Examples of radar remote sensing in Natural Resources Wales (NRW)

Dr Helena Sykes

helena.sykes@naturalresourceswales.gov.uk

Flooding – February 2020

Cyfoeth Naturiol Cymru | Natural Resources Wales
@NatResWales

👱‍♀️ 👱‍♀️ We're continuing to keep a close eye on river levels on the Wye at Monmouth, after the river reached record-breaking levels earlier this morning.

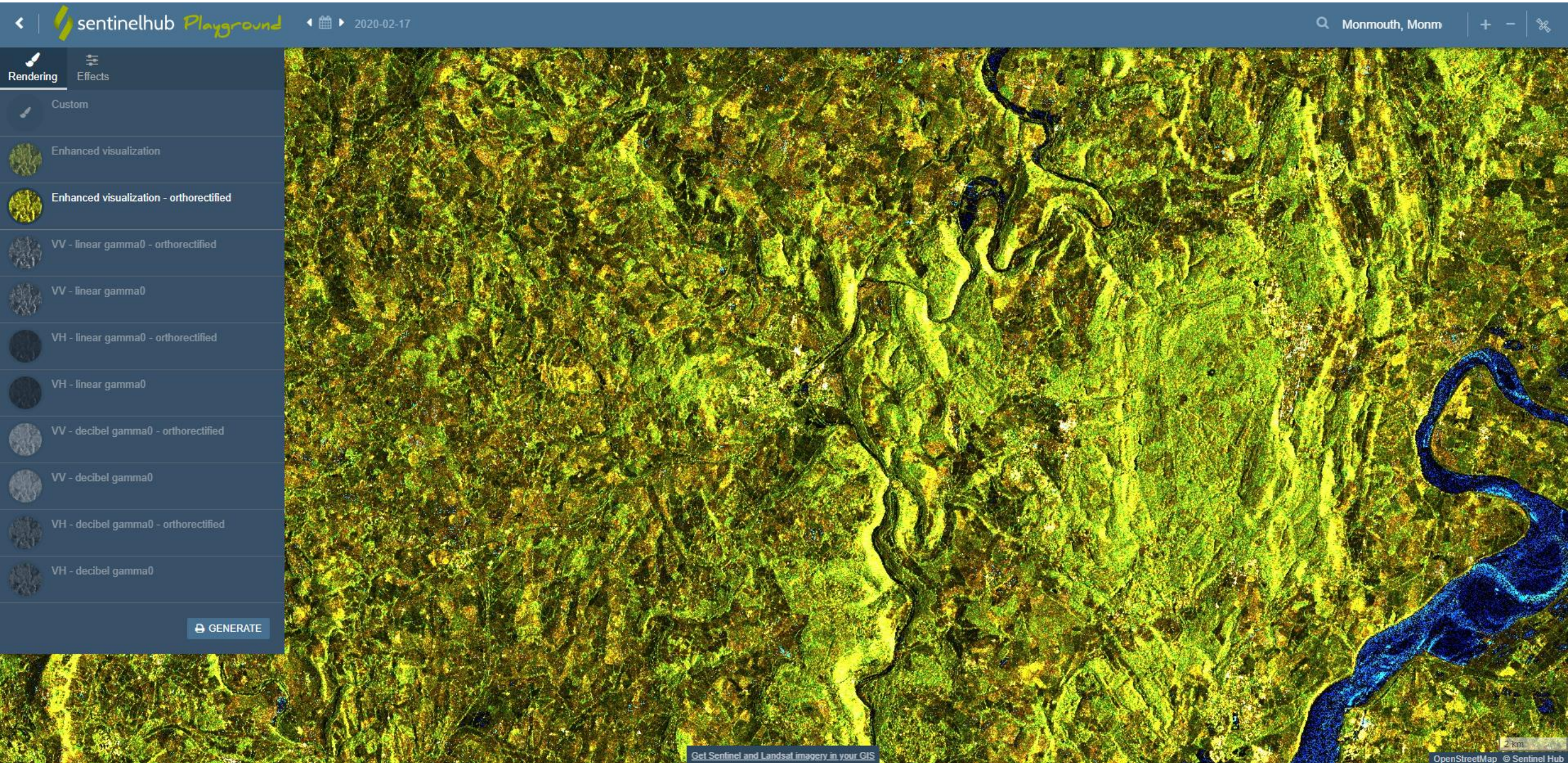
12:38 PM · Feb 18, 2020

22 See Cyfoeth Naturiol Cymru | Natural Resources Wales's o...

Picture credit: ITV https://www.itv.com/news/wales/2020-02-18/homes-evacuated-and-roads-closed-in-monmouth-as-severe-flood-warning-declared/

Visualisation – Sentinel Hub

https://www.sentinel-hub.com/



Cabinet Office

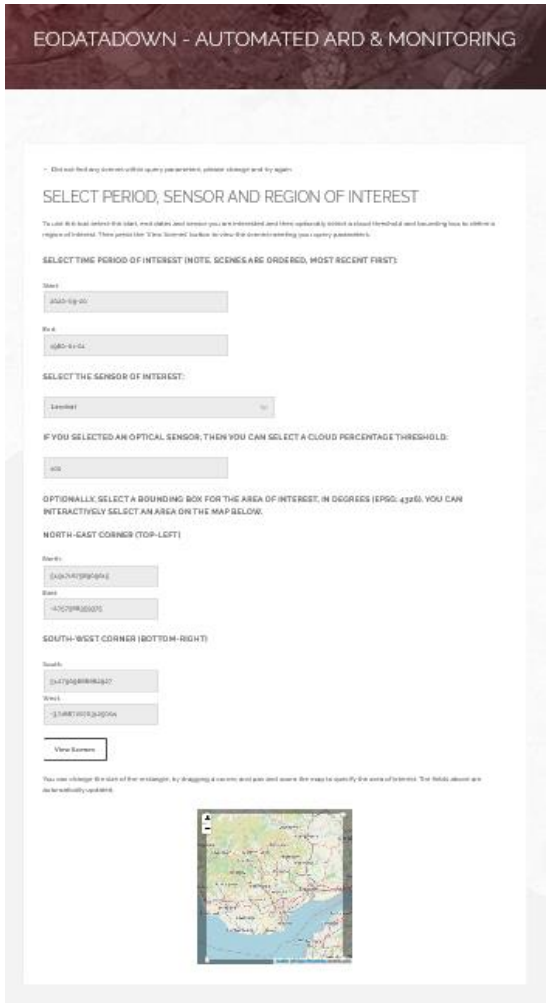
UK SPACE AGENCY

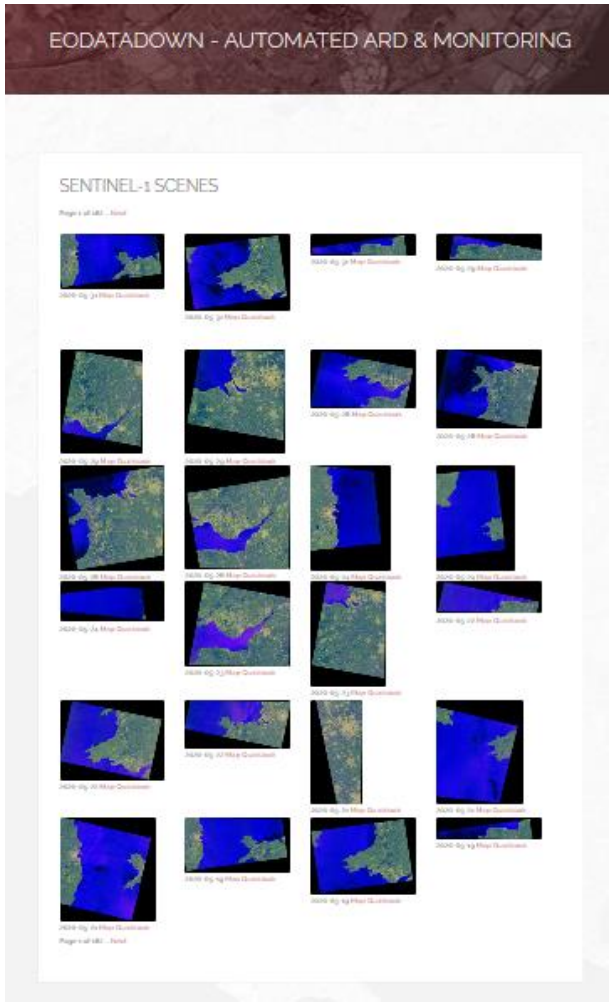
Copernicus Emergency Management Service (EMS)

