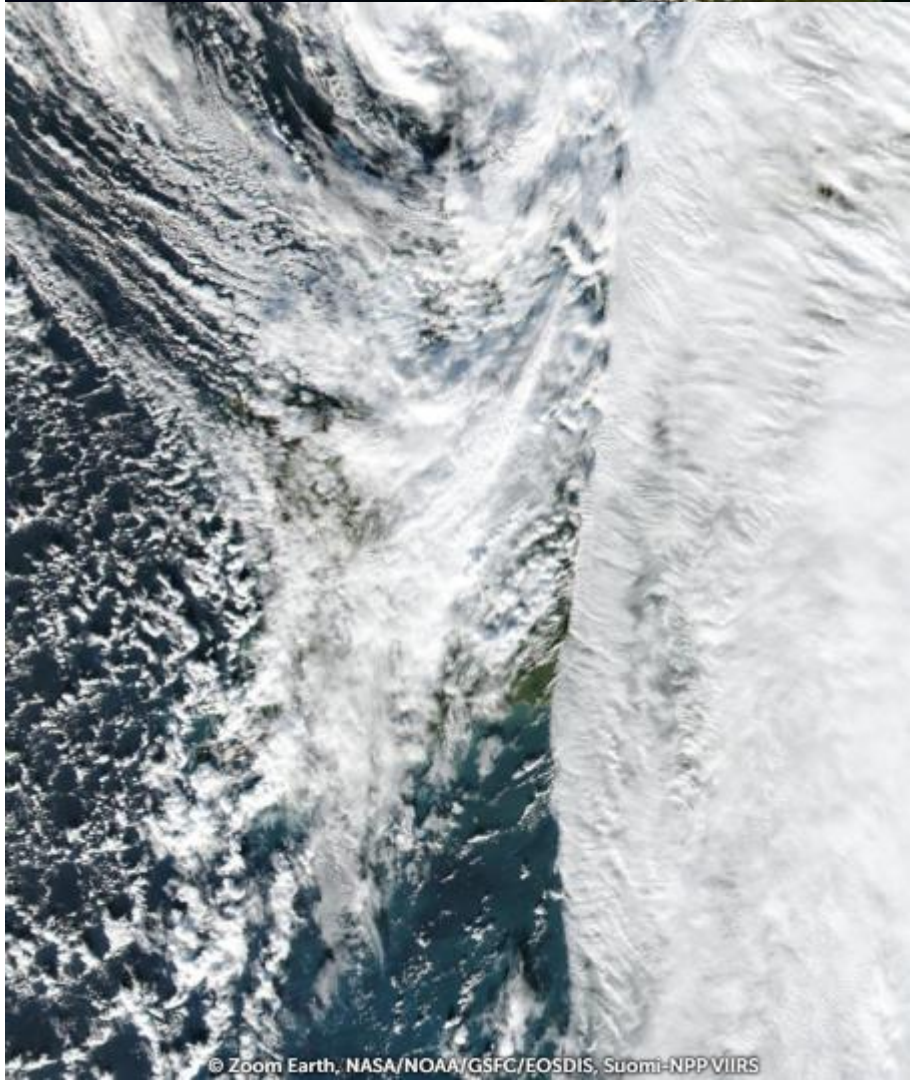

Sometimes satellites can see everything…..

….but most of the time they see only clouds

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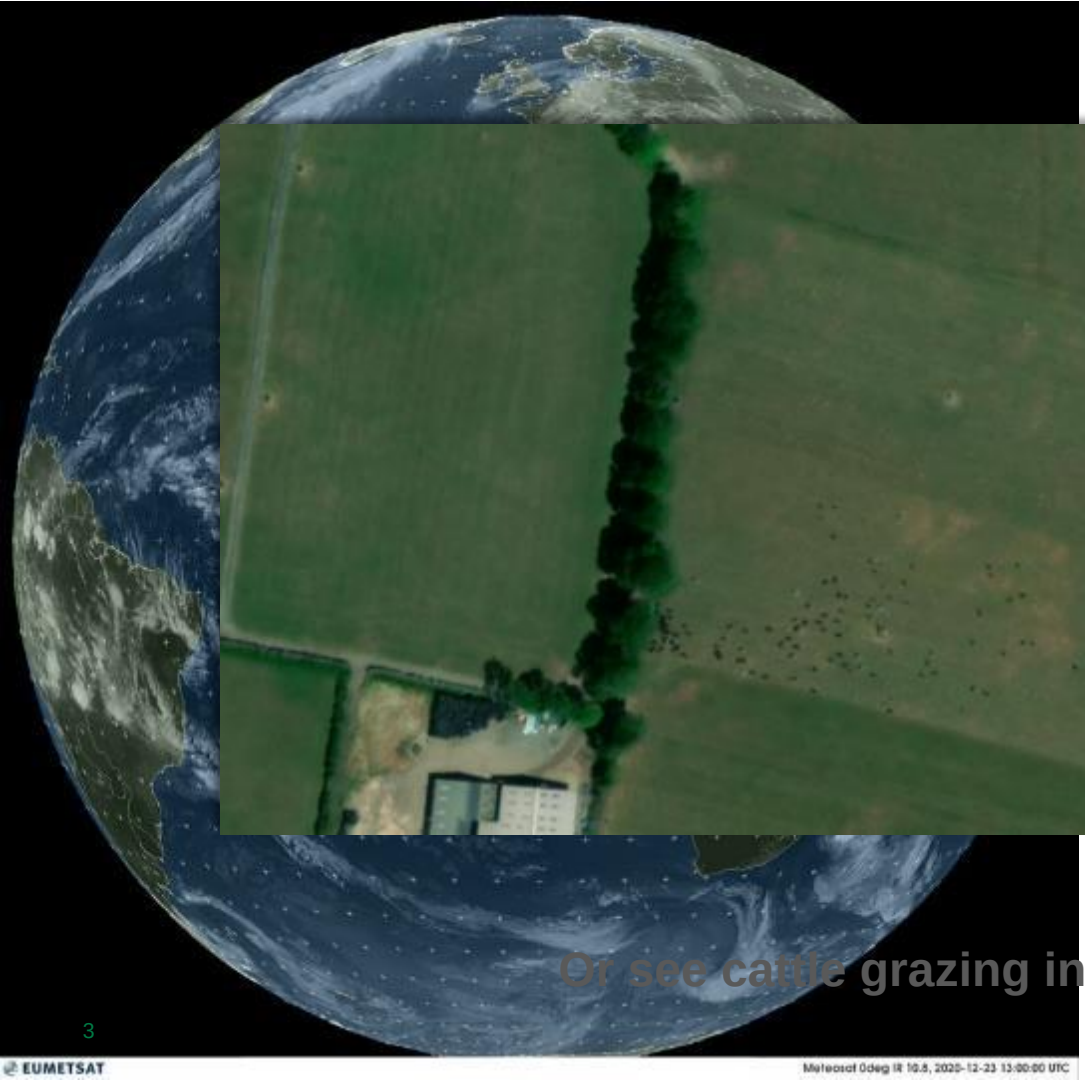

