

# Natura Island: Mapping habitat types in Iceland using remote sensing.

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# Presentation summary

- Background and aim of the project
- Methods
  - Central highland habitat mapping
  - Natura Island habitat mapping
- Accuracy assessment



• Status of the project today



# Background of the project

- 1999 Icelandic Institute of Natural History (IINH) started research on habitat types on the Icelandic central highland and finished the task 2009
- 2012 IINH got grant from EU to finish the research and mapping the rest of the country

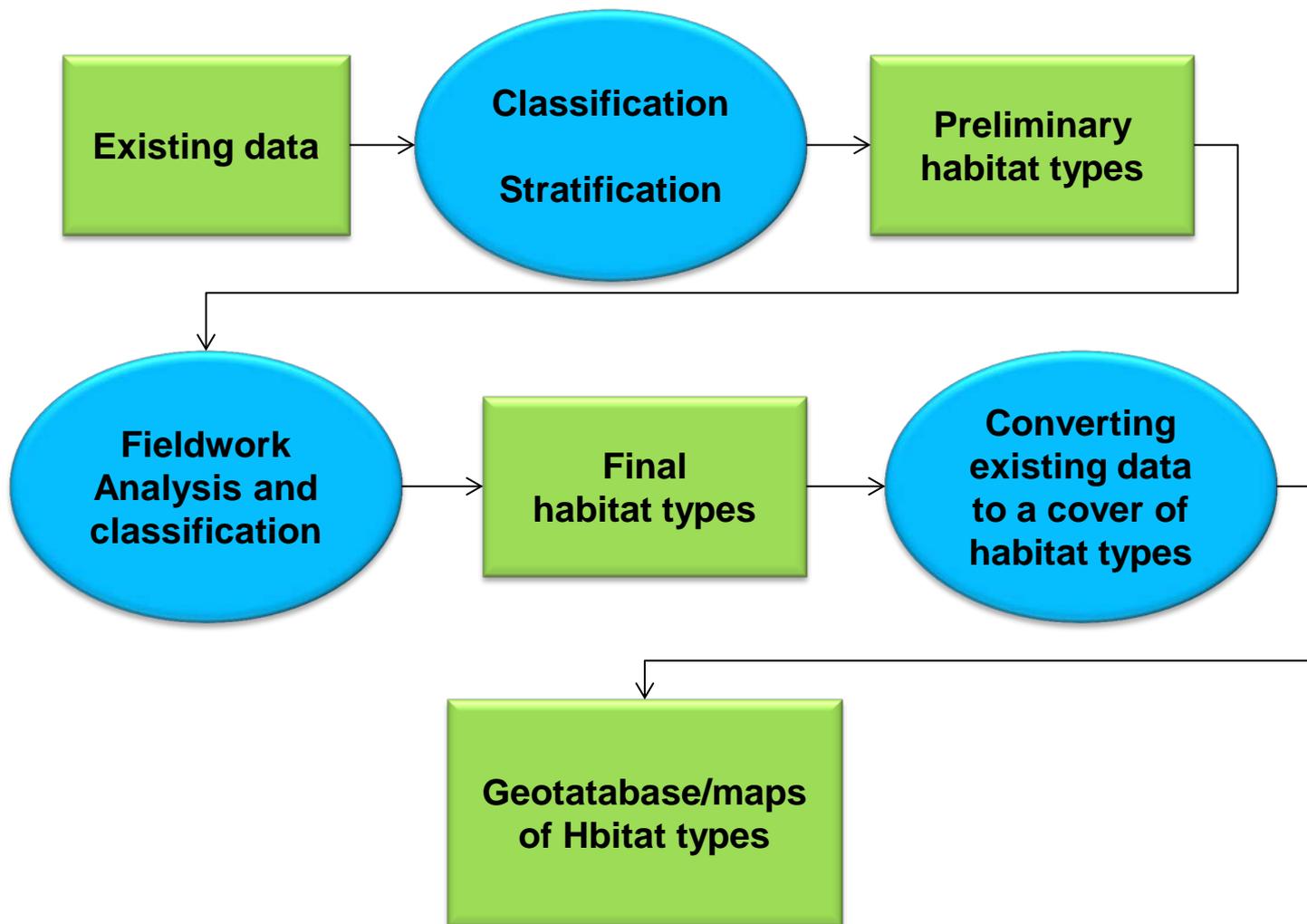


# Aim

- To define habitat types of the Iceland
- Describe their main characteristics environment and biota
- Analyse size and distribution of habitat types
- Develop methods to evaluate conservation value of habitat types