INTERNATIONAL CHARTER SPACE & MAJOR DISASTERS
CHARTE INTERNATIONALE ESPACE ET CATASTROPHES MAJEURES
20 YEARS

International Charter: Space and Major Disasters

Analysis Ready Data





Sentinel 1

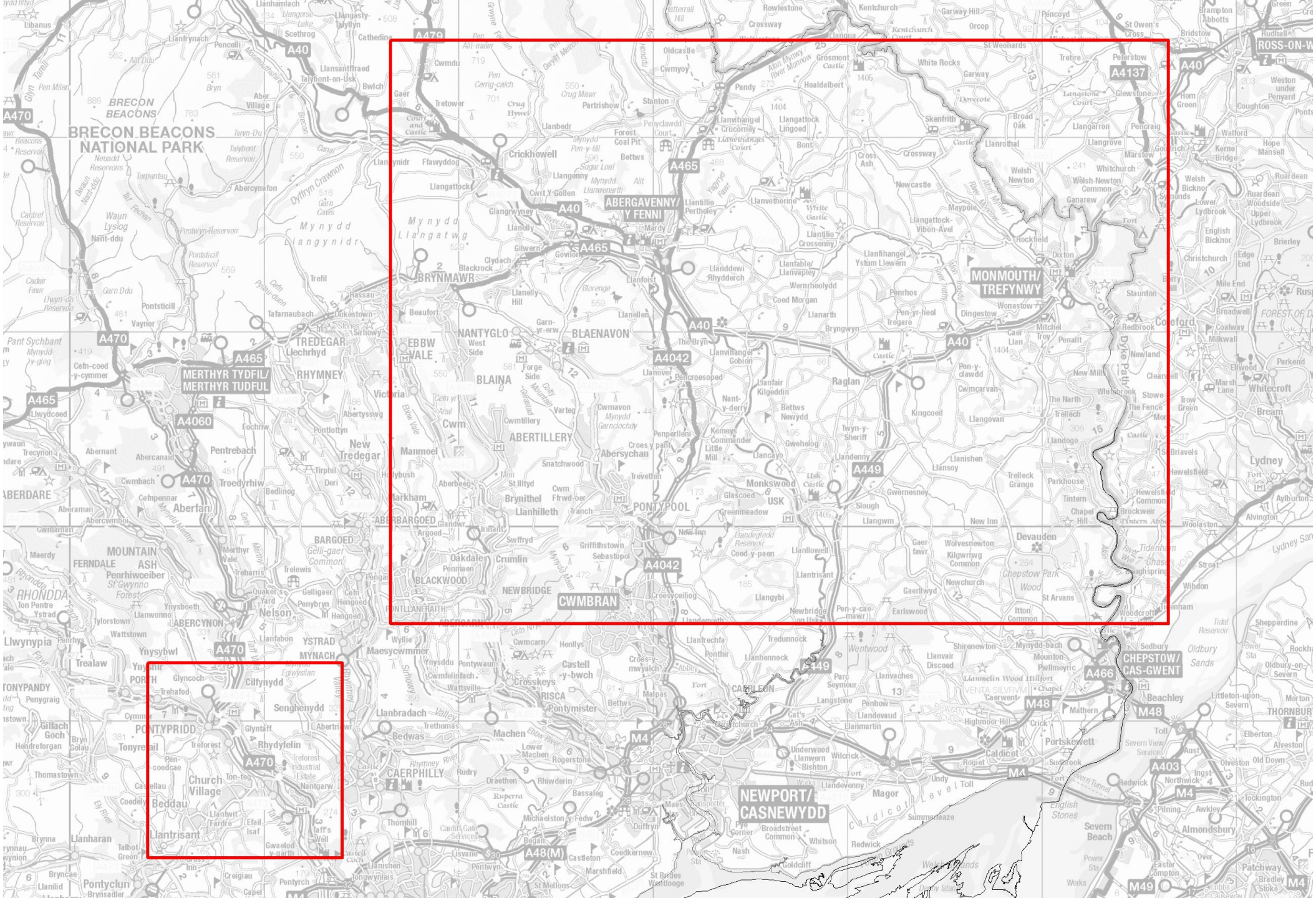