alf the globe

Or see cattle grazing in a field

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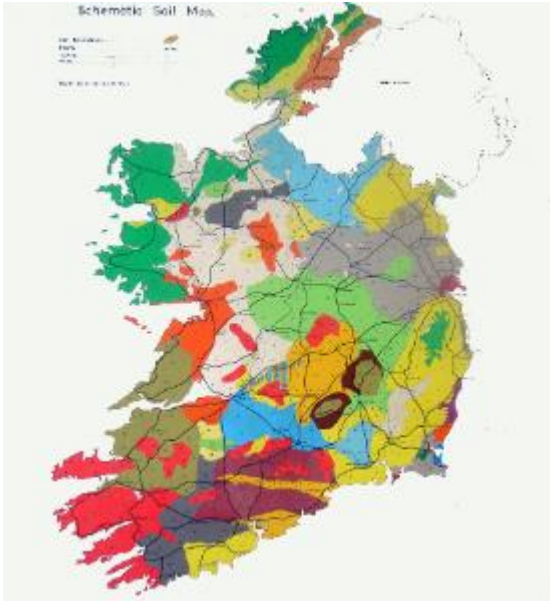
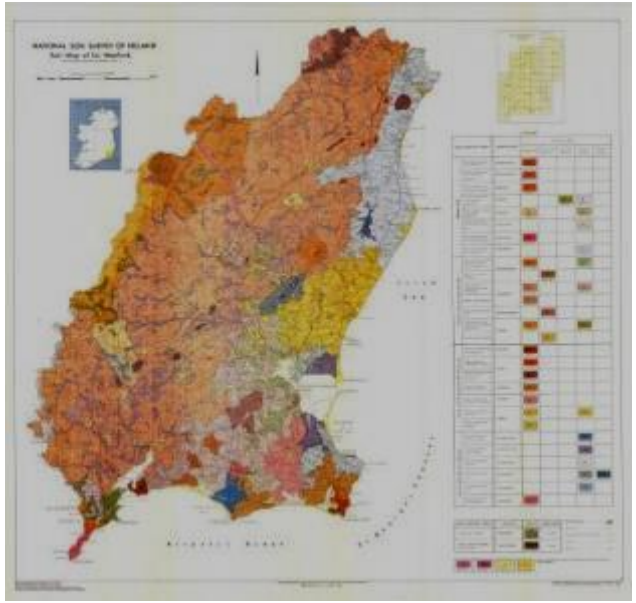
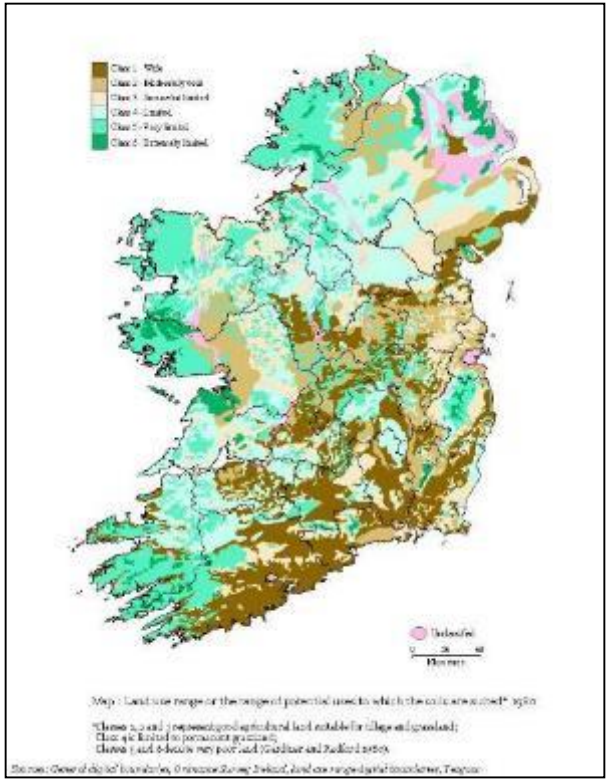
Teagasc has long been in the Land use mapping business.







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Now we use Earth Observation Technology

There are approximately 900 EO satellites in orbit now (out of a total of 2500)

50/50 split Military and Civilian

https://business.esa.int/newcomers-earth-observation-guide

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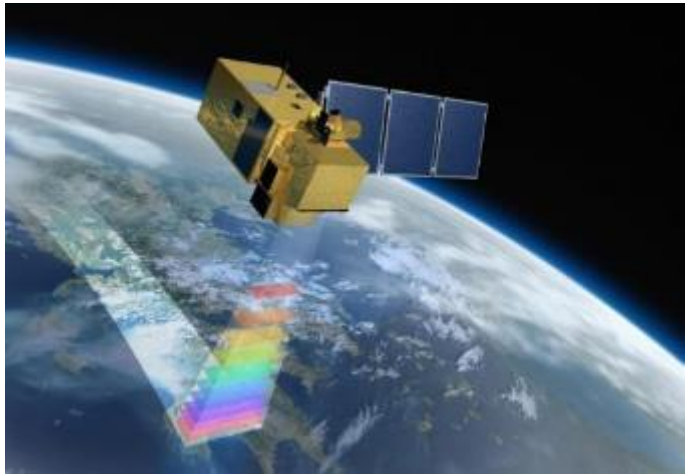
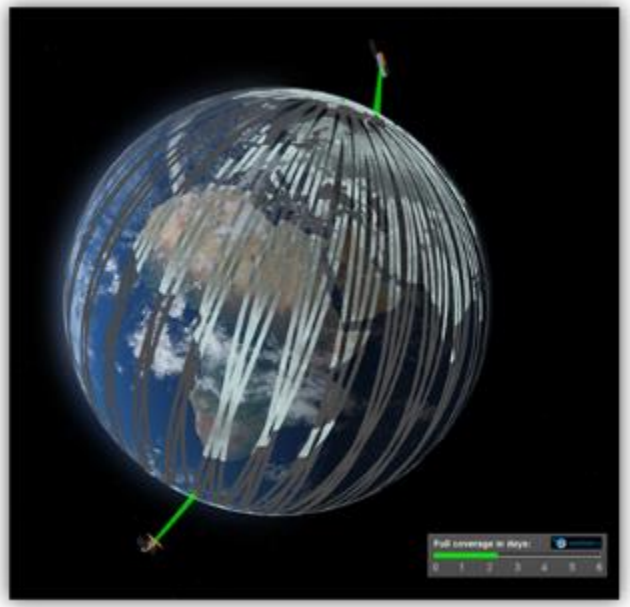
You can think of these EO satellites as digital cameras in space