# Methods



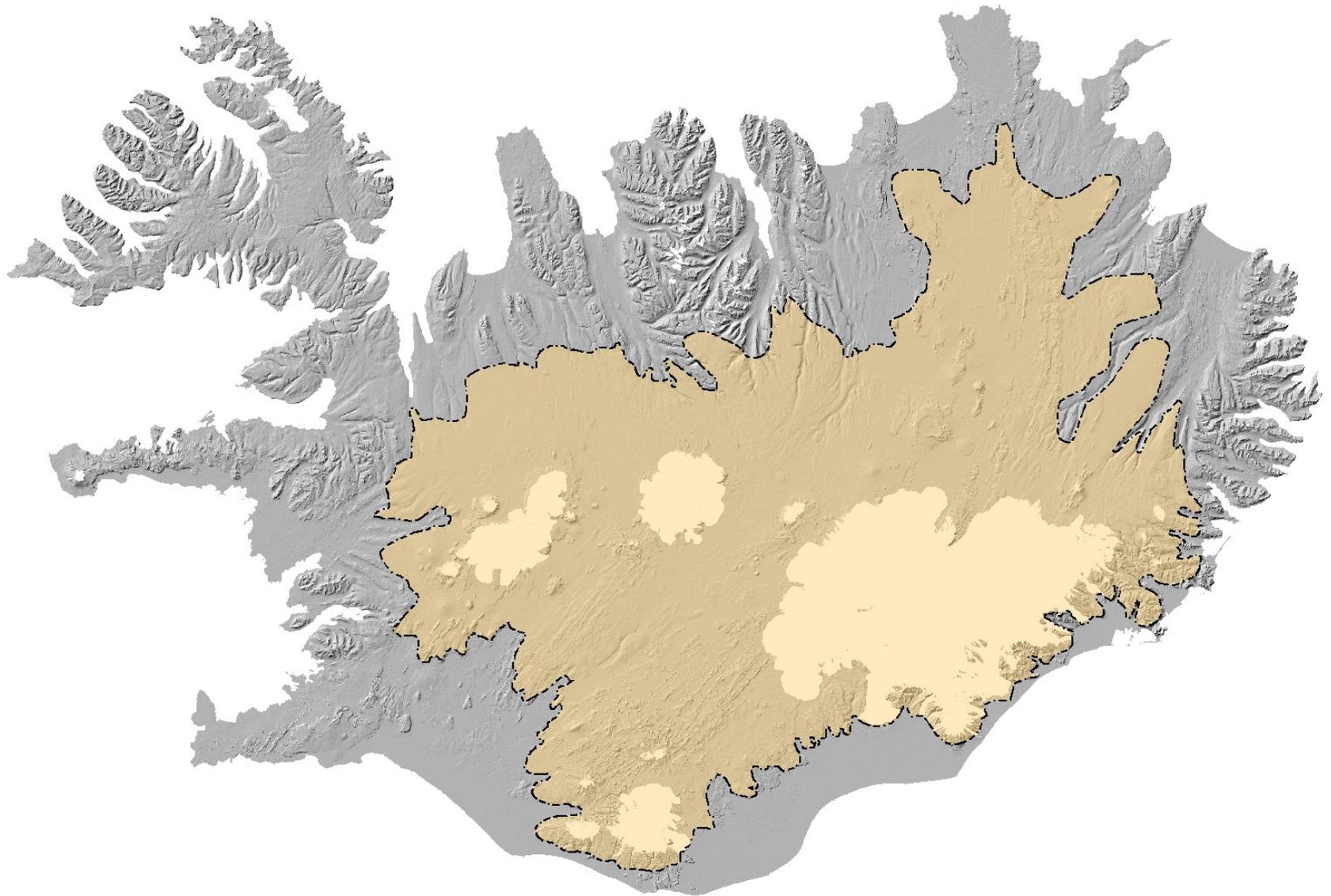


# The central highland classification

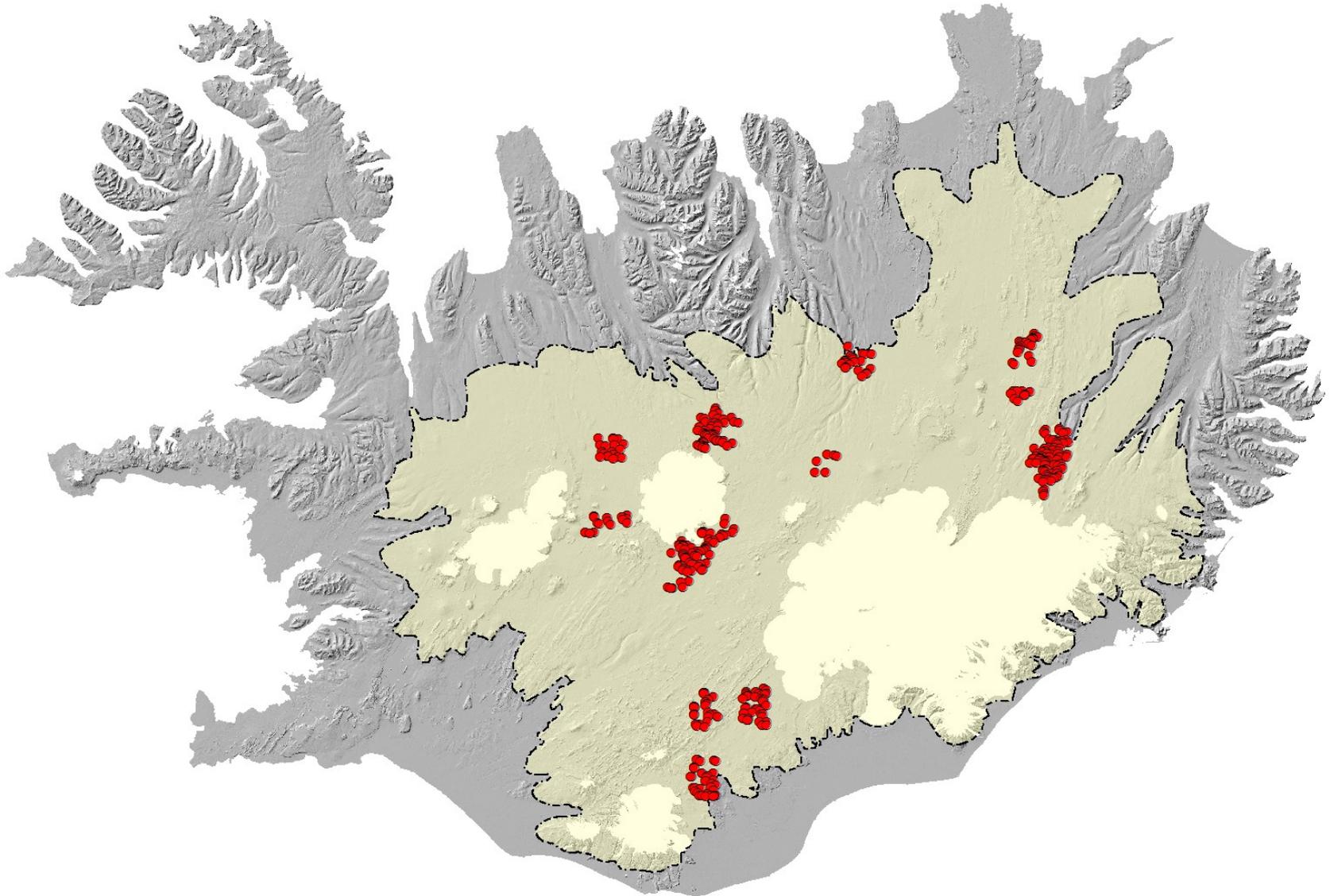
- Existing vegetation maps used as a base for location of transects for vegetation research and to make preliminary habitat types
- 392 transects on 7 defined areas
- 24 habitat types in 5 main groups identified in the central highland



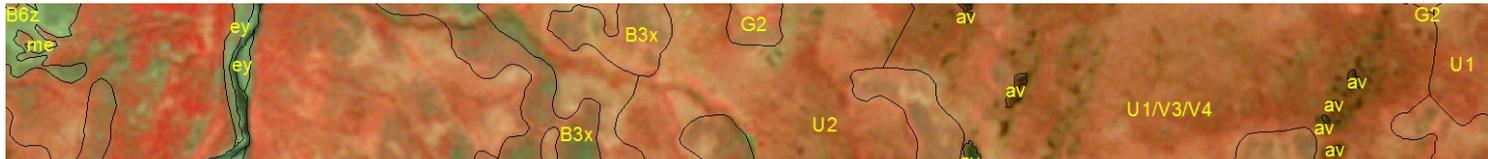
# Definition of the central highland



# Location of transects 392



# Vegetation information converted to habitat types



Table

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FID	Shape	Gr felag	Gr tekia	Flatarmal	x	y	grodurlend	vistgerd	Geometry A	Geometry P
70665	Polygon ZM	V3	>90%	20413,642316	669668	493943	Flói	Lágstarafloavist	20413,642316	898,950594
70675	Polygon ZM	V4/V2	>90%	166643,697905	514021	454149	Flói	Hástarafloavist	166643,697905	4026,401079
70688	Polygon ZM	V1/V2	>90%	72105,144809	658467	524351	Flói	Hástarafloavist	72105,144809	3515,240954
70690	Polygon ZM	V3/V2	>90%	709512,694882	398380	449926	Flói	Hástarafloavist	709512,694882	19489,220648
70755	Polygon ZM	V3	>90%	9928,806346	572130	510425	Flói	Lágstarafloavist	9928,806346	404,933265
70778	Polygon ZM	V2	>90%	36928,045402	635461	615785	Flói	Hástarafloavist	36928,045403	1750,276111
70795	Polygon ZM	V3	>90%	809953,226335	407066	490091	Flói	Lágstarafloavist	809953,226335	18502,810451
70800	Polygon ZM	V3/A3	>90%	73949,060792	511049	452441	Flói	Lágstarafloavist	73949,060792	1497,550582
70859	Polygon ZM	V2	>90%	3208,62195	657042	538224	Flói	Hástarafloavist	3208,62195	537,689081
70865	Polygon ZM	V3/U3	>90%	886991,863552	412059	481156	Flói	Lágstarafloavist	886991,863552	14948,949669
70928	Polygon ZM	V2/V3	>90%	836885,738622	423071	495987	Flói	Hástarafloavist	836885,738622	18499,01799
70940	Polygon ZM	V3	>90%	69811,597592	643901	483636	Flói	Lágstarafloavist	69811,597592	1644,598545
70978	Polygon ZM	V6/U11	>90%	3554,729772	461666	535778	Flói	Lágstarafloavist	3554,729772	271,496626
70983	Polygon ZM	V3	>90%	167037,827835	684267	523278	Flói	Lágstarafloavist	167037,827835	3239,925967
71003	Polygon ZM	V4	>90%	74053,965371	442977	519535	Flói	Lágstarafloavist	74053,965371	1624,297976
71018	Polygon ZM	V3	>90%	167078,833656	426420	488234	Flói	Lágstarafloavist	167078,833656	3492,189576
71085	Polygon ZM	V3	>90%	20459,720838	665273	530216	Flói	Lágstarafloavist	20459,720838	1110,111378
71095	Polygon ZM	V3/U14/U11	>90%	160460,613896	667461	524221	Flói	Lágstarafloavist	160460,613896	4440,338553

(0 out of 117949 Selected)

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# Natura Island classification