Sentinel 2

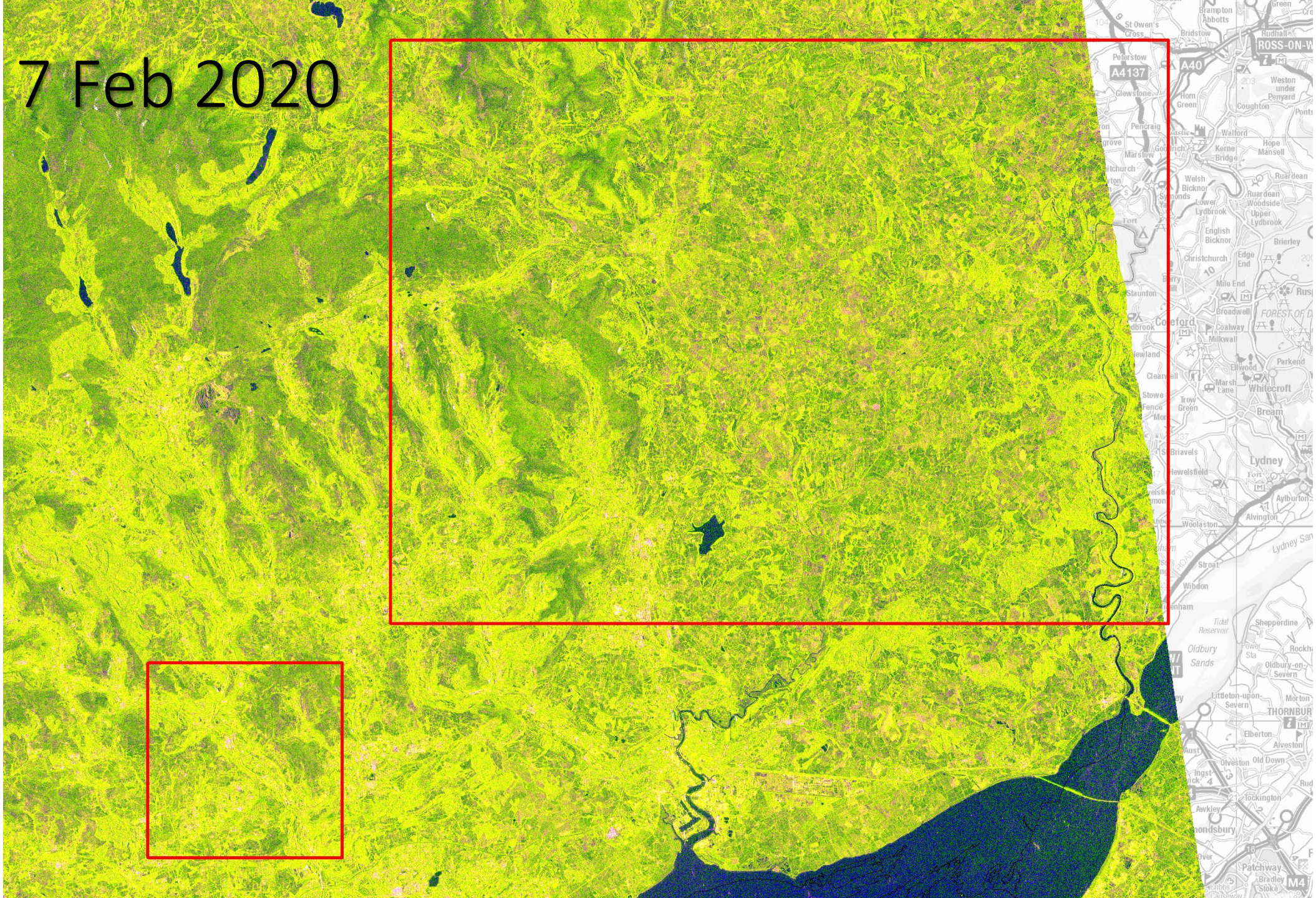
Landsat

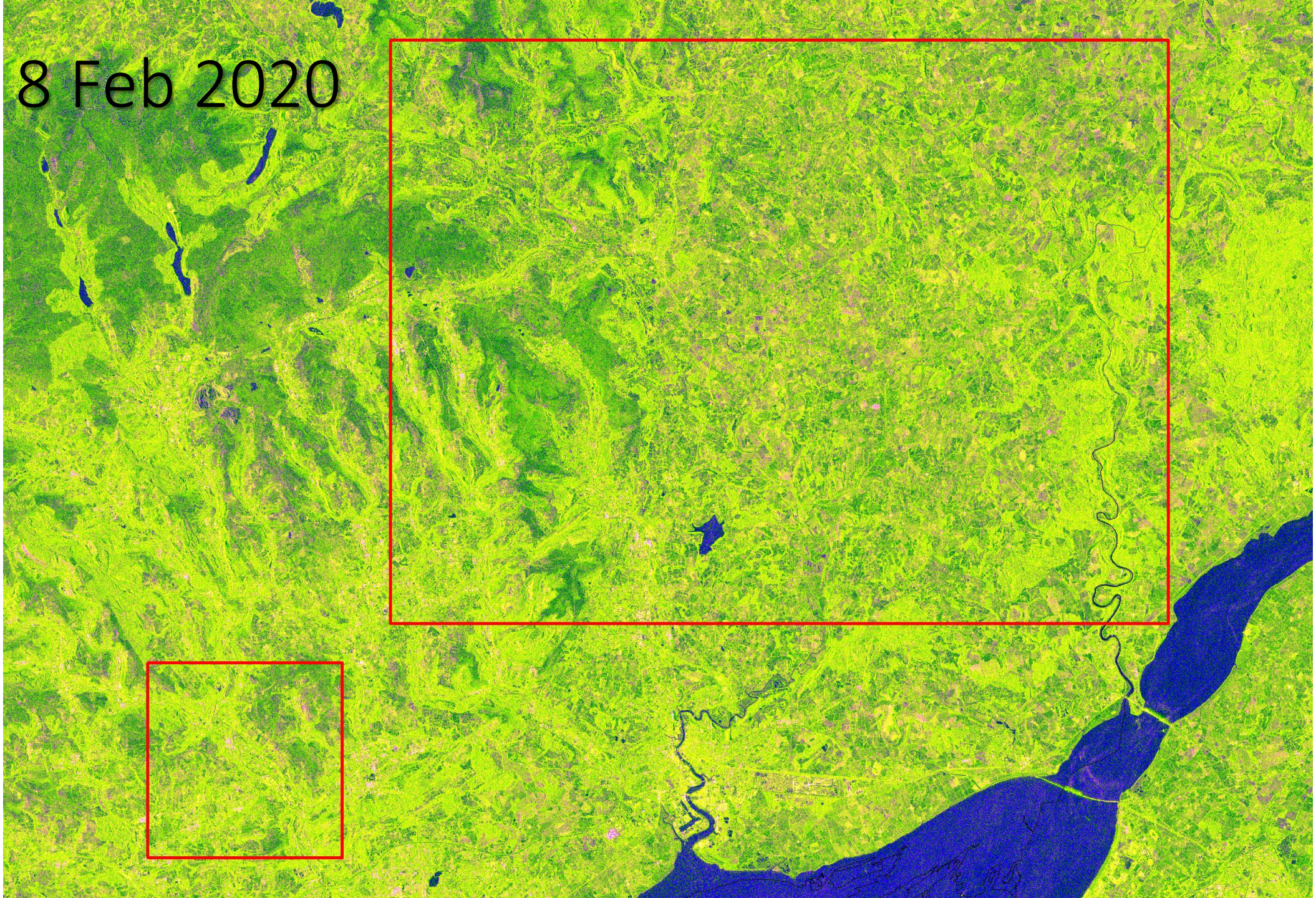
Processed to ARD standards

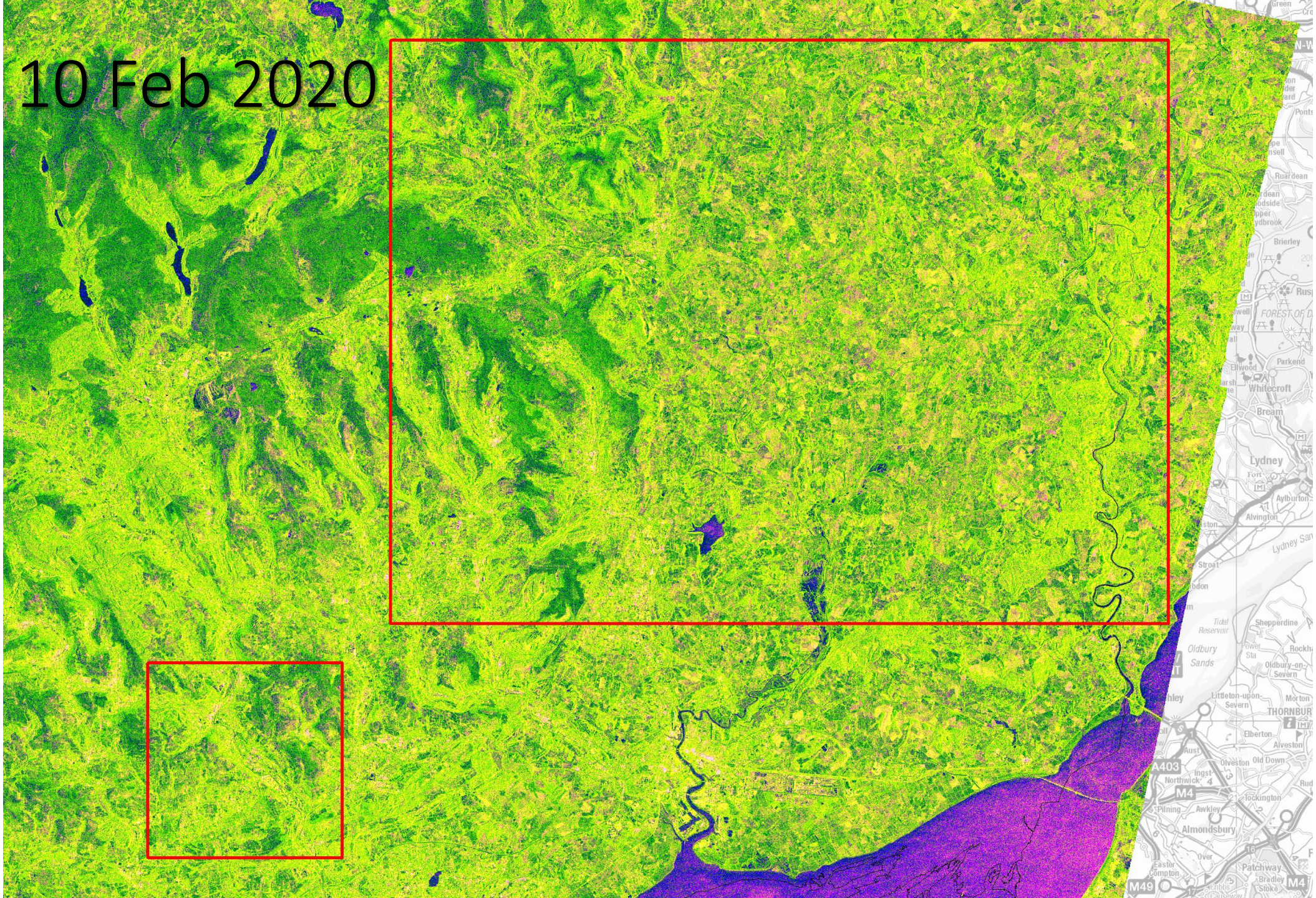
The Remote Sensing and GIS Software Library (RSGISLib)