http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Sentinel-2

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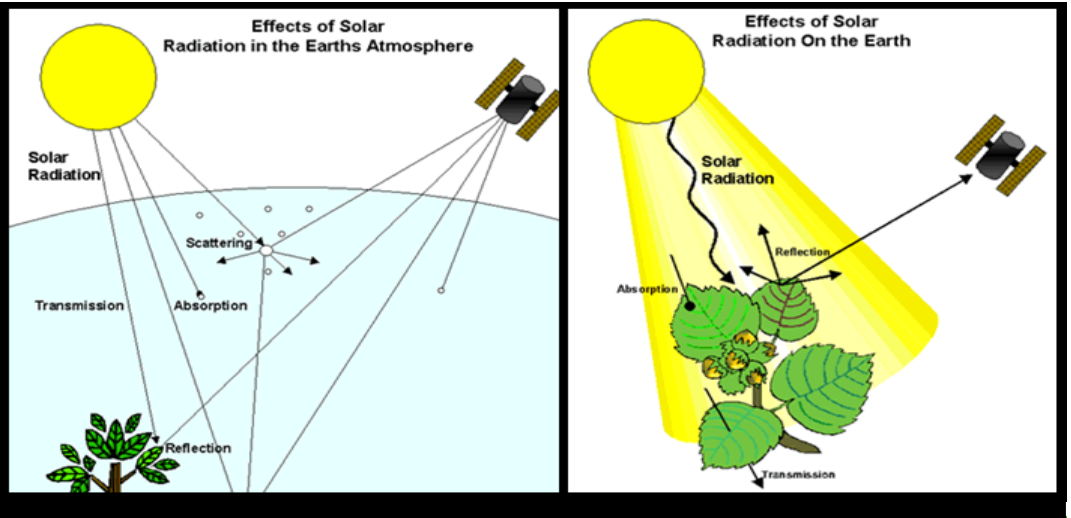
Taking a picture from space



Grass is green because it absorbs red and blue light but reflects green.

The physics of EO can be complex. To use EO data to its fullest we have to model this physics to correct for distortion due to atmosphere etc.

All these processes are wavelength dependent

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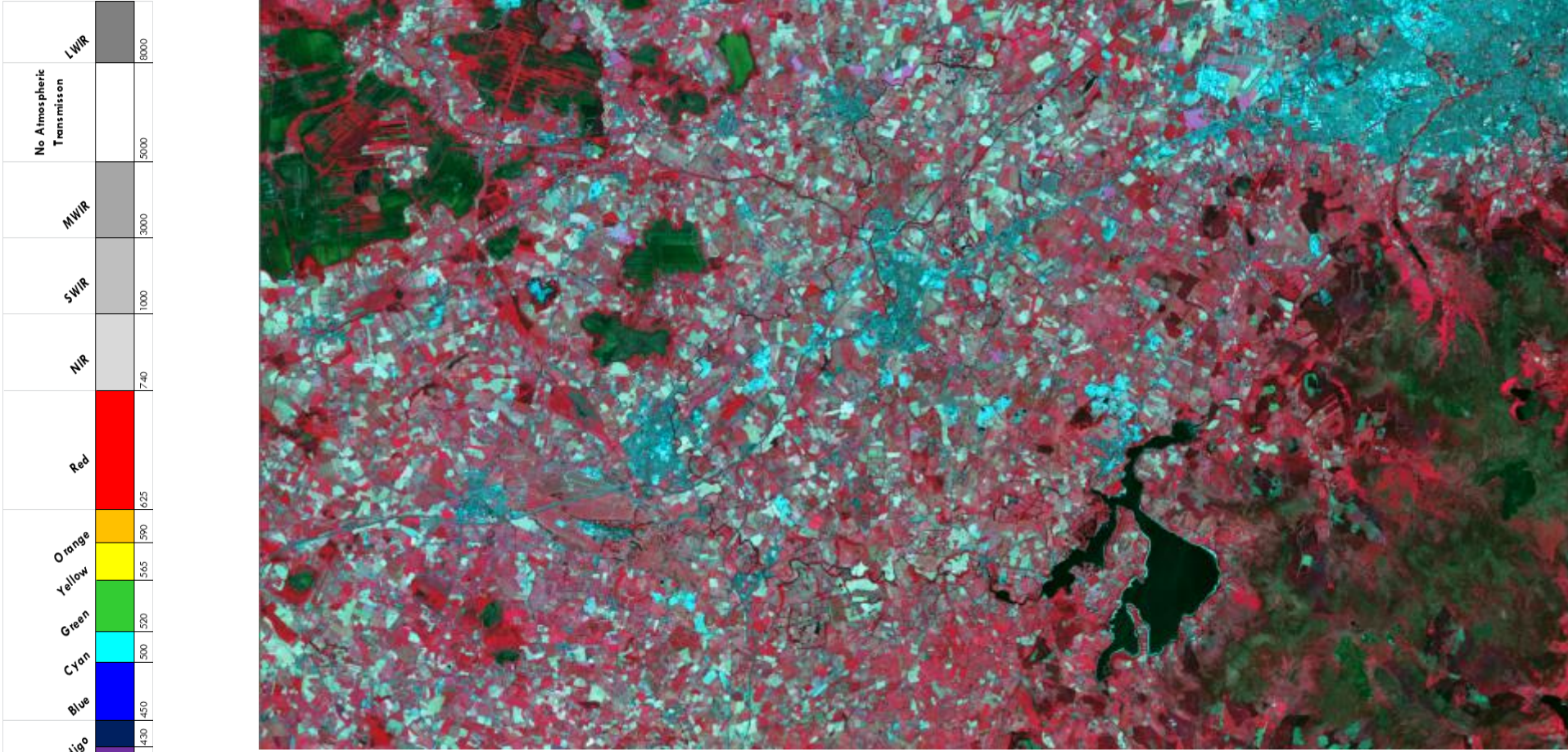