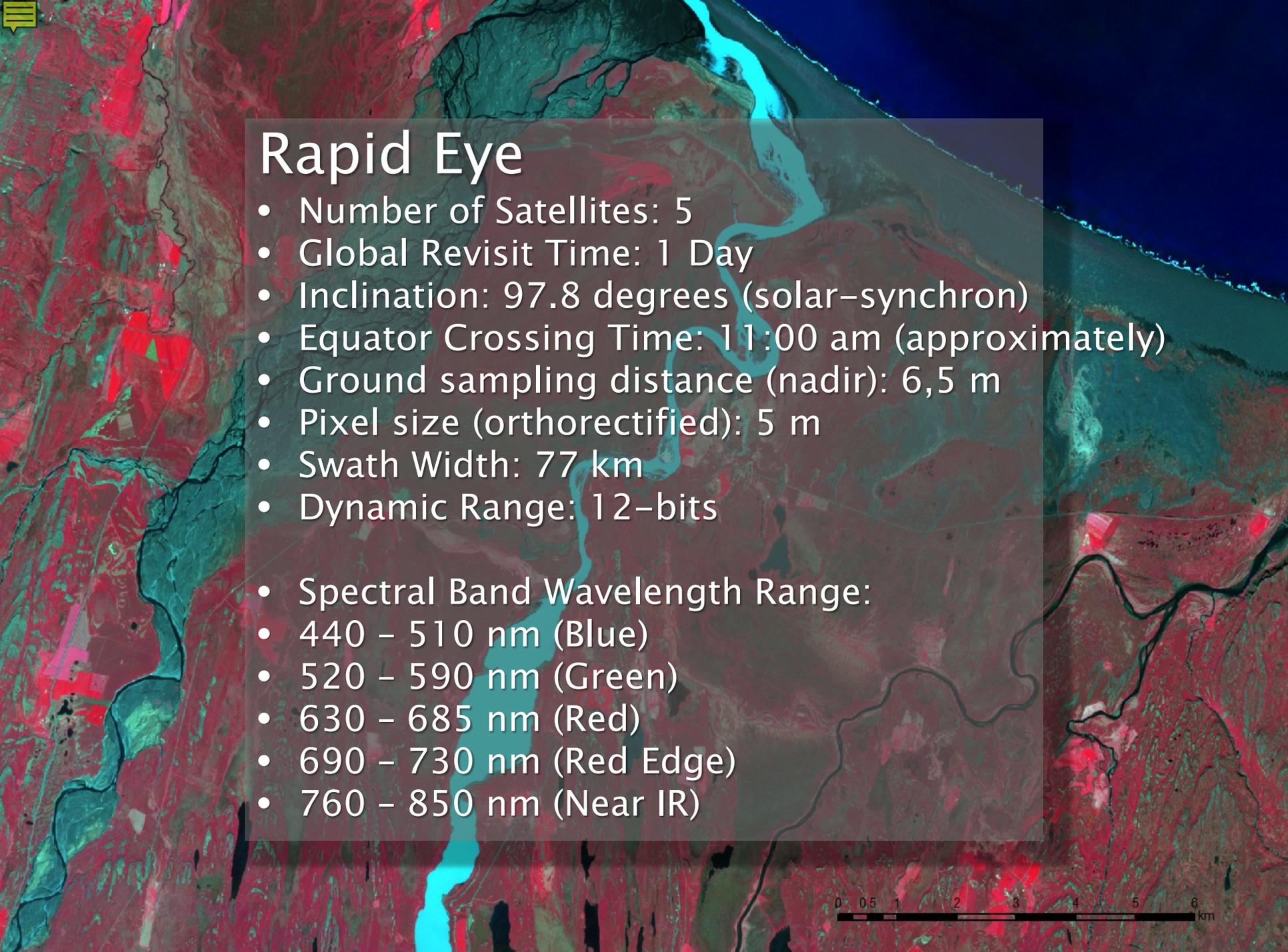
- Natura Island continuing from the highland habitat mapping
- Inadequate vegetation information
- Other methods required
- Remote sensing



# Satellite data

- New Radid Eye images of Iceland
- Older Spot images (2002 – 2010) all Iceland
- Landsat data as needed



A satellite image of a river delta, likely the Amazon, showing a complex network of water channels and land. The image is color-coded, with a prominent cyan/blue color for the water bodies and various shades of red and green for the land. A semi-transparent grey box is overlaid on the left side of the image, containing text. In the bottom right corner, there is a scale bar in kilometers.

# Rapid Eye

- Number of Satellites: 5
- Global Revisit Time: 1 Day
- Inclination: 97.8 degrees (solar-synchron)
- Equator Crossing Time: 11:00 am (approximately)
- Ground sampling distance (nadir): 6,5 m
- Pixel size (orthorectified): 5 m
- Swath Width: 77 km
- Dynamic Range: 12-bits
  
- Spectral Band Wavelength Range:
  - 440 – 510 nm (Blue)
  - 520 – 590 nm (Green)
  - 630 – 685 nm (Red)
  - 690 – 730 nm (Red Edge)
  - 760 – 850 nm (Near IR)