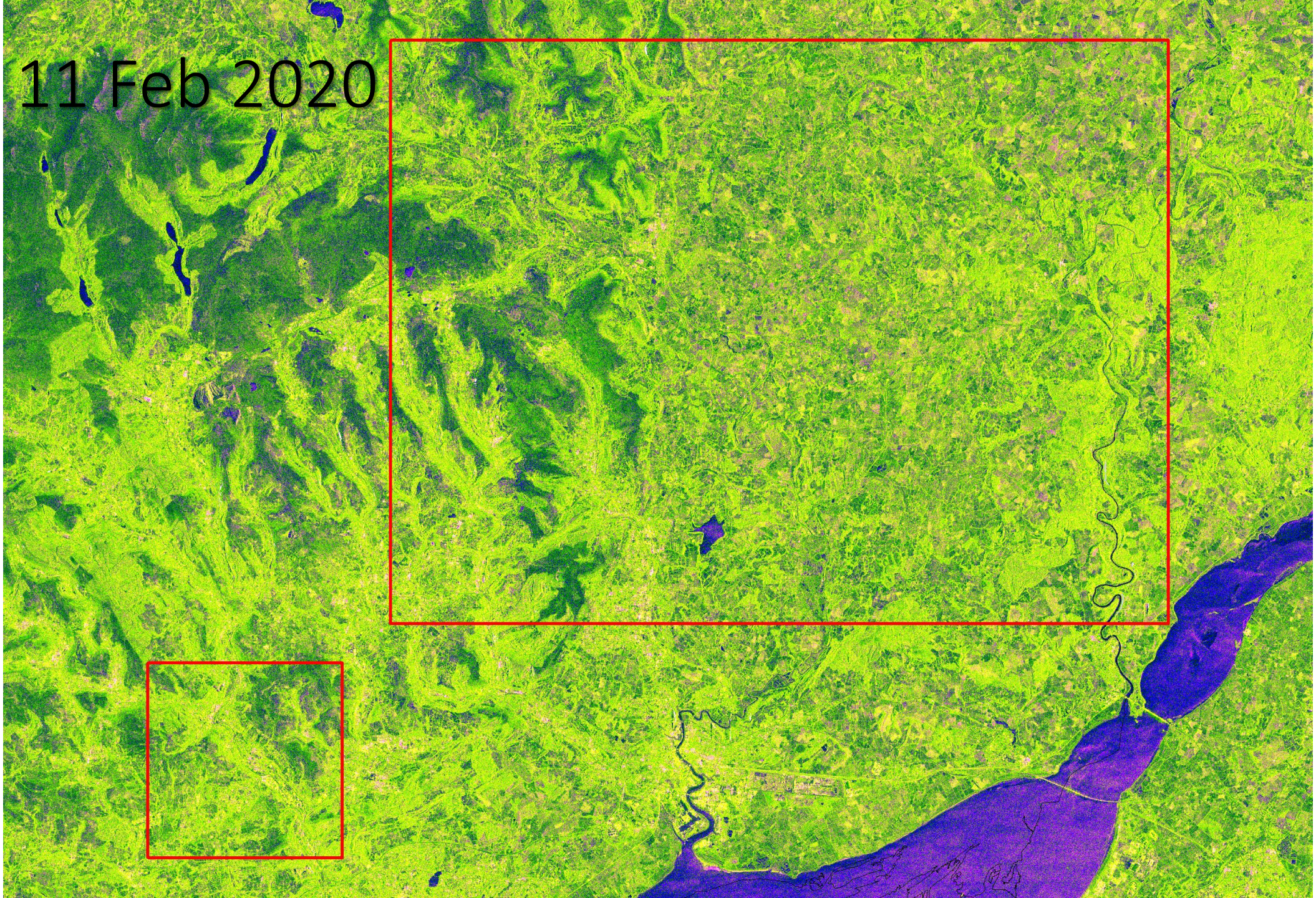
https://www.rsgislib.org/

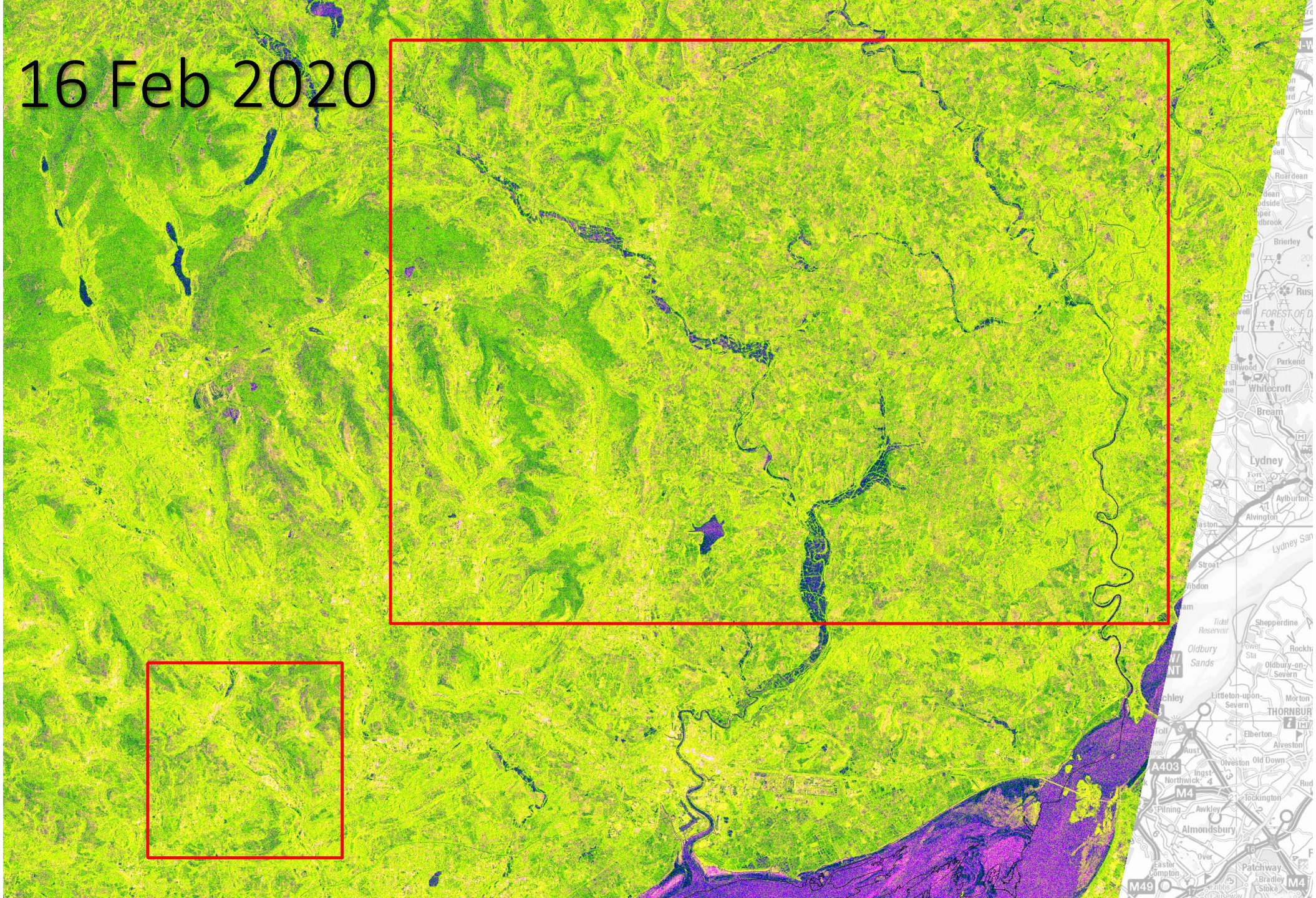

BRECON BEACONS NATIONAL PARK
ABERGAVENNY/ Y FENNI
MONMOUTH/ TREFYNWY
MERTHYR TYDFIL/ MERTHYR TUDFUL
CWMBRAN
PONTYPOOL
NEWPORT/ CASNEWYDD
CHEPSTOW/ CAS-GWENT
CRICKHOWELL
BRYNMAWR
BLAENAVON
TREDEGAR
RHYMNEY
ABERTILLERY
NANTYGLO
EBBW VALE
BLAINA
NEWBRIDGE
CRUMLIN
ABERCYNON
PONTYPRIDD
CAERPHILLY
LLANTRISANT
RAGLAN
USK
MONKSWOOD
CALDICOT
CASTLETON
A40
A465
A4042
A449
A4060
A470
A48(M)
M4
M48
M49
A403
A466
A4137