Landsat 8 RGB 543

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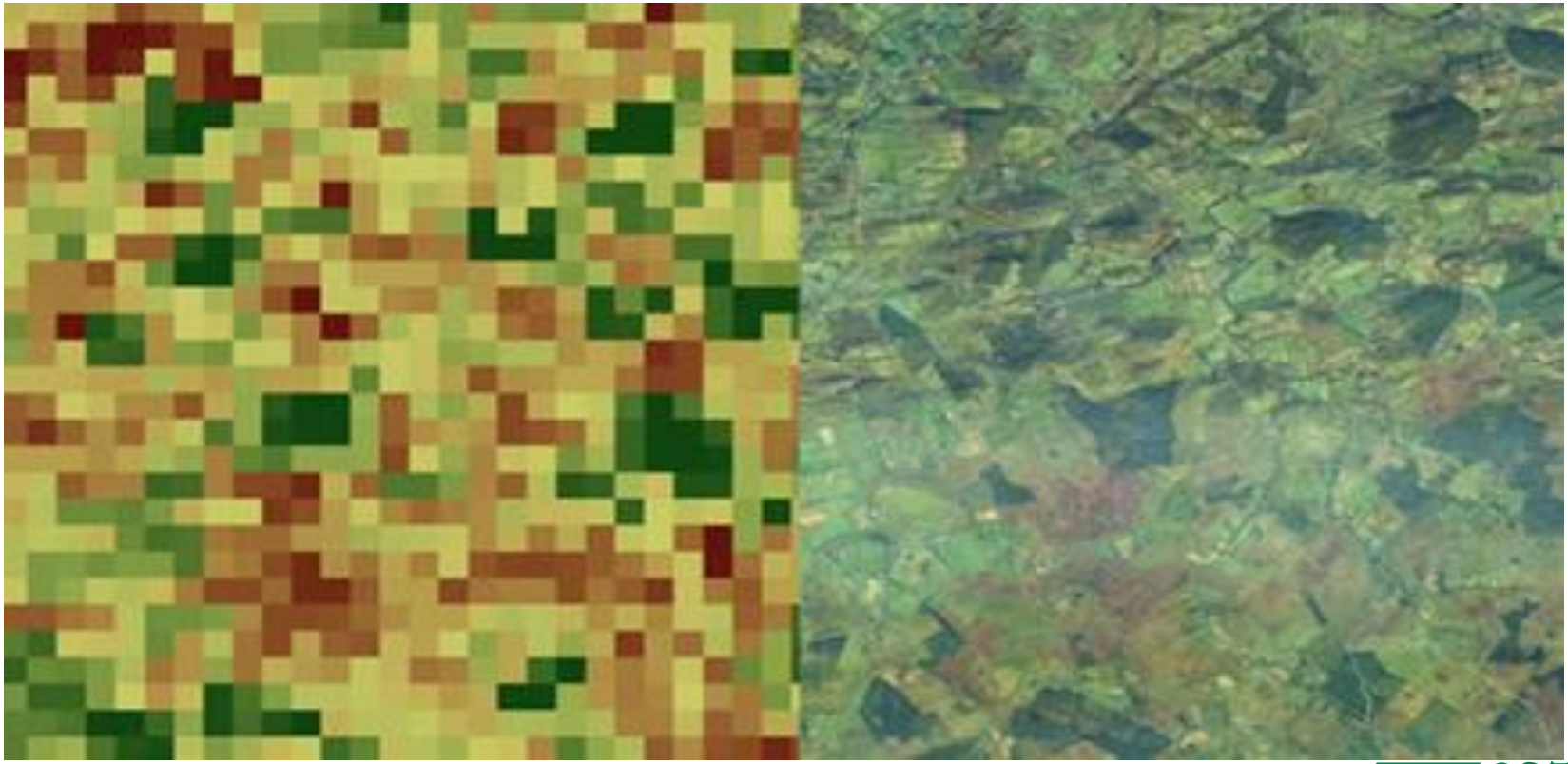
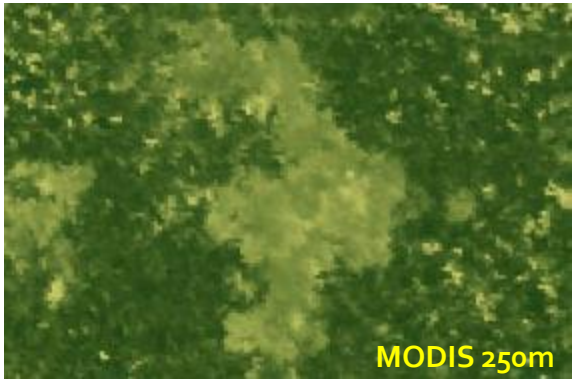
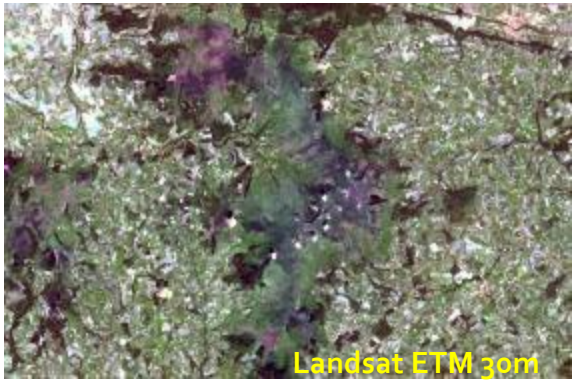
Resolution







https://sentinel-hub.com/explore

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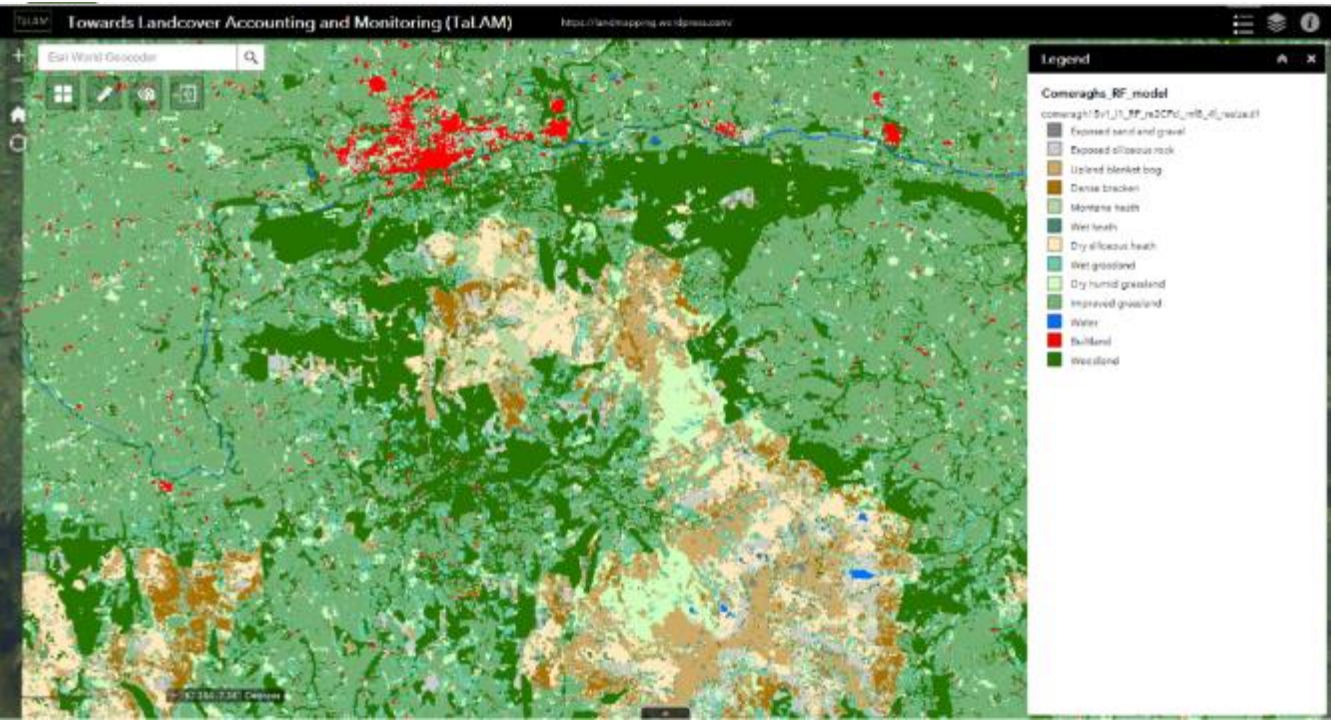
Mapping land cover- classification of Satellite Images