0 0.5 1 2 3 4 5 6 km

# Classification for preliminary habitat types

Isodata classifier 200 classes

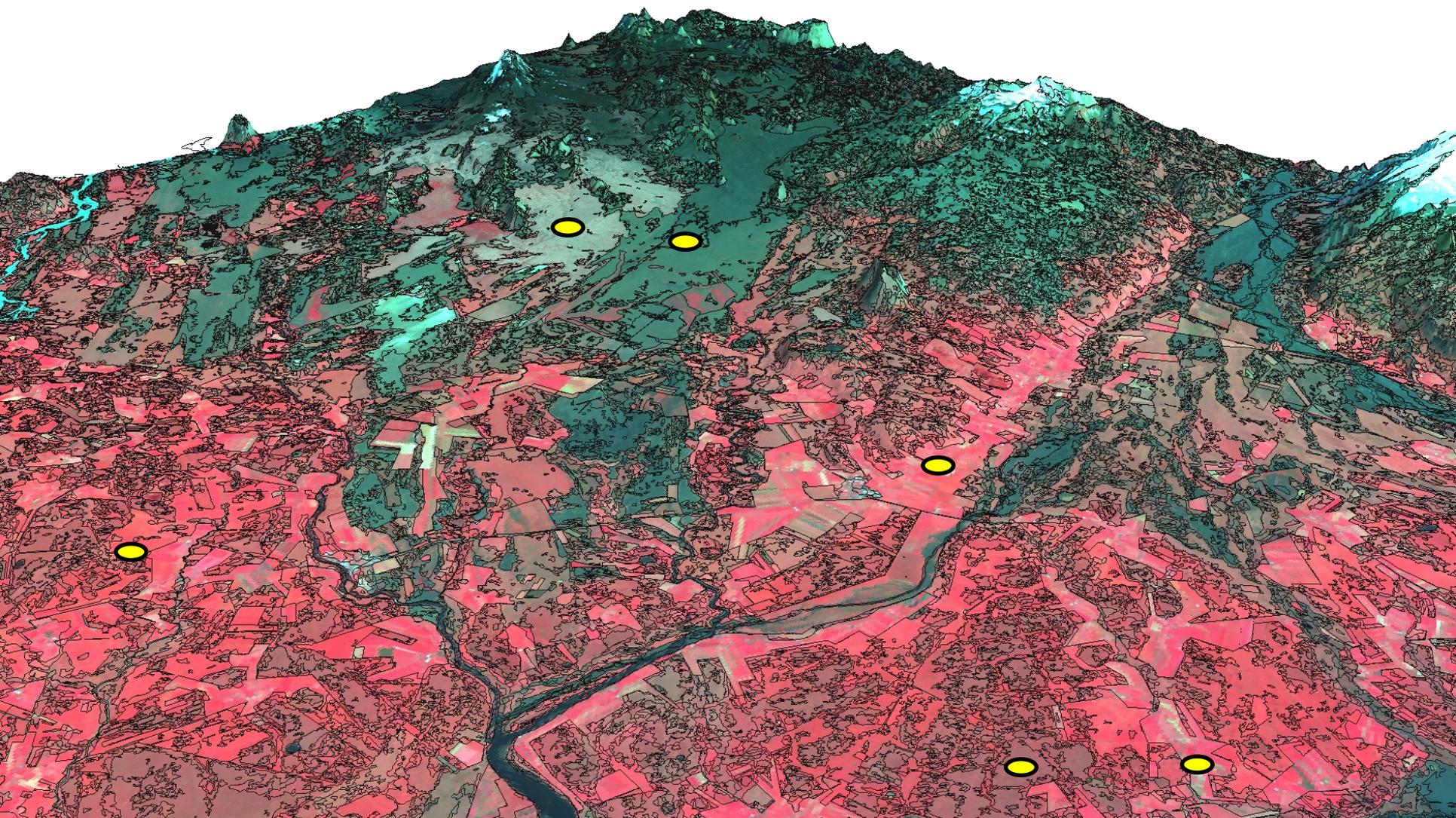
Classes merged

Classes get preliminary names

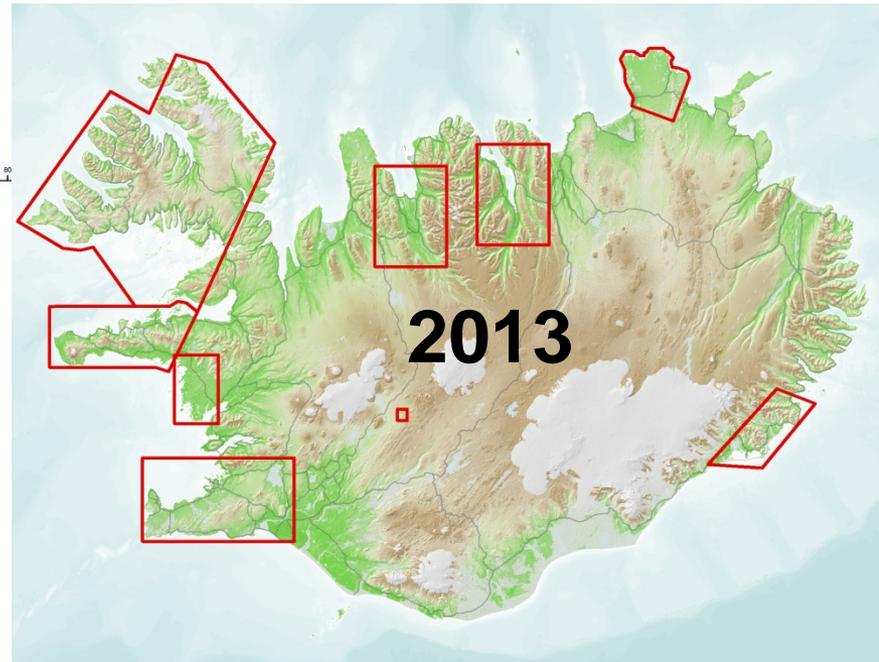
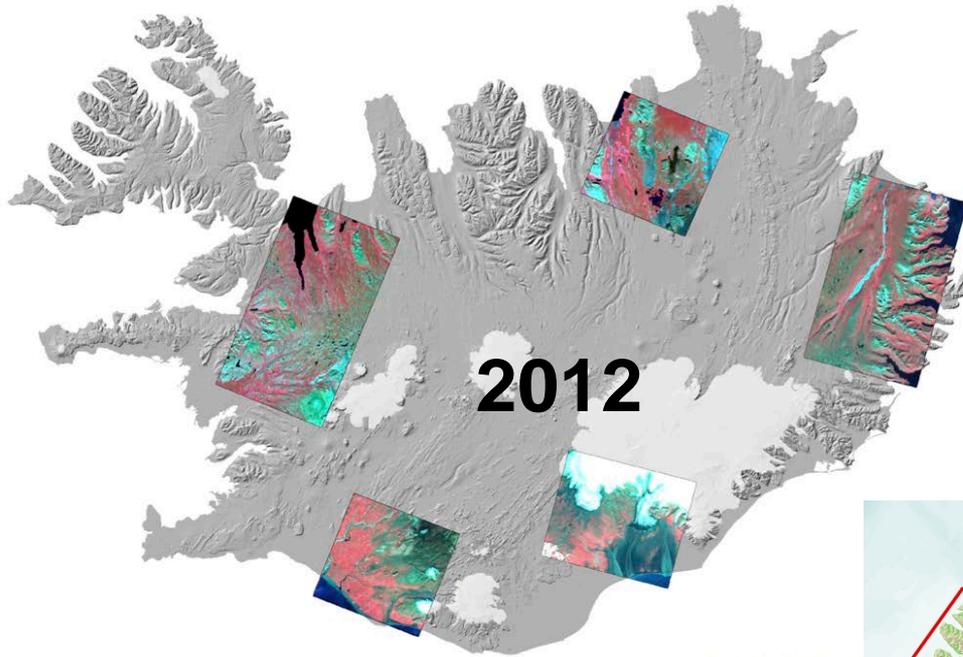
Ancillary data used for help such as lava cover and  
DEM

Vegetation transects location set out randomly,  
based on stratification and signal variability