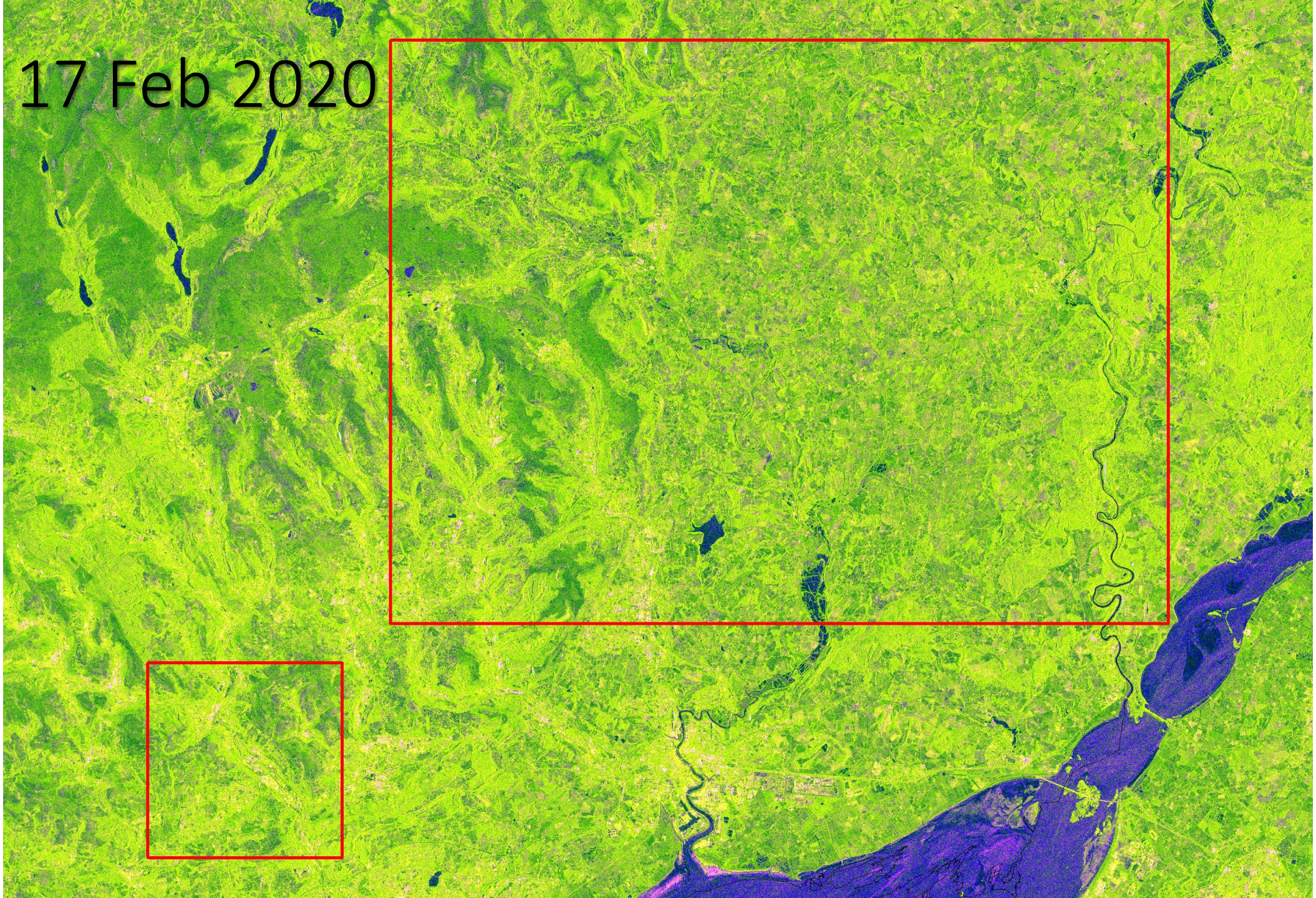

7 Feb 2020
A40
A4137
ROSS-ON-W
Lydney
Whitecroft
Bream
Coleford
Littleton-upon-Severn
Oldbury-on-Severn
Patchway
M4

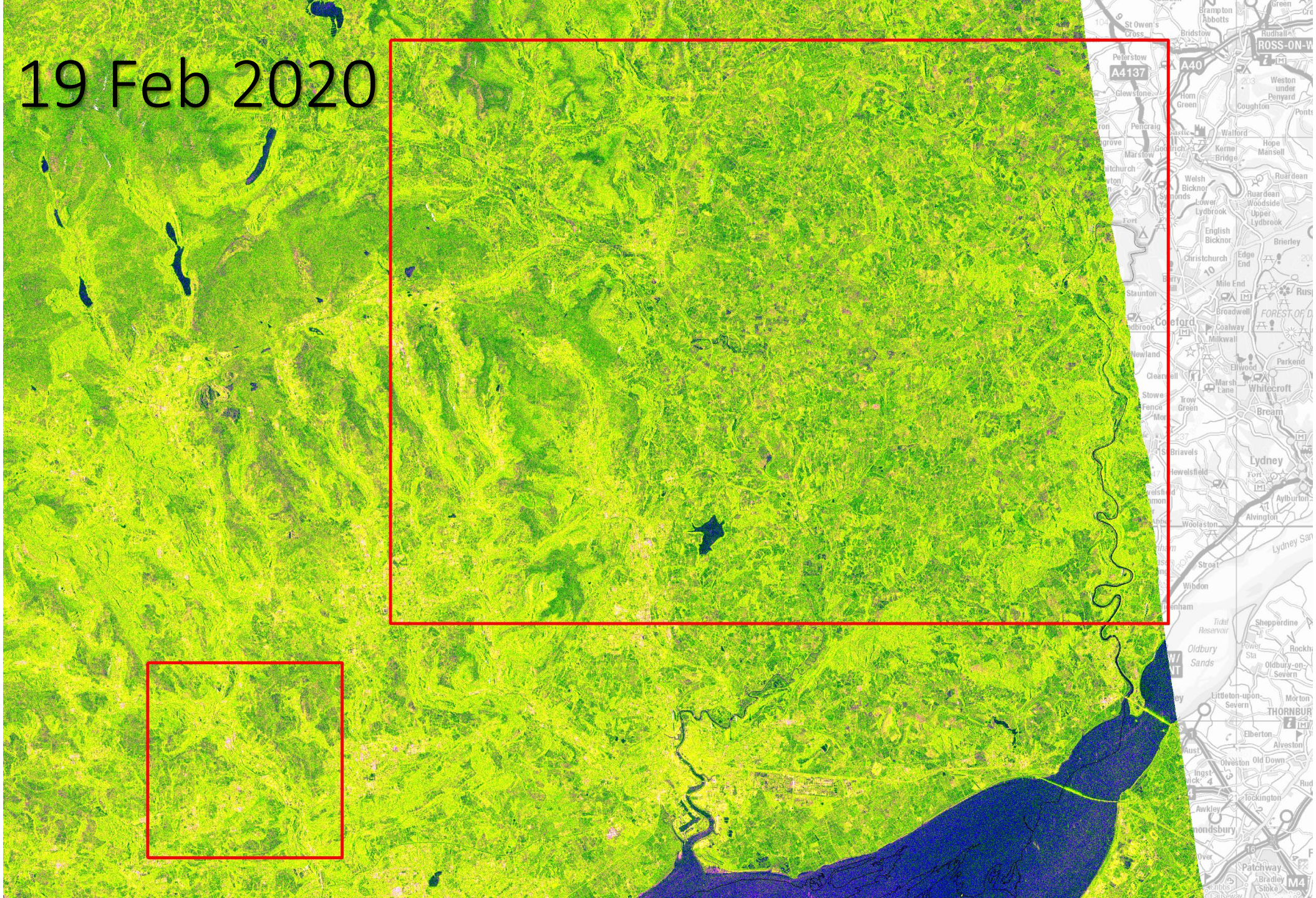

8 Feb 2020


10 Feb 2020
Ruardean
Brierley
Parkend
Ellwood
Whitecroft
Bream
Lydney
Aylburton
Alvington
Shepperdine
Oldbury
Sands
Littleton-upon-
Severn
Elberton
Alveston
A403
Northwick
M4
Pilning
Awkley
Almondsbury
Patchway
Bradley
Stoke
M49
M4


11 Feb 2020

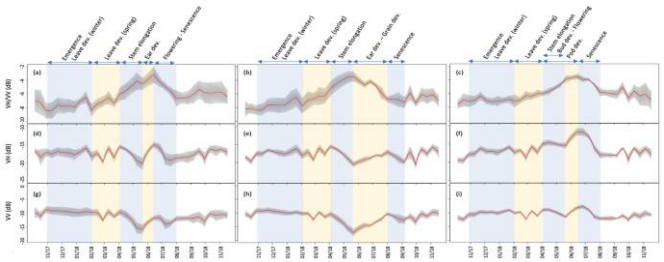

16 Feb 2020
Ruardean
Brierley
Parkend
Ellwood
Whitecroft
Bream
Lydney
Aylburton
Alvington
Shepperdine
Oldbury
Sands
Oldbury-on-Severn
Littleton-upon-Severn
Elberton
Alveston
A403
Northwick
M4
Pilning
Awkley
Almondsbury
Patchway
Bradley Stoke
M49
Easter Compton


17 Feb 2020


19 Feb 2020
A40
A4137
Lydney
Whitecroft
Coleford
Oldbury Sands
Patchway
M4

Living Wales: Crop classification

Winter Barley
Winter Rapeseed
Winter Wheat
Maize
Potatoes
Beets
Spring Barley
Spring Wheat
Grassland



Based on biophysics, allowing development tracking through the growth cycle

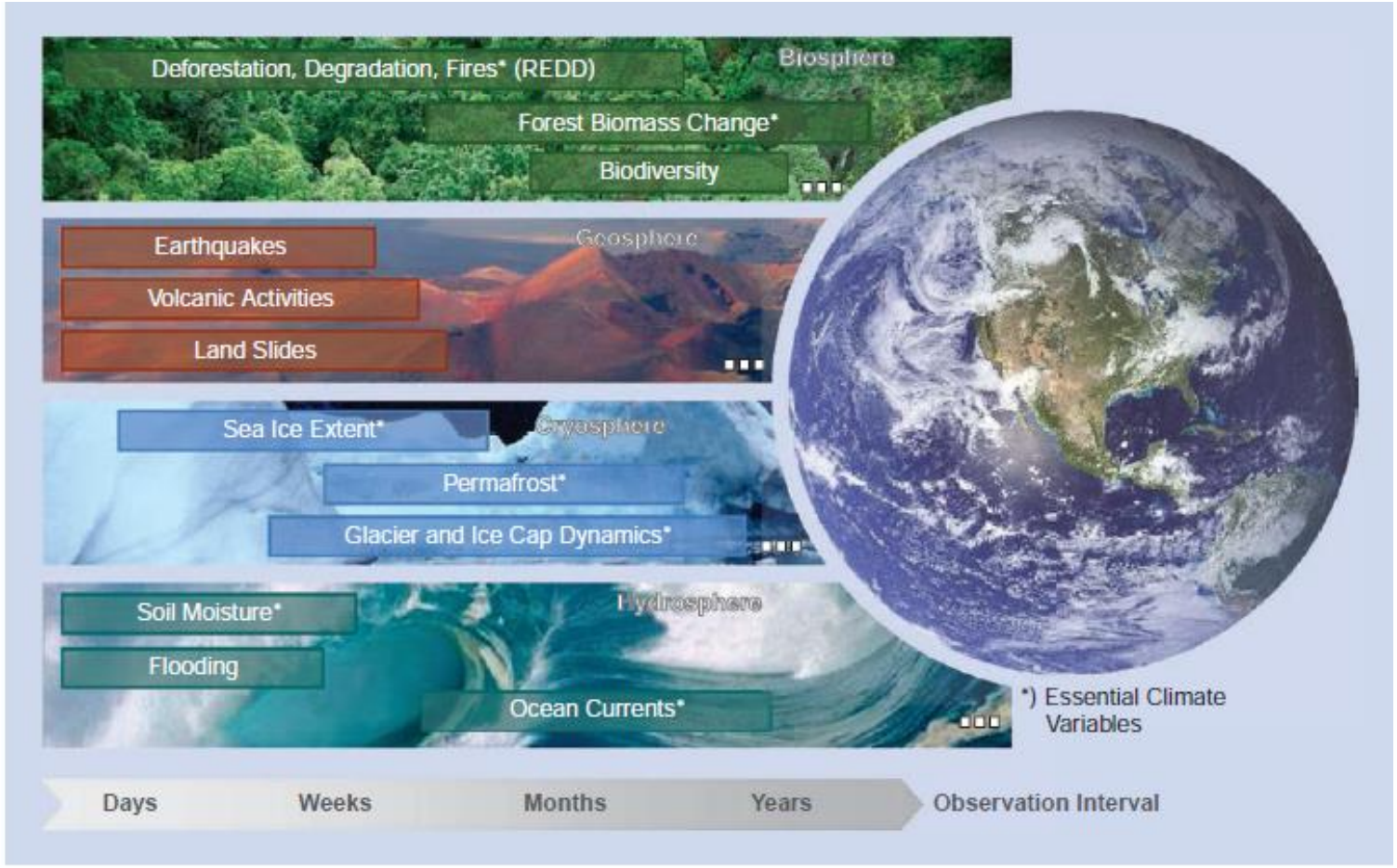
Planque et al. (2020)