- Land use
- Land cover
- Habitat
- Land management

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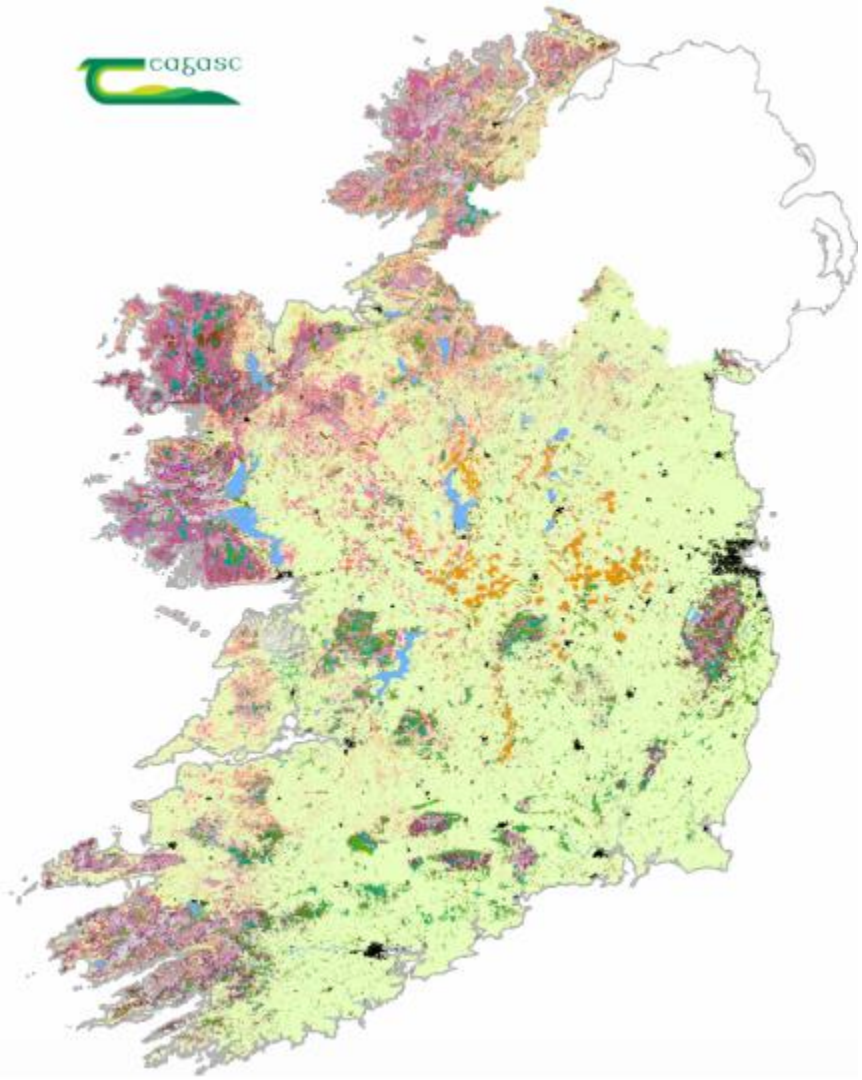

Classical methods were used to create the first habitat and land cover maps for Ireland.

These in turn were used in the Teagasc Indicative Soil Map project to digital model soil properties for Ireland

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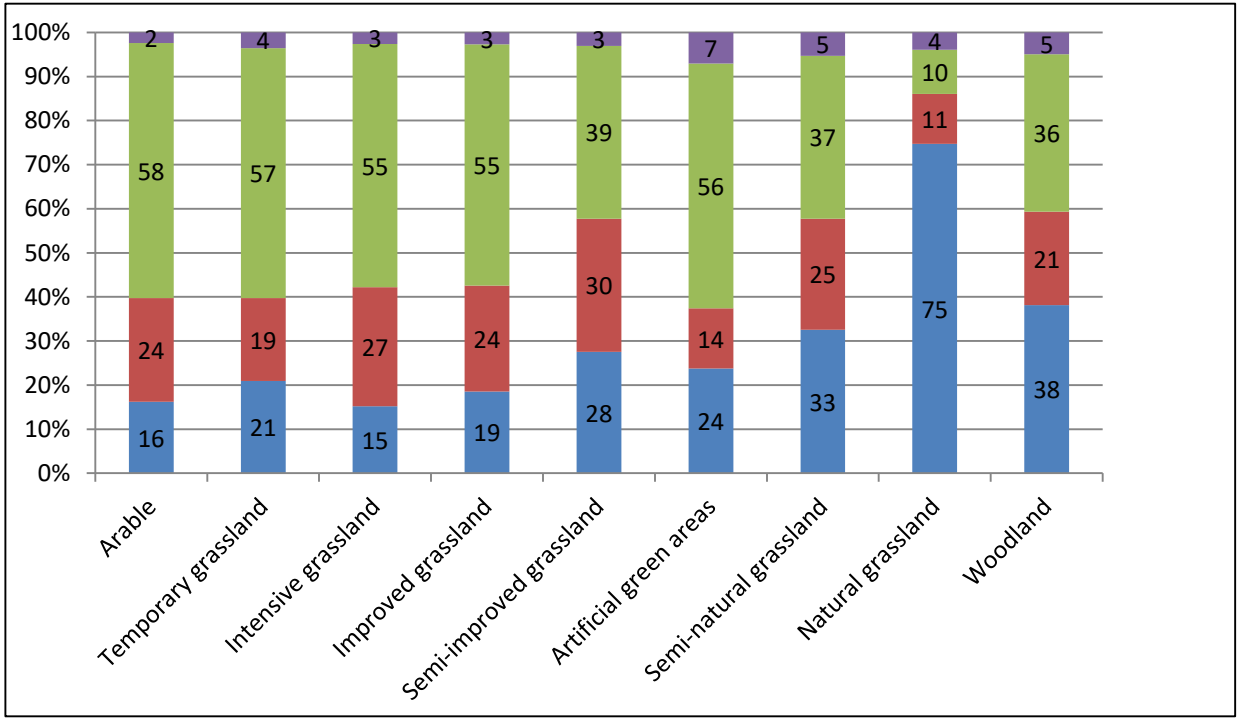
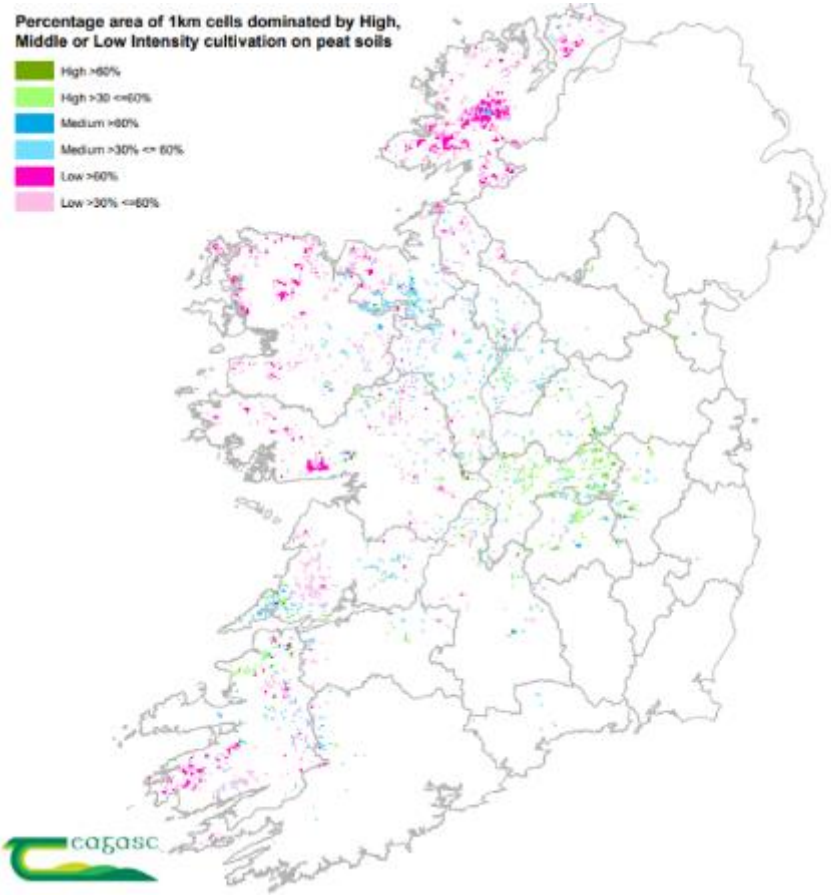
“SOLUM” project