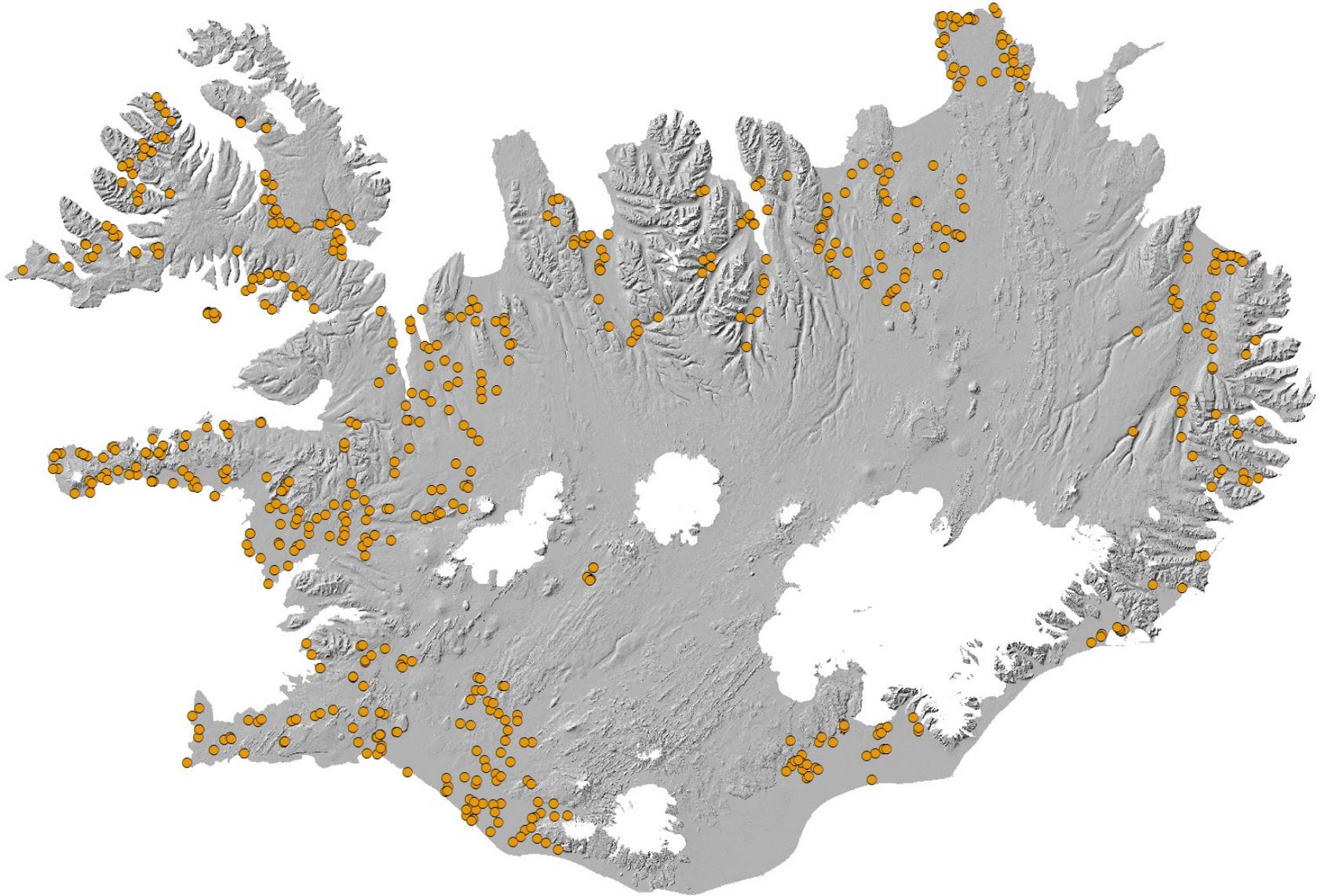




# Fieldwork sites 2012–2013

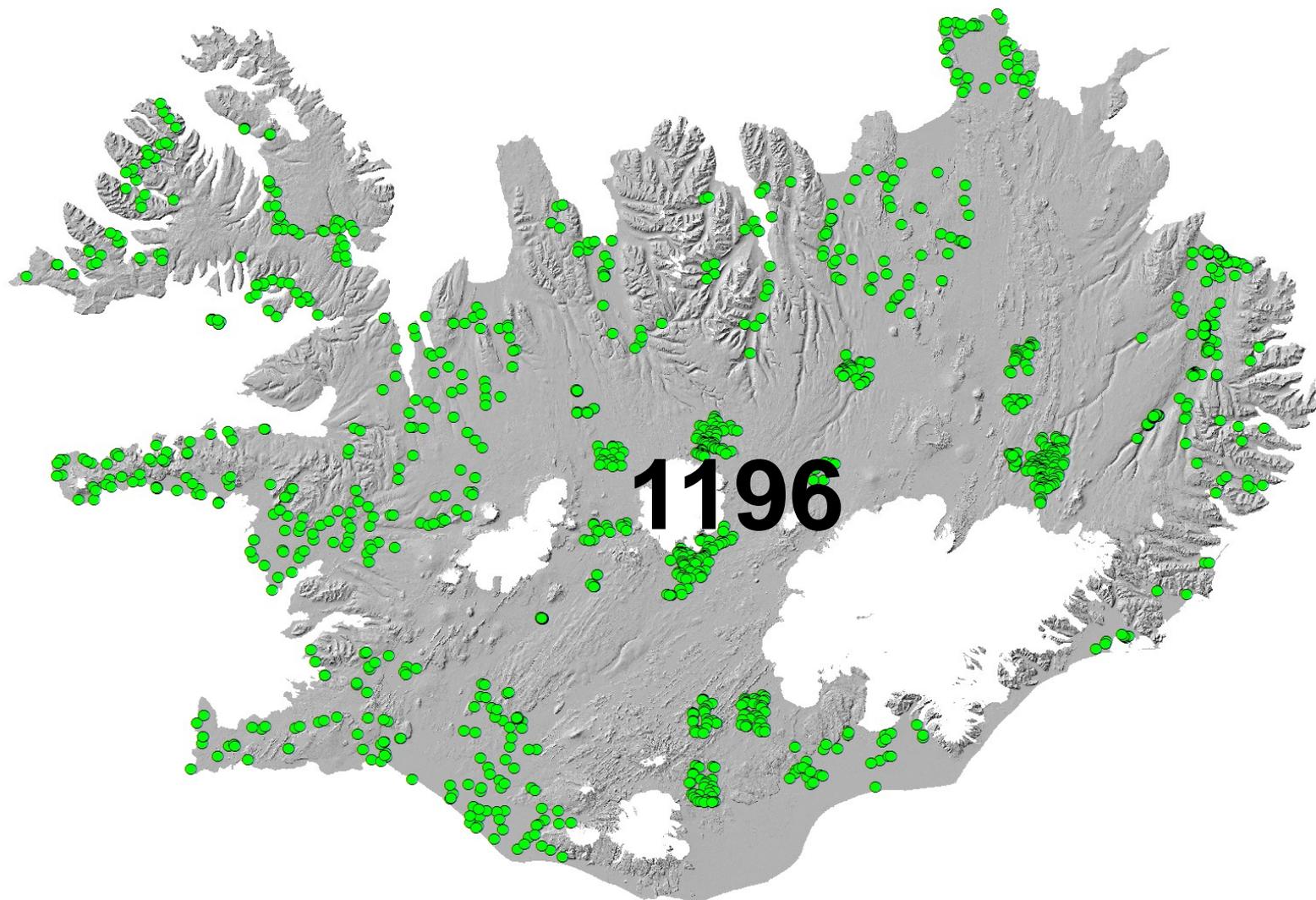


# Location of transects (638)



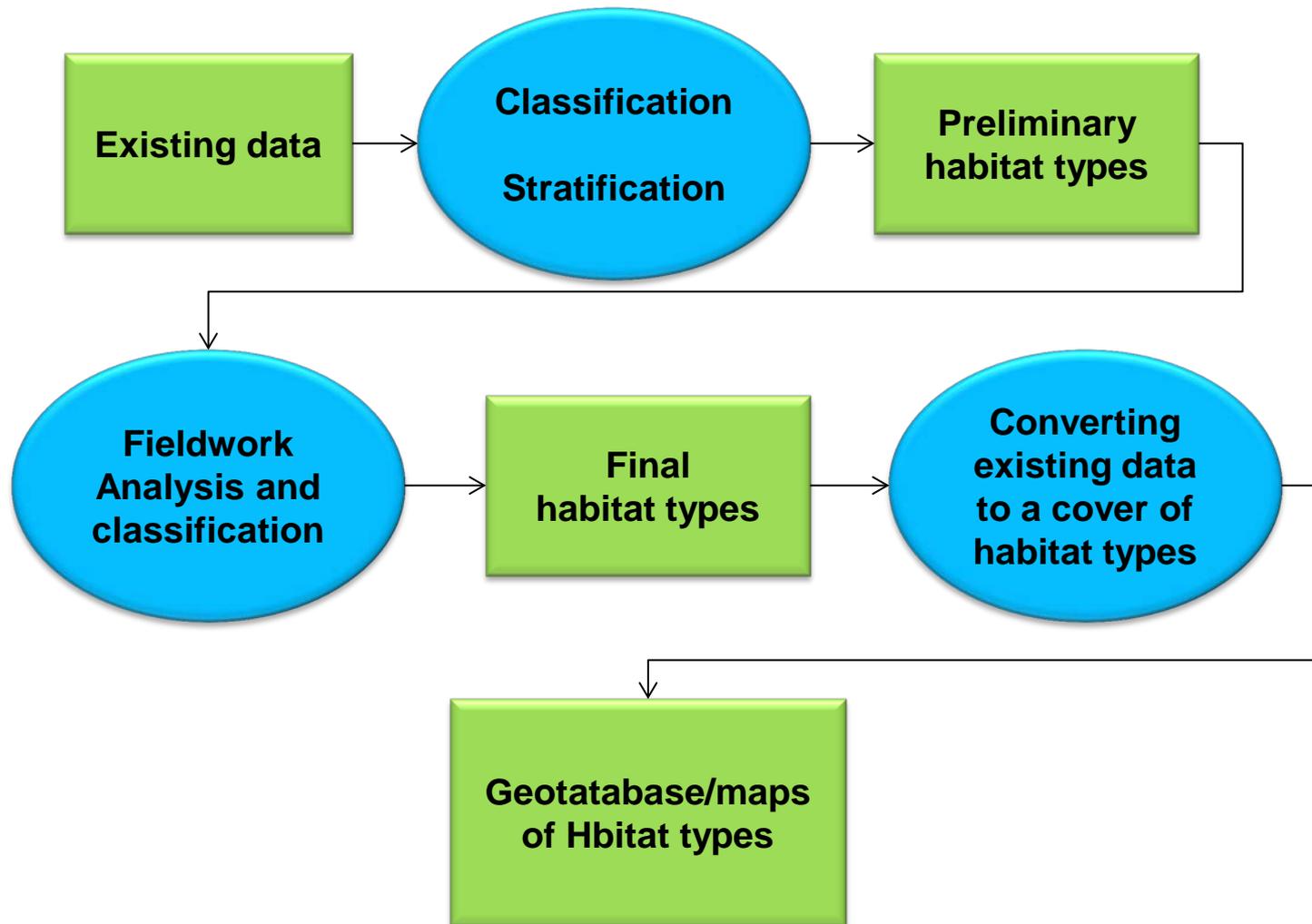


For statistical analysis and classification transects from other projects were also used



- **Twin Span vegetation classification used to identify the habitat types**
- **60 habitat types in 10 main classes identified**
  - **Alluvium habitats**
  - **Grassland habitats**
  - **Lava habitats**
  - **Gravelly habitats**
  - **Moss habitats**
  - **Heath habitats**
  - **Wetlands habitats**
  - **Scree habitats**
  - **Woodland habitats**
  - **Costal habitats**



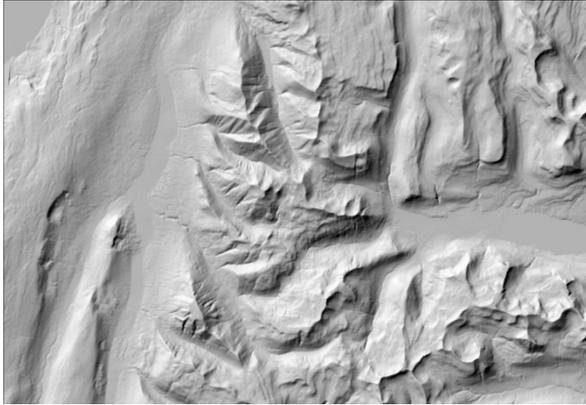


# Image classification

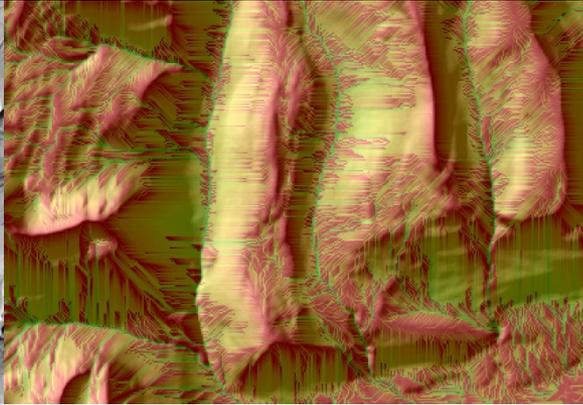
- Using only classified Rapid Eye satellite images does not give acceptable outcome
- Spectral resolution is poor, only one near ir channel plus red edge channel
- Other data necessary
- Some habitats needs to be extracted by using GIS only
- Some habitats extracted by using semi automated process such as segmentation