Satellite Radar Interferometry: Applications

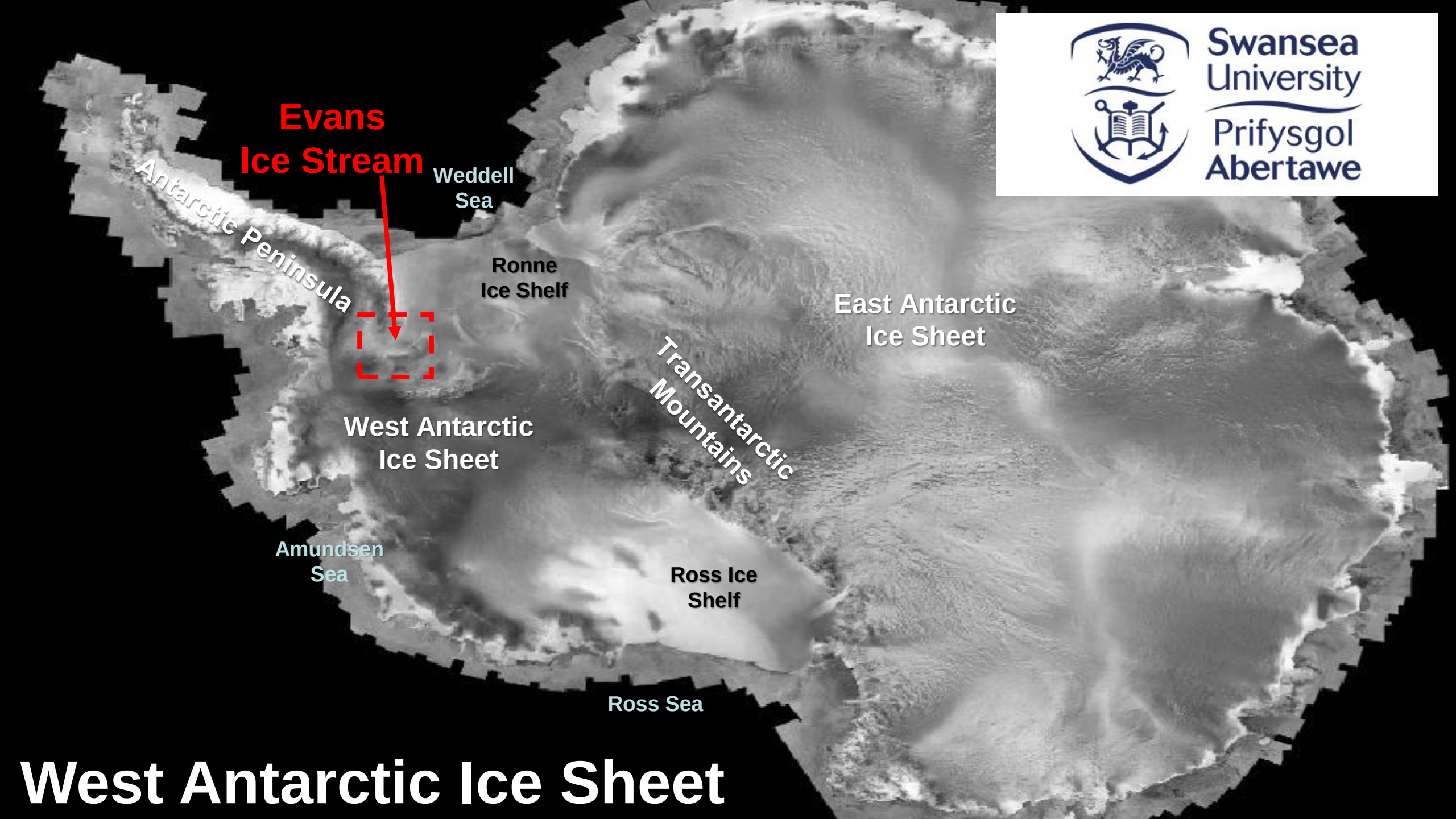
Cyfoeth Naturiol Cymru
Natural Resources Wales

TABLE 7. COMPILATION OF INFORMATION EXTRACTION AND APPLICATION EXAMPLES FOR SAR IMAGERY. ESSENTIAL CLIMATE VARIABLES (ECV) AS DEFINED BY THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) ARE IDENTIFIED WITH "*".

Land	Multi-purpose land surface imagery, soil type, land cover*, Earth topography (elevation and surface model), lake levels*, subsidence, landslides, erosion, earthquake and volcano monitoring, disaster monitoring, mitigation and assessment, flooding monitoring, coherent change detection, urban and infrastructure planning, road traffic monitoring, soil moisture*, wetlands monitoring, permafrost and seasonally-frozen ground*
Vegetation	Vegetation type, forest biomass*, forest biomass change, biodiversity, forest profile, forest height, fire disturbance and monitoring, crop classification, crop height, crop biomass, deforestation and forest degradation
Ocean	Multi-purpose ocean imagery, sea state*, ocean currents*, wind speed and vector over sea surface, bathymetry at coastal zones, wave height, ocean wavelength, wave direction, oil spill cover, ship monitoring
Sea ice	Sea-ice cover and extent, sea-ice type, sea-ice thickness, iceberg cover and movement, ship route optimization
Snow and land ice	Snow cover*, ice and glacier cover*, snow melting status (wet/dry), snow water equivalent, glacier motion and dynamics, glacier topography



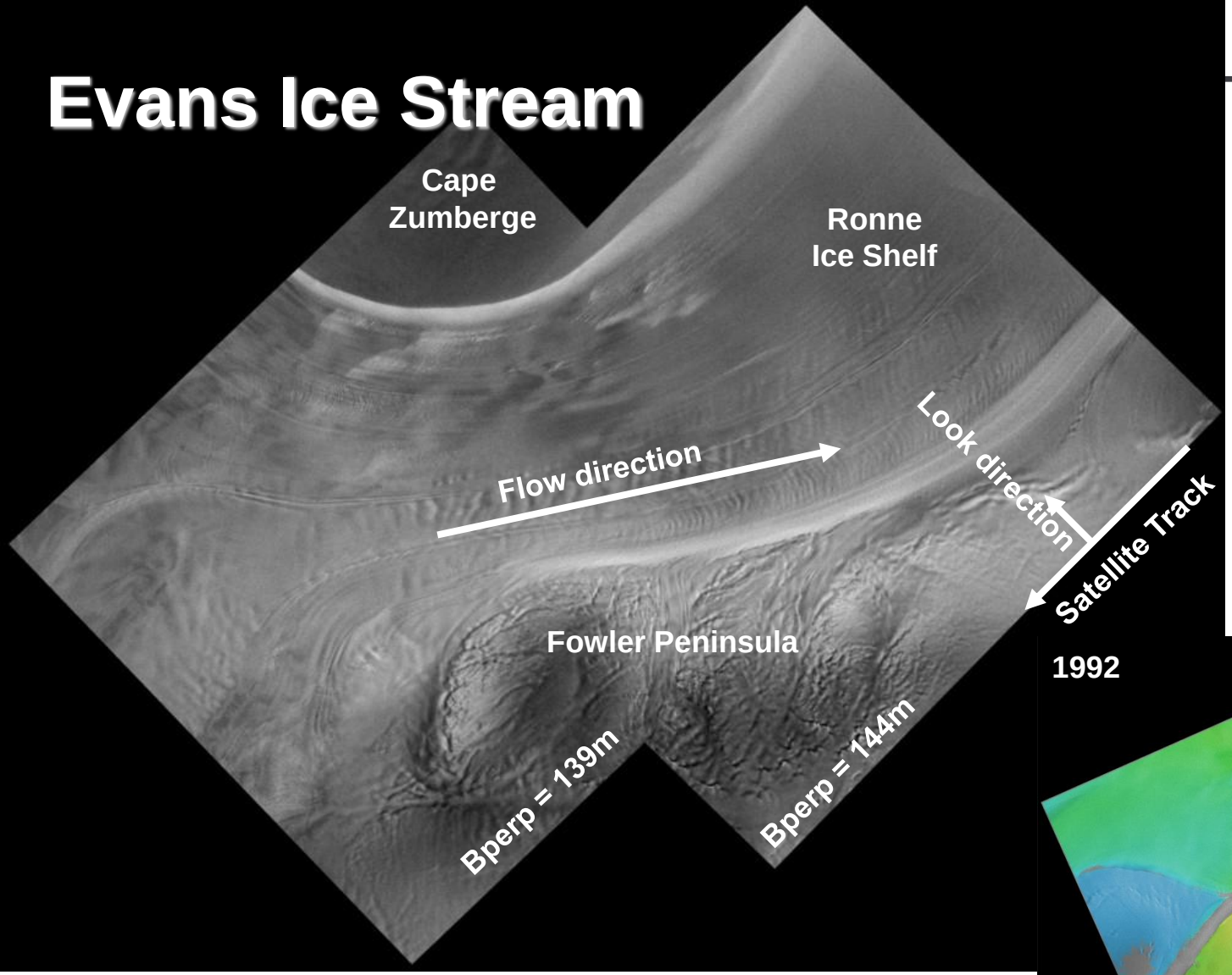
Moreira et al. (2013)