Mapping grasslands over peat



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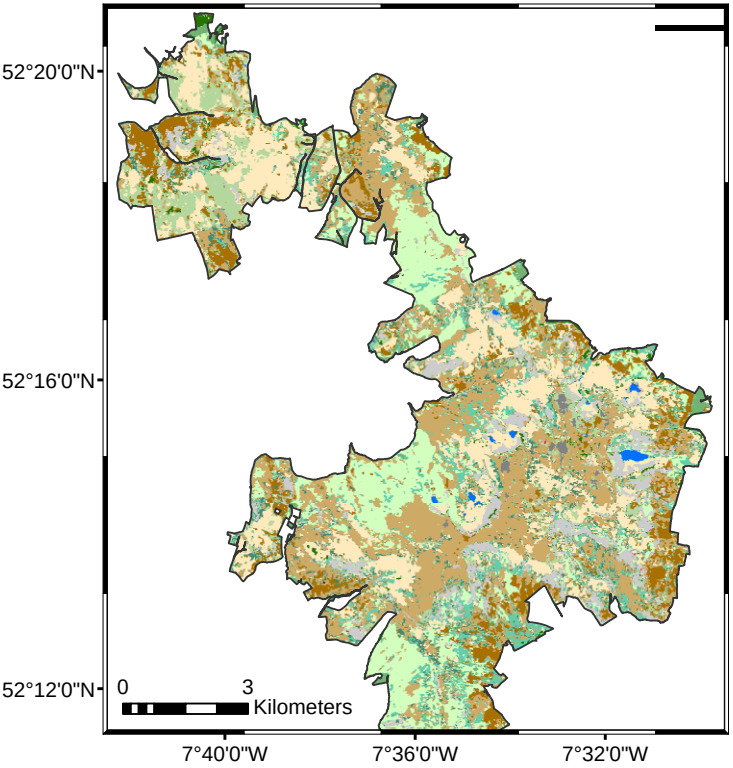
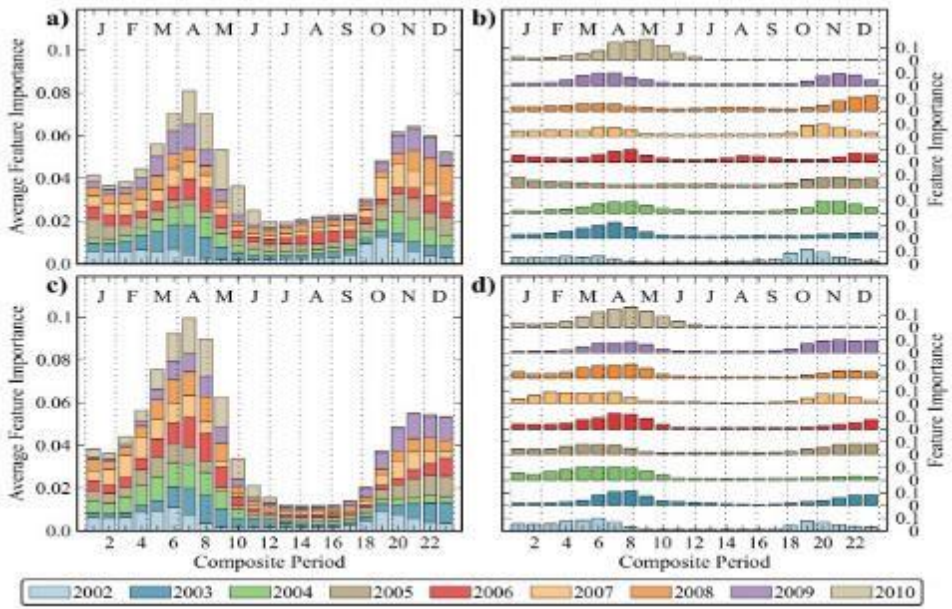
“TALAM” & “ILMO” projects