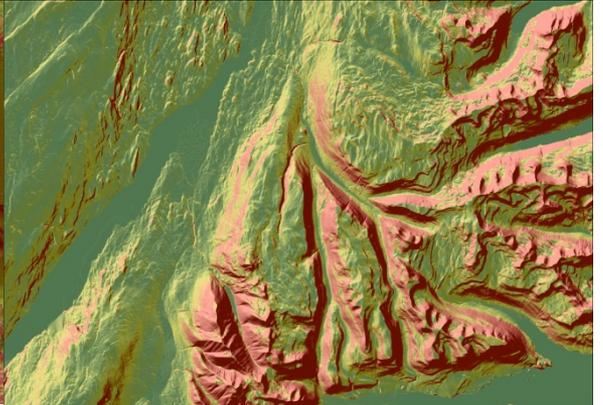
# The toolbox



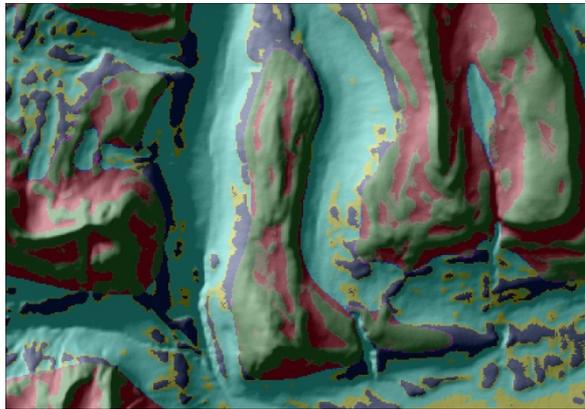
DEM



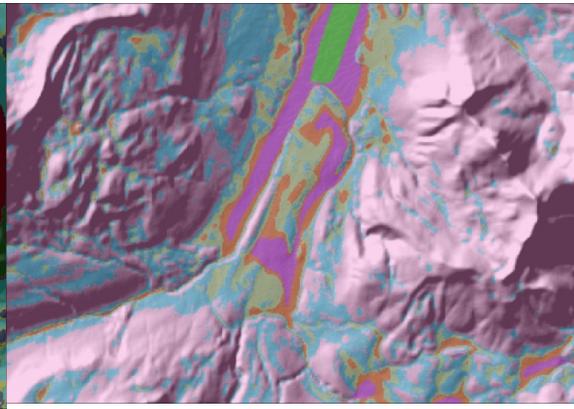
Flow accumulation



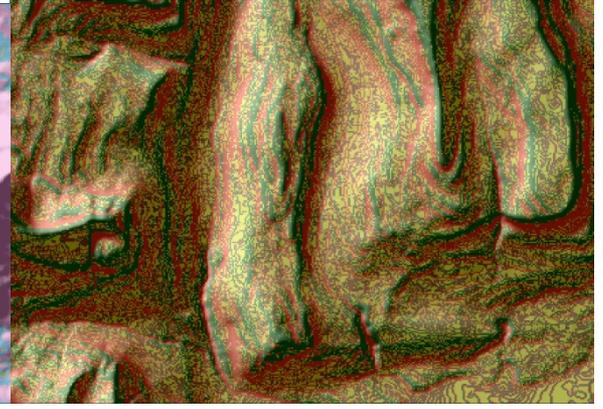
Ruggedness



TPI classes



Valley bottom flatness

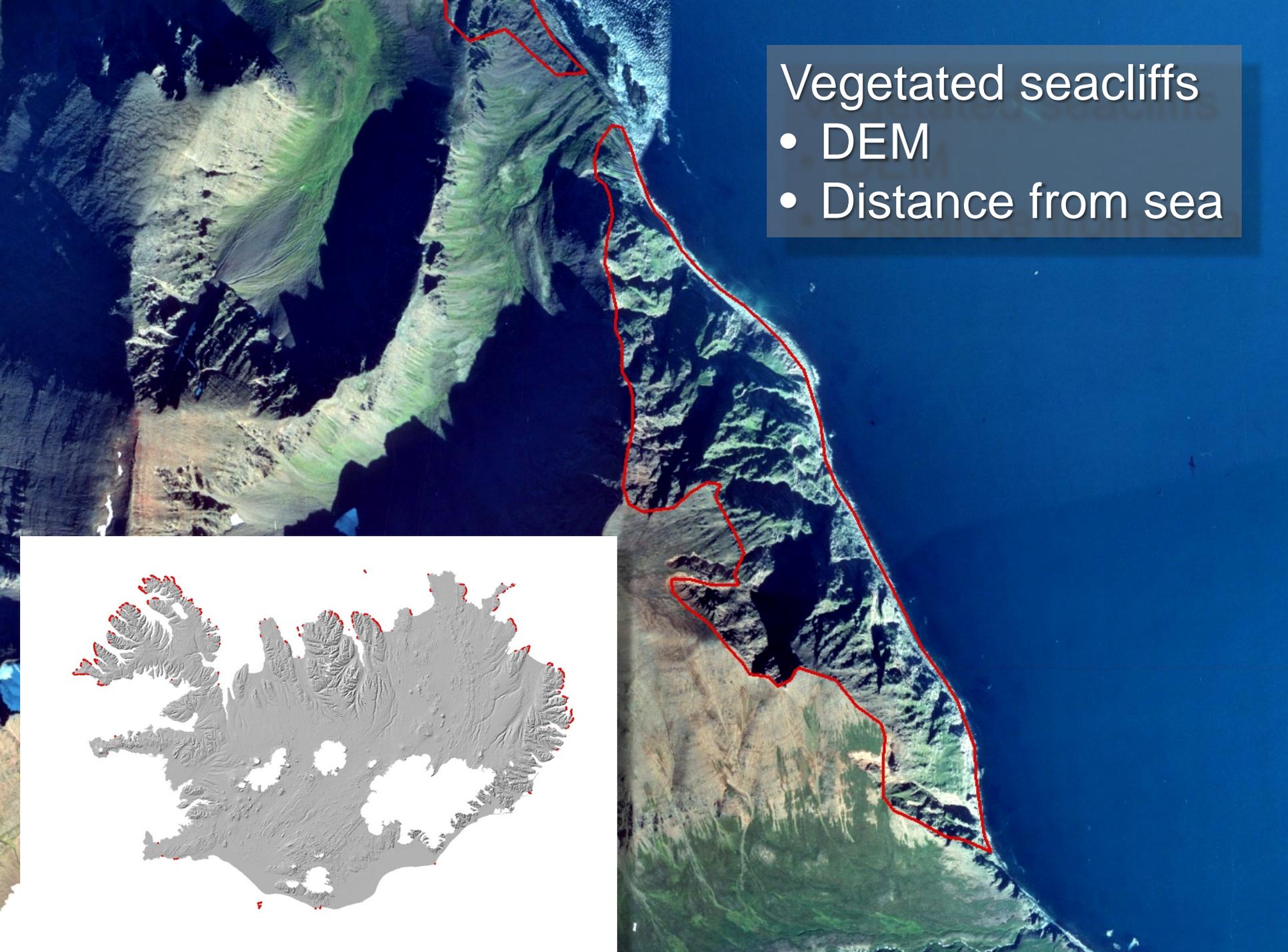
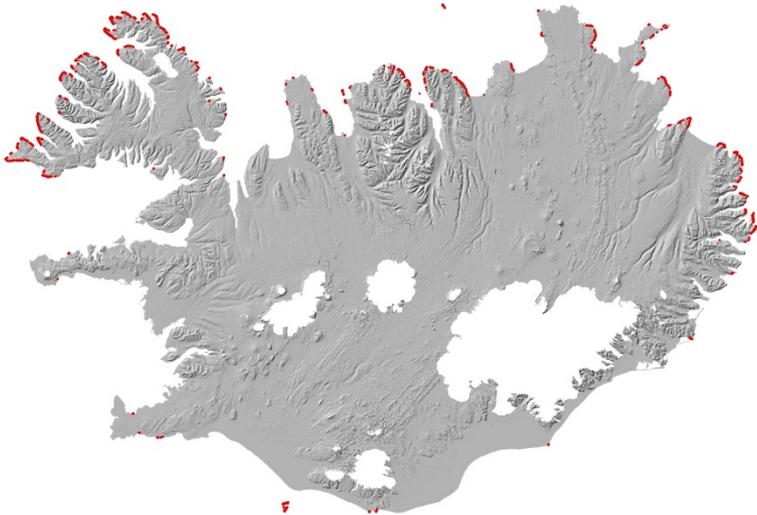


