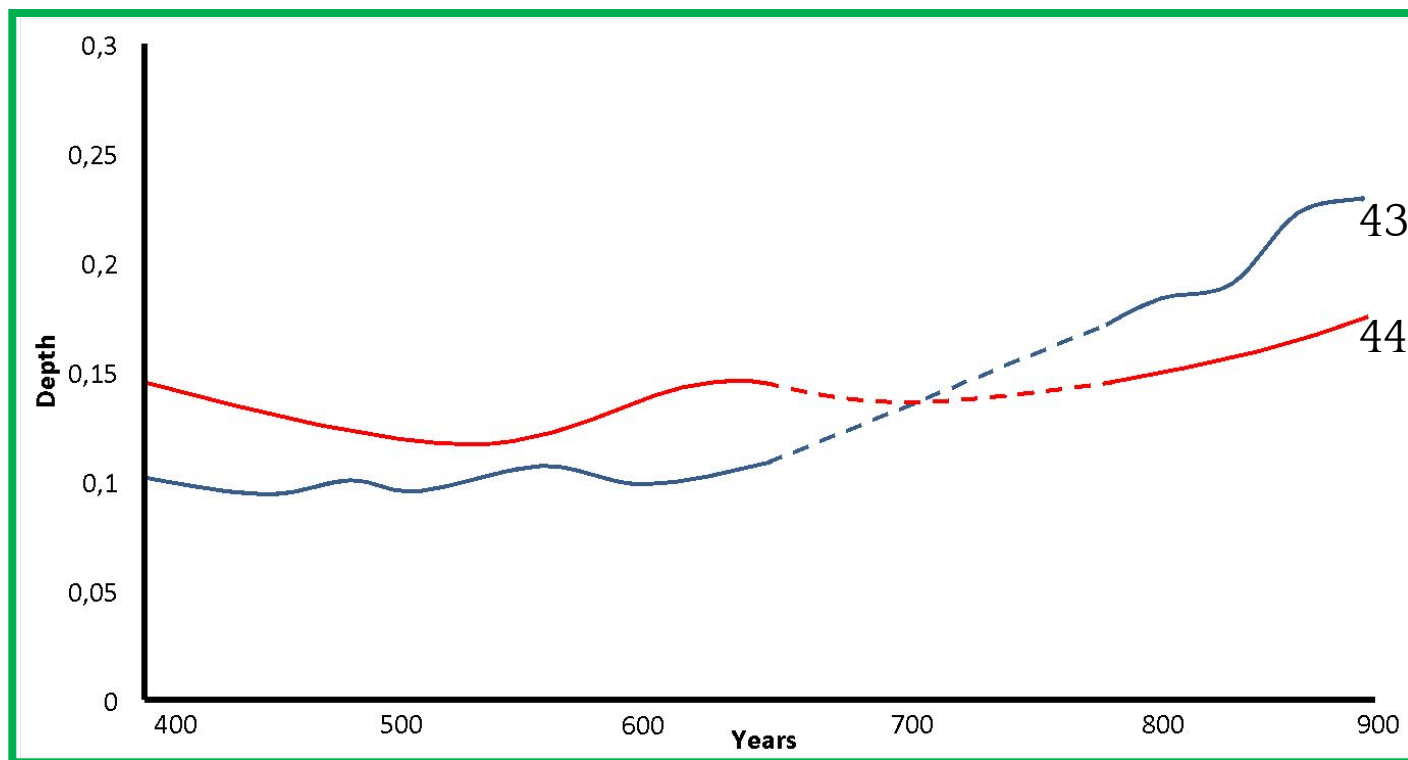


Save your money and time with us



DriLife

Spectral reflection coefficient for saxaul (haloxylon)