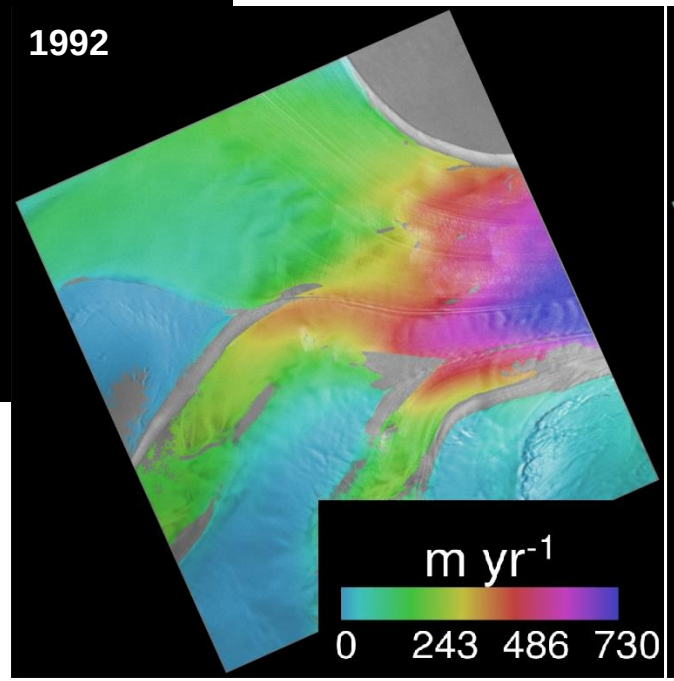
Swansea University
Prifysgol Abertawe

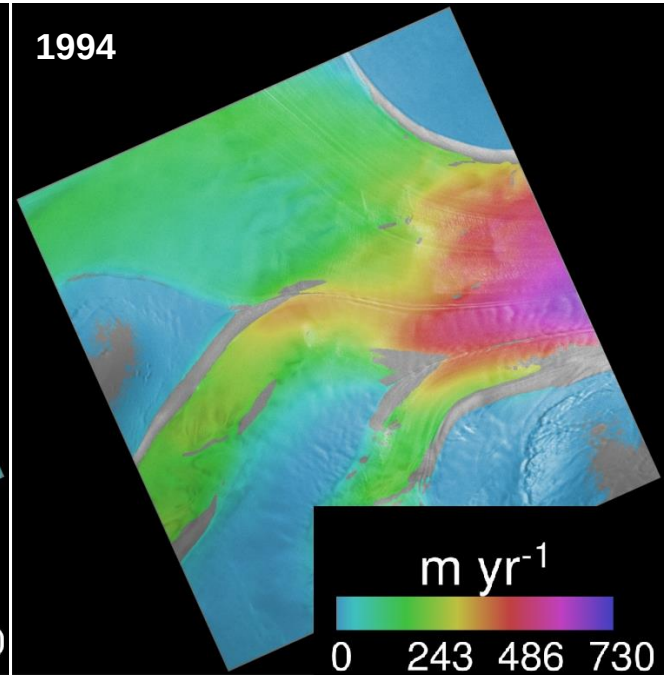
West Antarctic Ice Sheet

Evans Ice Stream

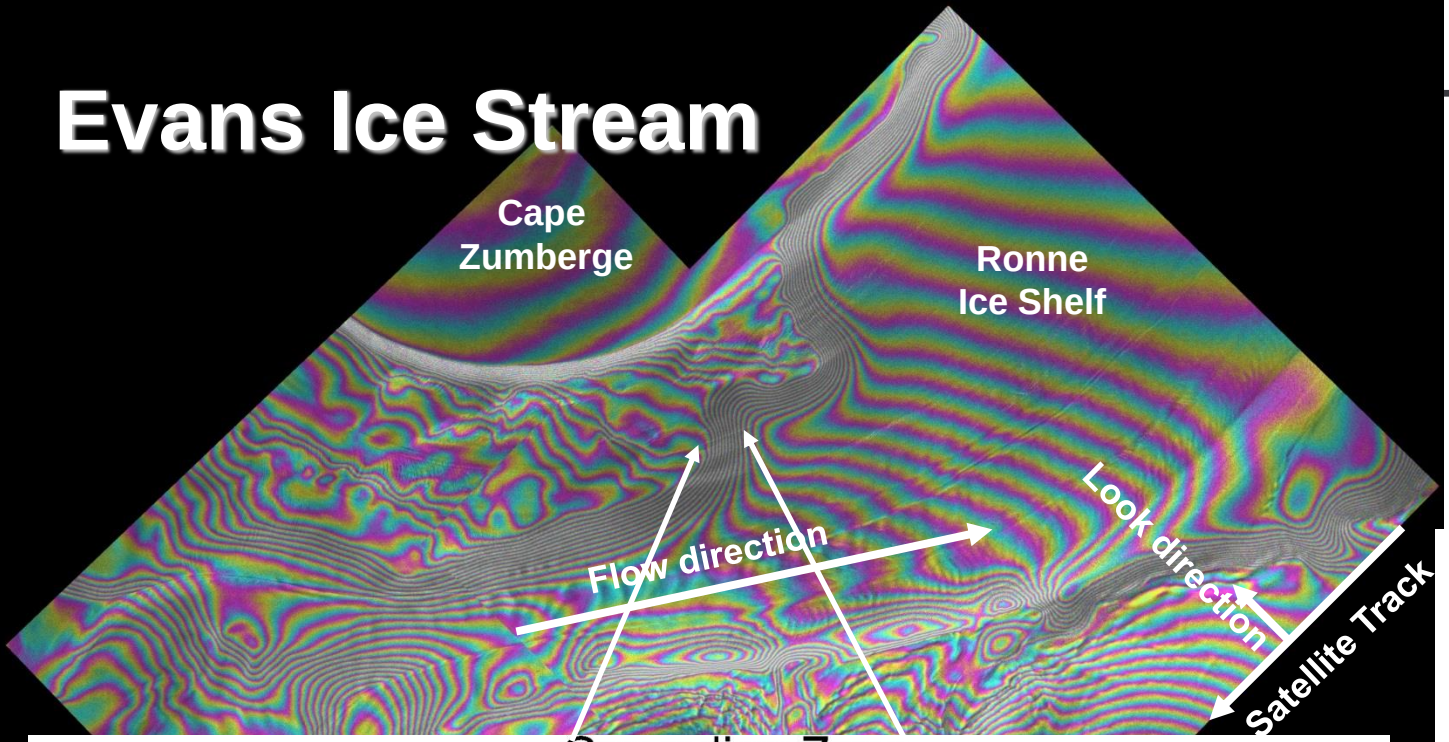


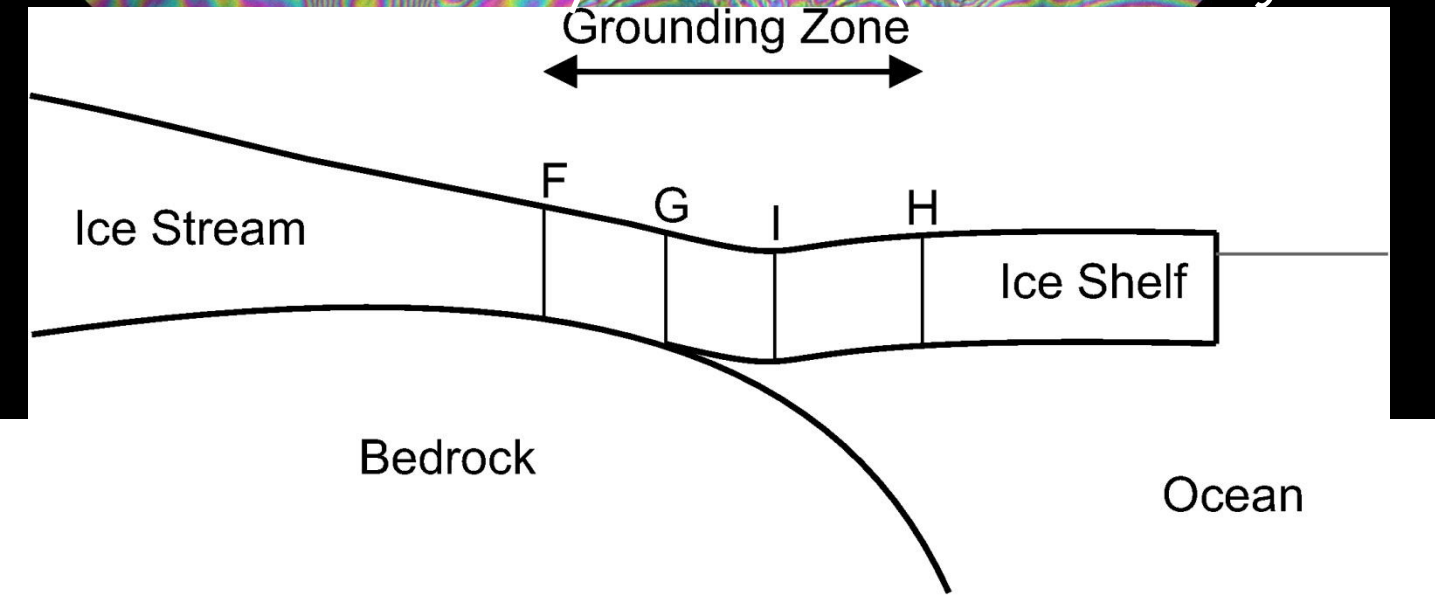
Swansea University
Prifysgol Abertawe

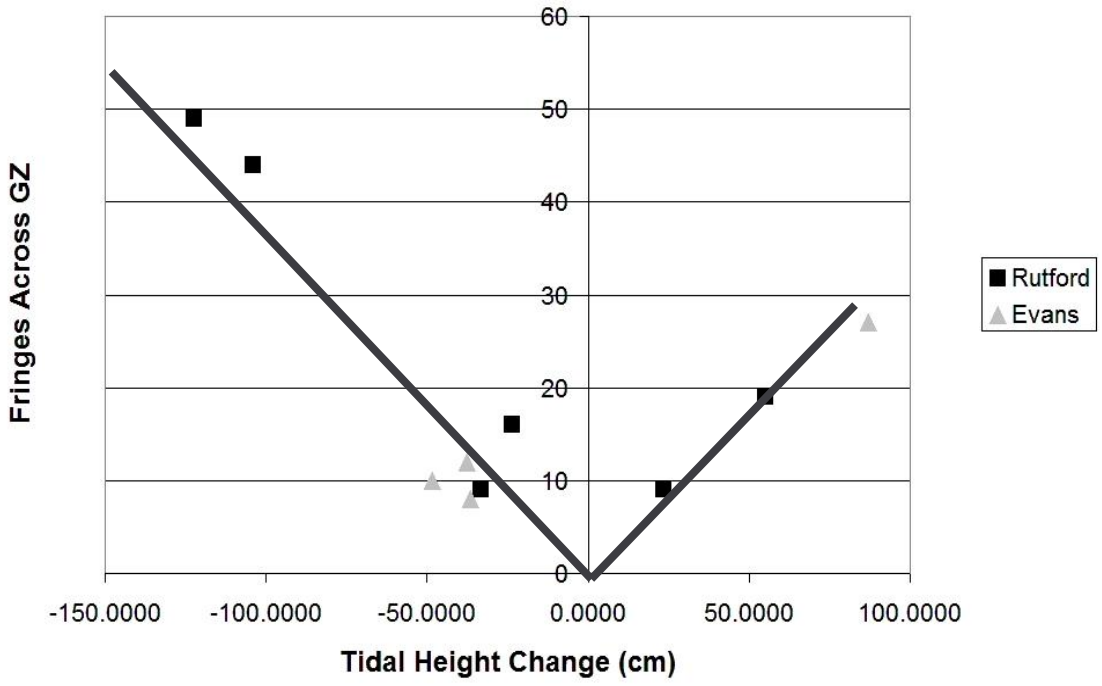


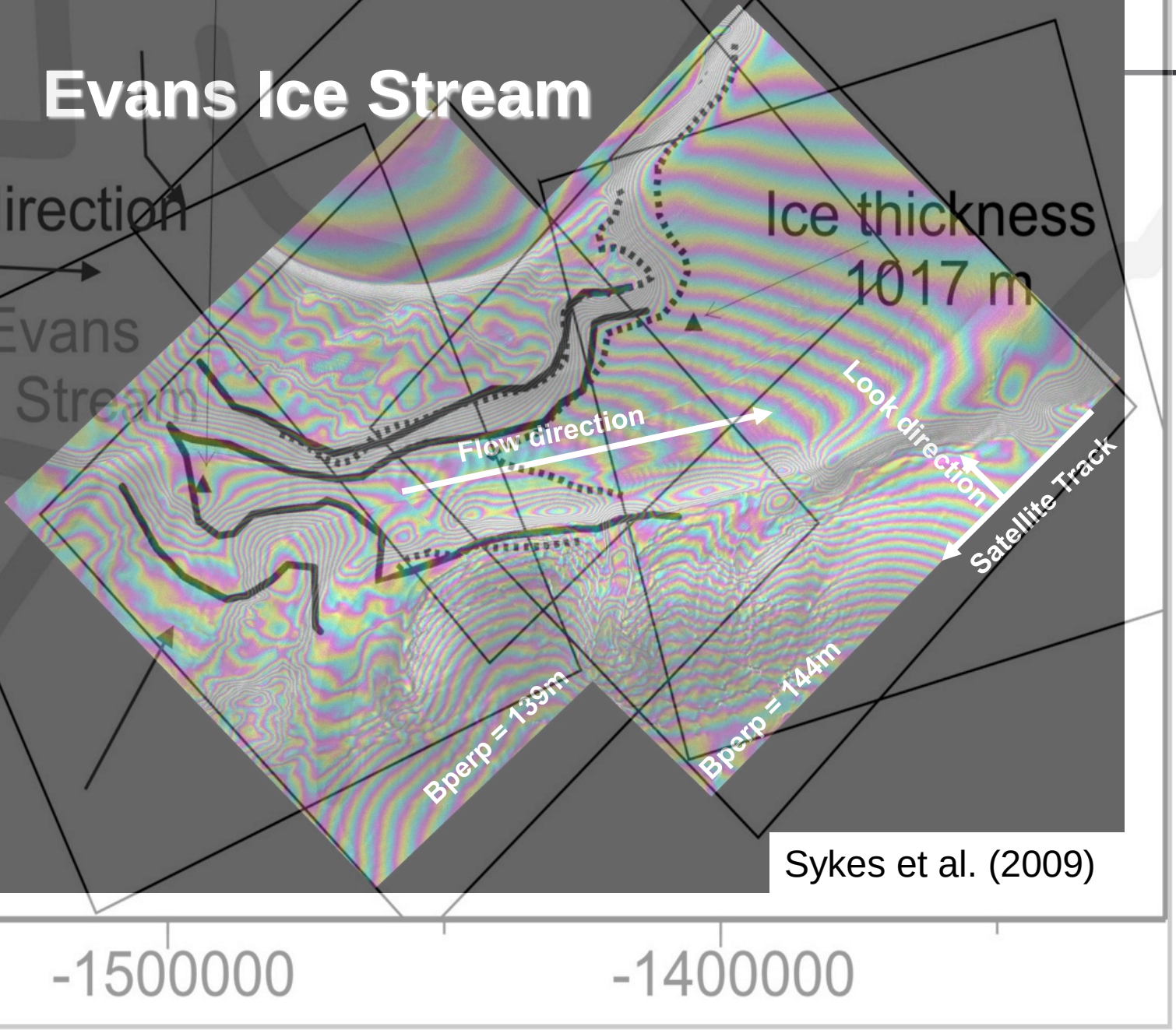


Evans Ice Stream









Sykes et al. (2009)

Swansea University
Prifysgol Abertawe

East side (top) is grounded and west side (bottom) is floating!

Access NRW data

https://naturalresources.wales/evidence-and-data/access-our-data/

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Access Geospatial data for Wales

https://lle.gov.wales/home

Llywodraeth Cymru
Welsh Government

Procurement

https://www.sell2wales.gov.wales/

Contact us

www.cyfoethnaturiol.cymru
www.naturalresources.wales

Cymraeg

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0300 065 3000 (Mon-Fri, 9am-5pm)

Cymraeg

https://www.youtube.com/watch?v=RFljJpo3QD8