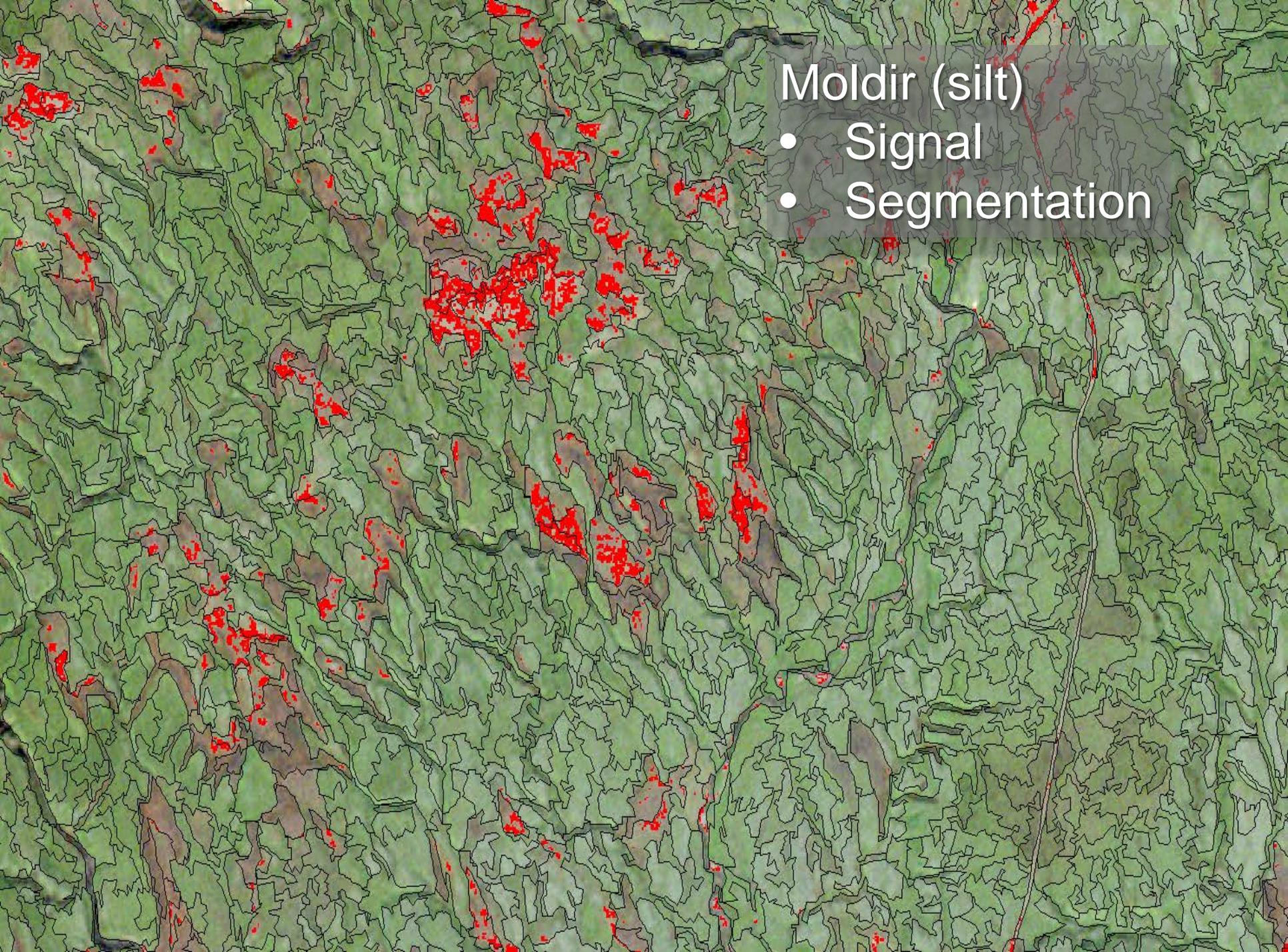
Curvature



## Vegetated seacliffs

- DEM
- Distance from sea





Moldir (silt)