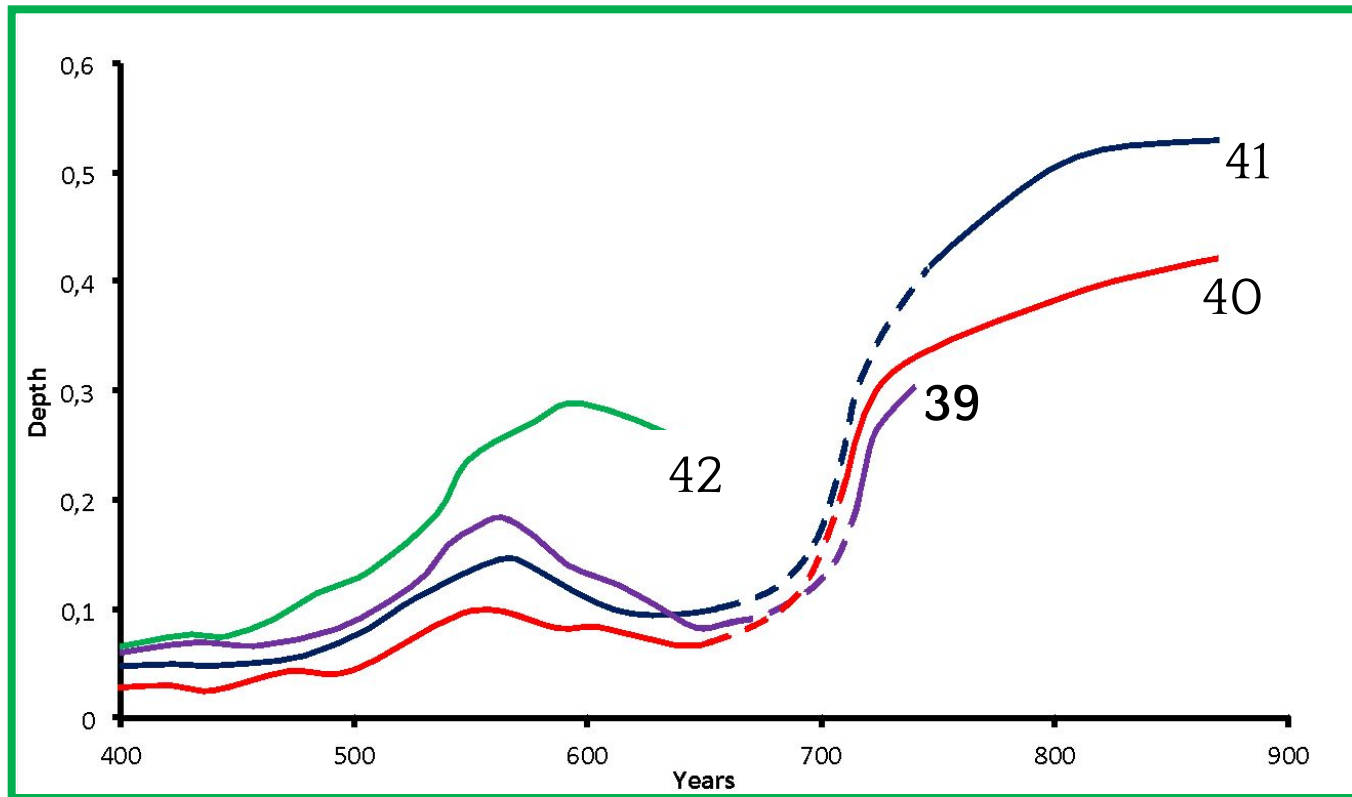


43-mature leafs; 44-dried

Saxaul

— dried — mature leafs

Spectral reflection coefficient for mature aspen wood



39-young leaf; 40-full leaf; 41-mature leaf; 42-autumn coloration

Aspen wood

— full leaf	— mature leaf
— young leaf	— autumn coloration

Microseepage model

Geochemical

Anomalous surface concentrations

Geophysical

Carbonate precipitation

High resistivity anomaly

Pyrite precipitation

High polarization

Precipitation sulphur,
pyrrhotite, greigite, uranium,
etc.