fers

epa

ucc
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

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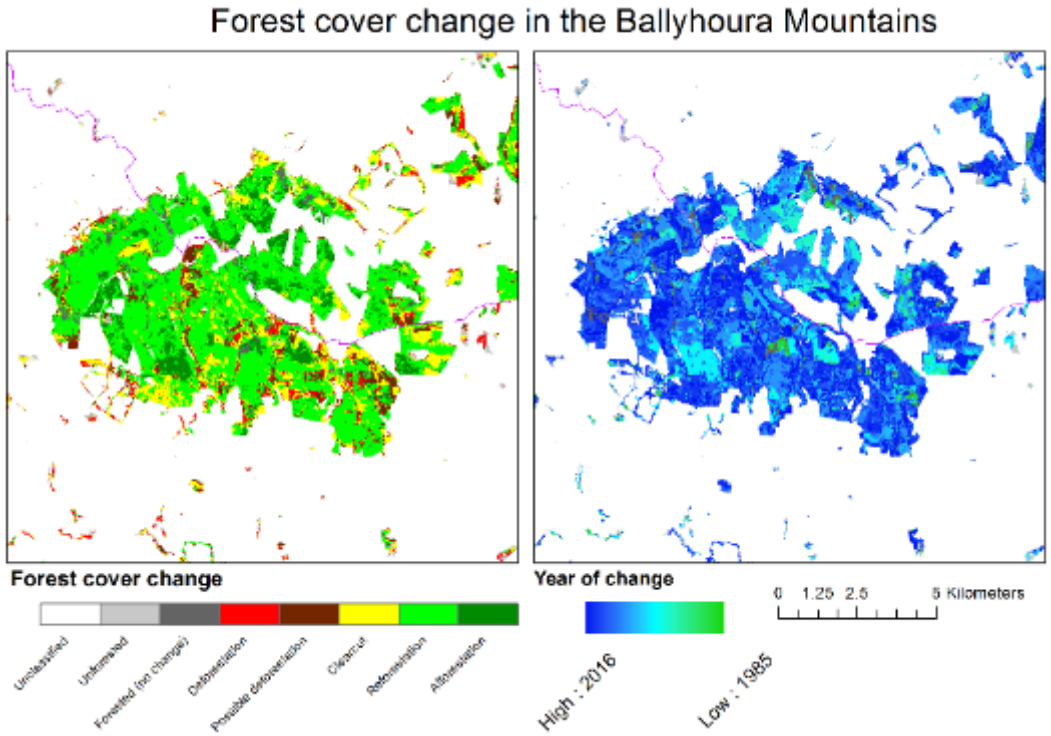
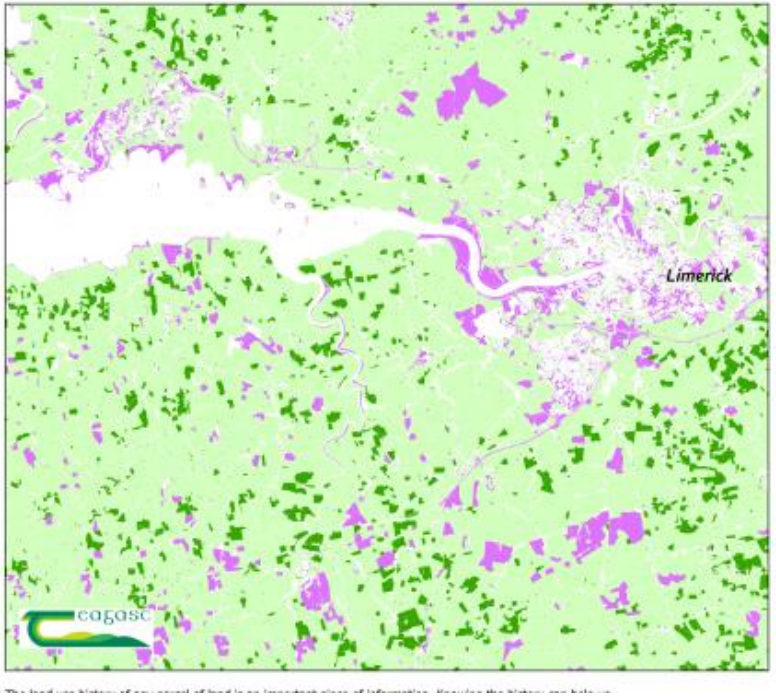
Teagasc EO archive

Creating an indicative history of vegetation cover since the 1980's

- Ifordeo- open source software to create land use histories form our Teagasc Landsat Archive (1986 on)





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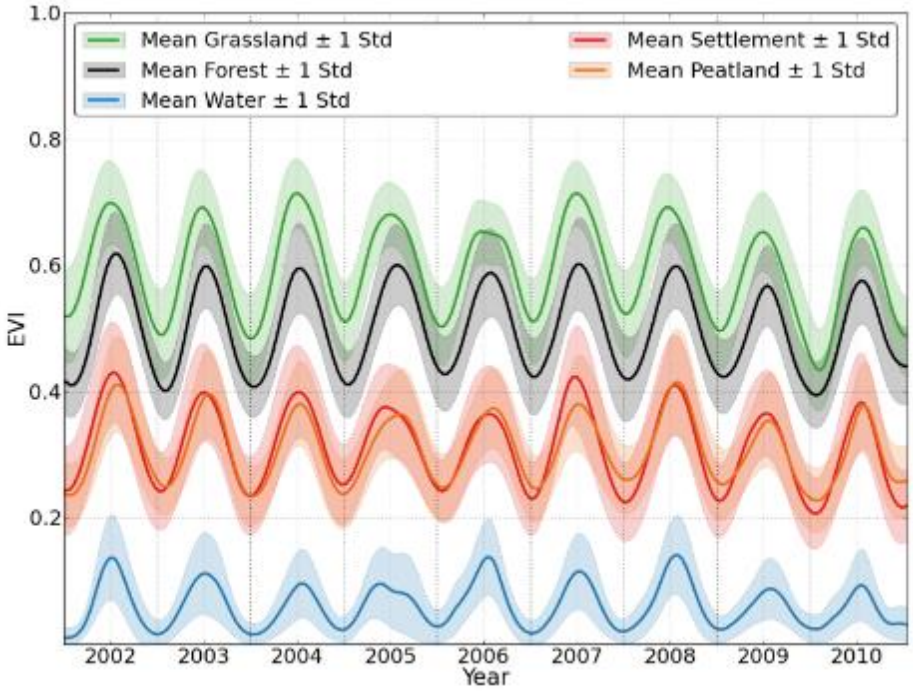
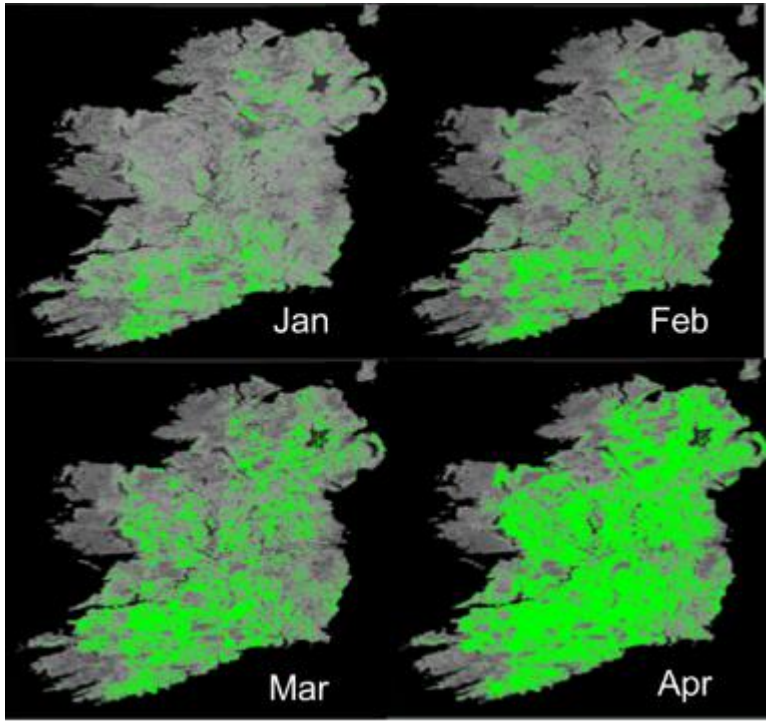
The archive means we can go from today back to the 80s