- Signal
- Segmentation

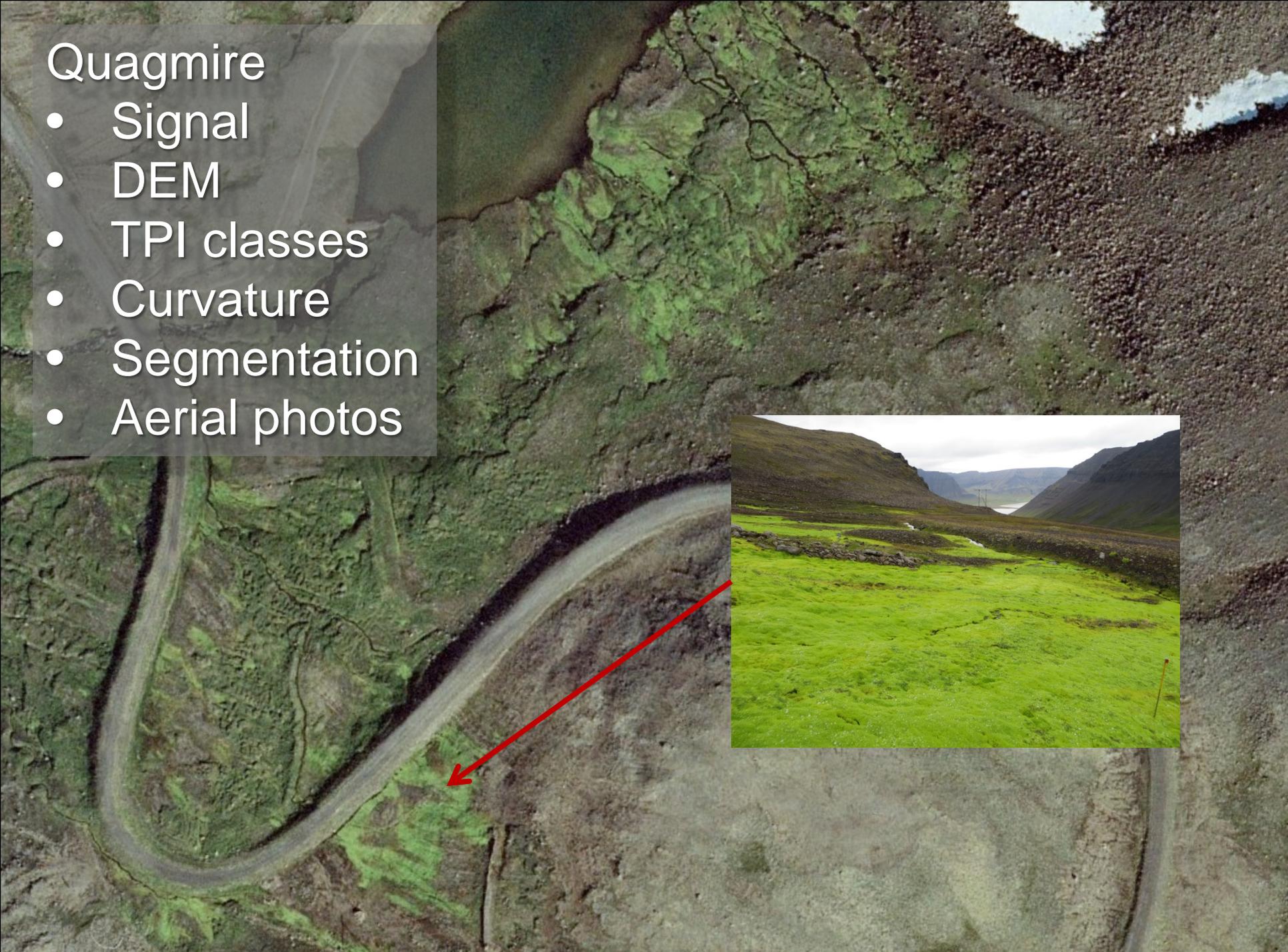


## Tidal flats

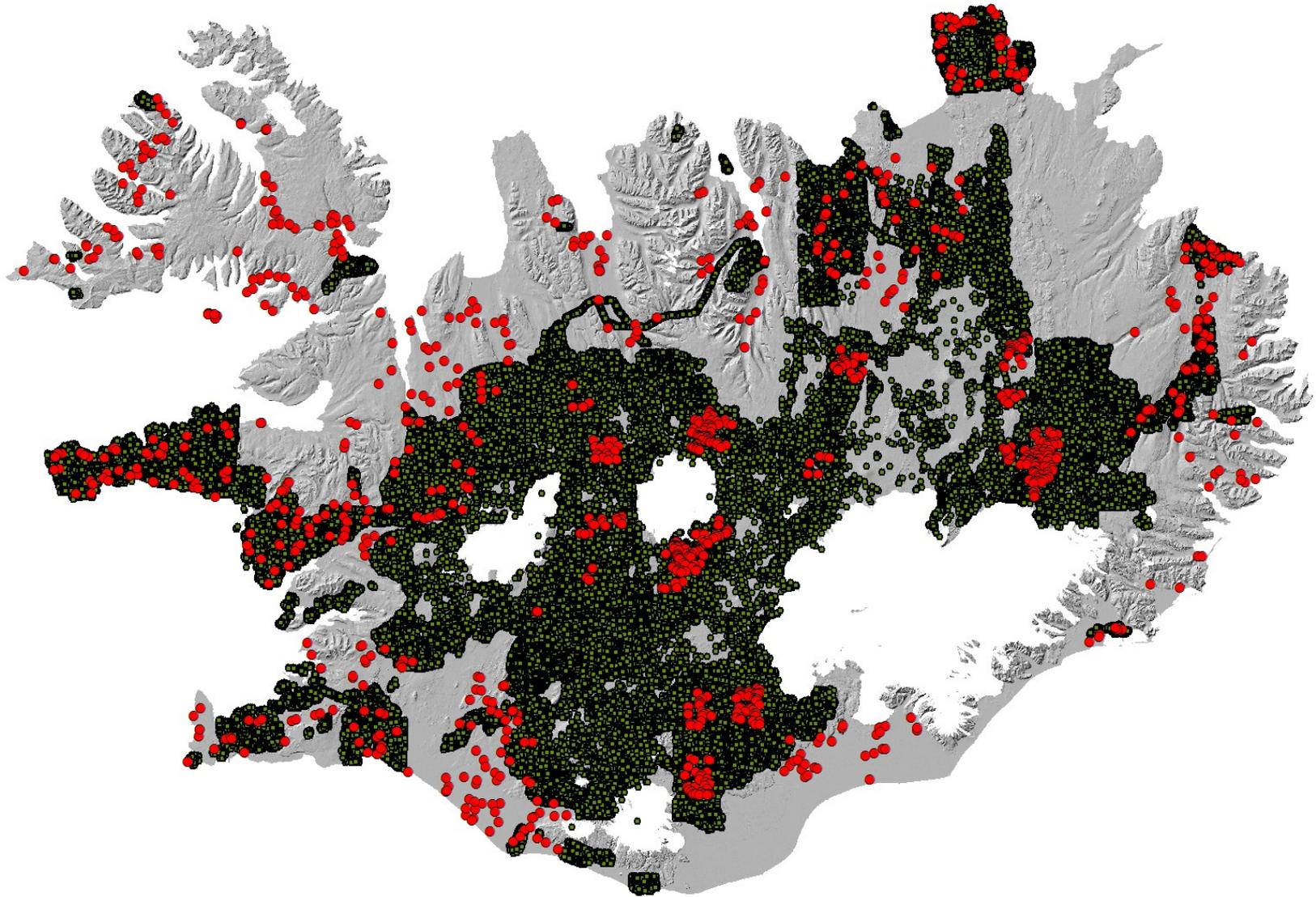
- Signal
- Distance from coast
- DEM
- Aerial photos

# Quagmire

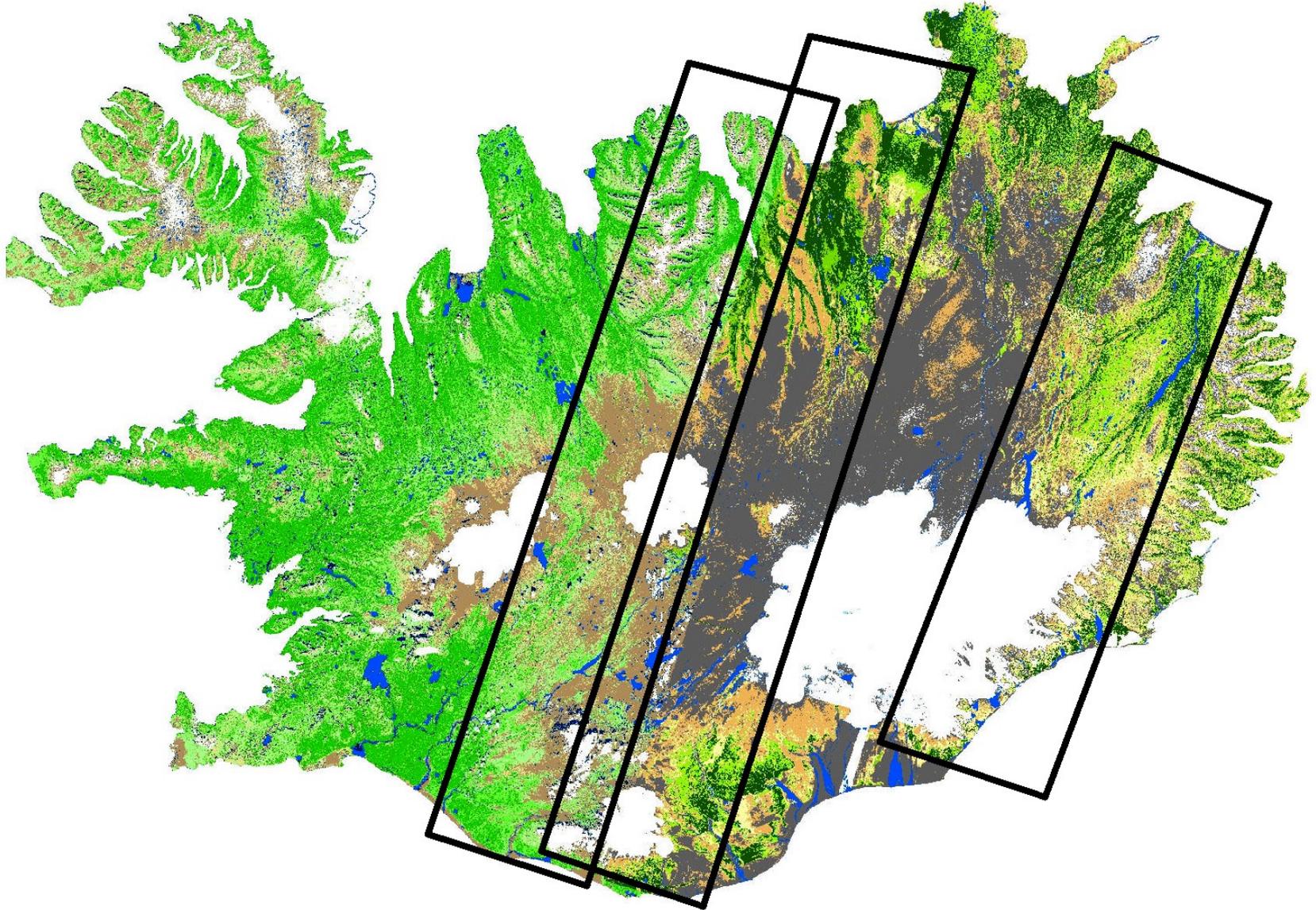
- Signal
- DEM
- TPI classes
- Curvature
- Segmentation
- Aerial photos



# Accuracy assessment



# The status sept 2014



In the beginning



At the end

Thank you