Phenology





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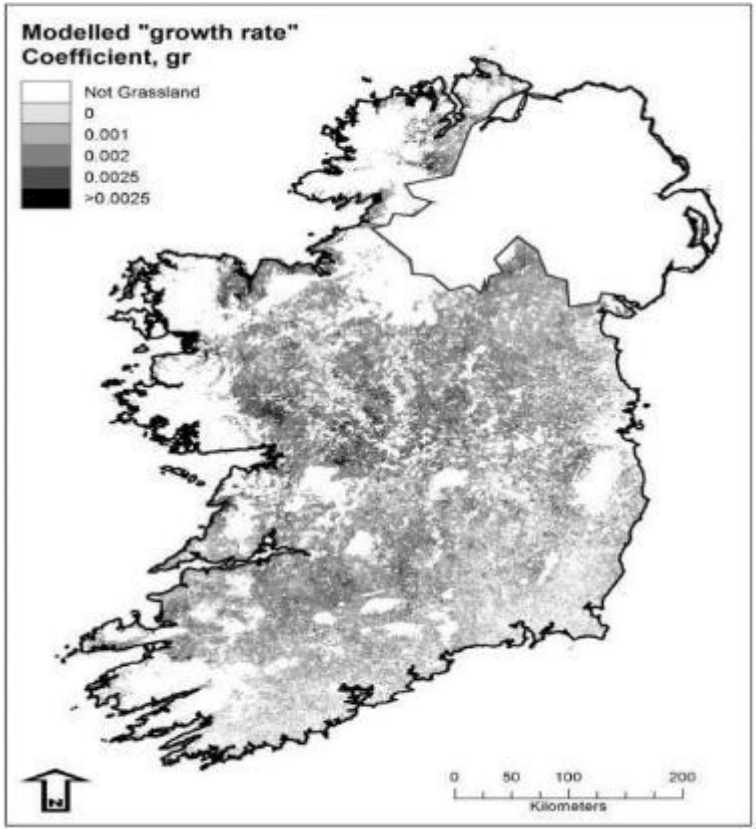
Phenology: Spring Growth Model



Linking spring growth with weather data and current satellite observations we can predict Turn out Date and model environmental impacts on TOD. For example:

Turn Out Date gets a day later for every 16km north from the south coast.

See through cloud with RADAR

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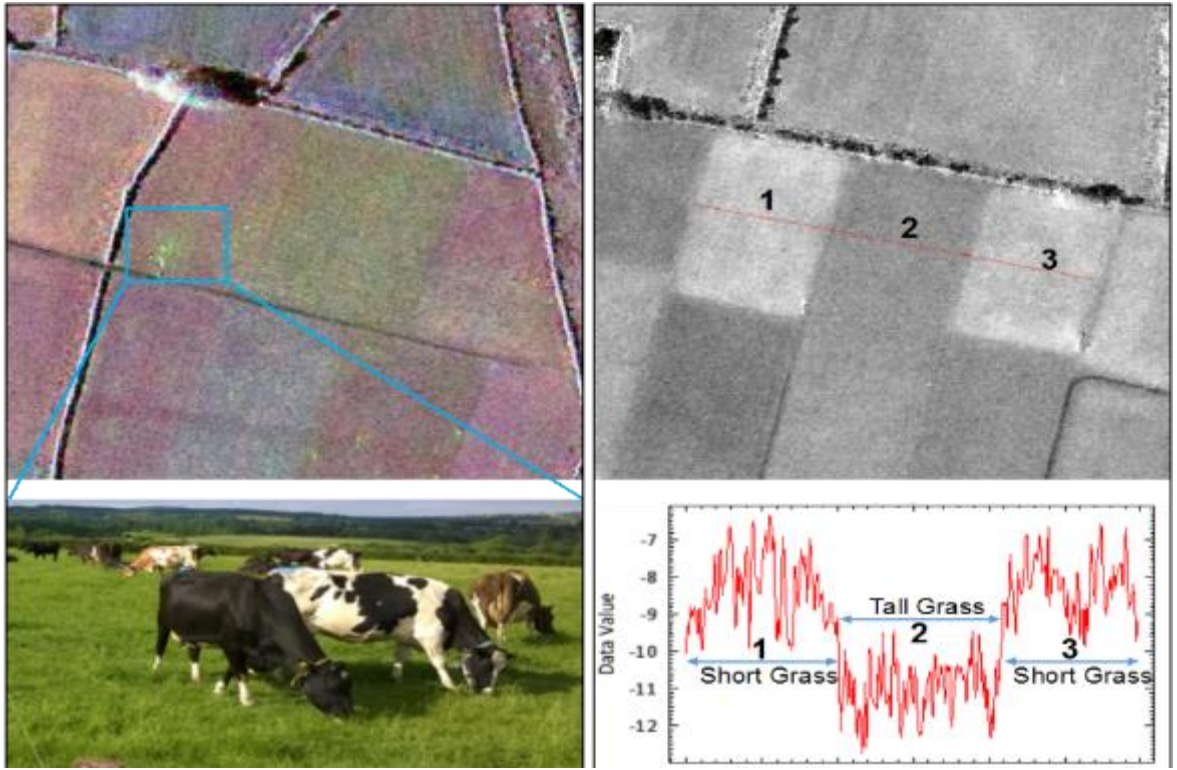

RADAR is good at spotting change- not so good at explaining it

Mapping wild fires in 2020

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Satellites can tell us a lot about Irish agriculture

- What agriculture is occurring
- What management is happening
- It gives us detail and an overview
- Give us statistics on land use AND land use change