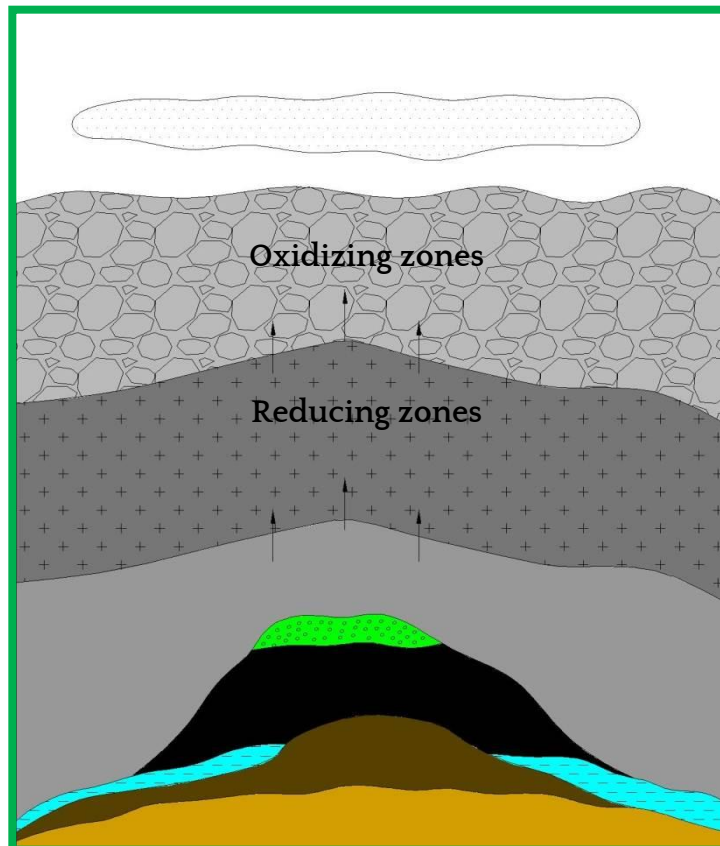
Magnetic anomaly

Bacterial degradation of
hydrocarbons

Low resistivity anomaly

Light hydrocarbons seep
upward from trap creating a
reducing zone

Seismic velocity anomaly



H₂S alteration anomalies example

(geochemical bleaching along joints, bedding planes)



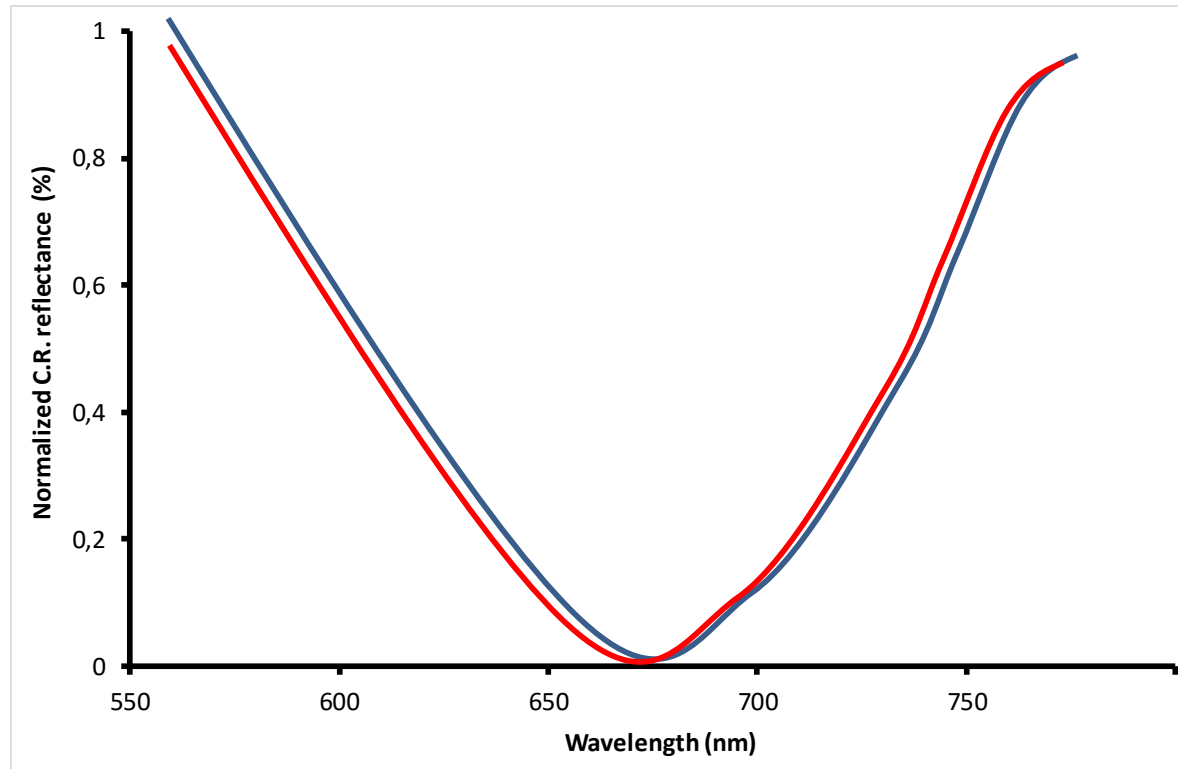
Chemical reduction over HC, removal of hematite, bleaching of red color, can be identified by aerial imagery

CO₂ alteration anomalies example (light tonal (caliche) anomaly)



HC biochemical degradation over petroleum, CO₂ formation, carbonate cements, carbonate mineralization of surface, excessive caliche in soil, tonal/color anomalies, can be identified by aerial imagery

Ethane influence on vegetation reflectance (example - maize)



— control — ethane

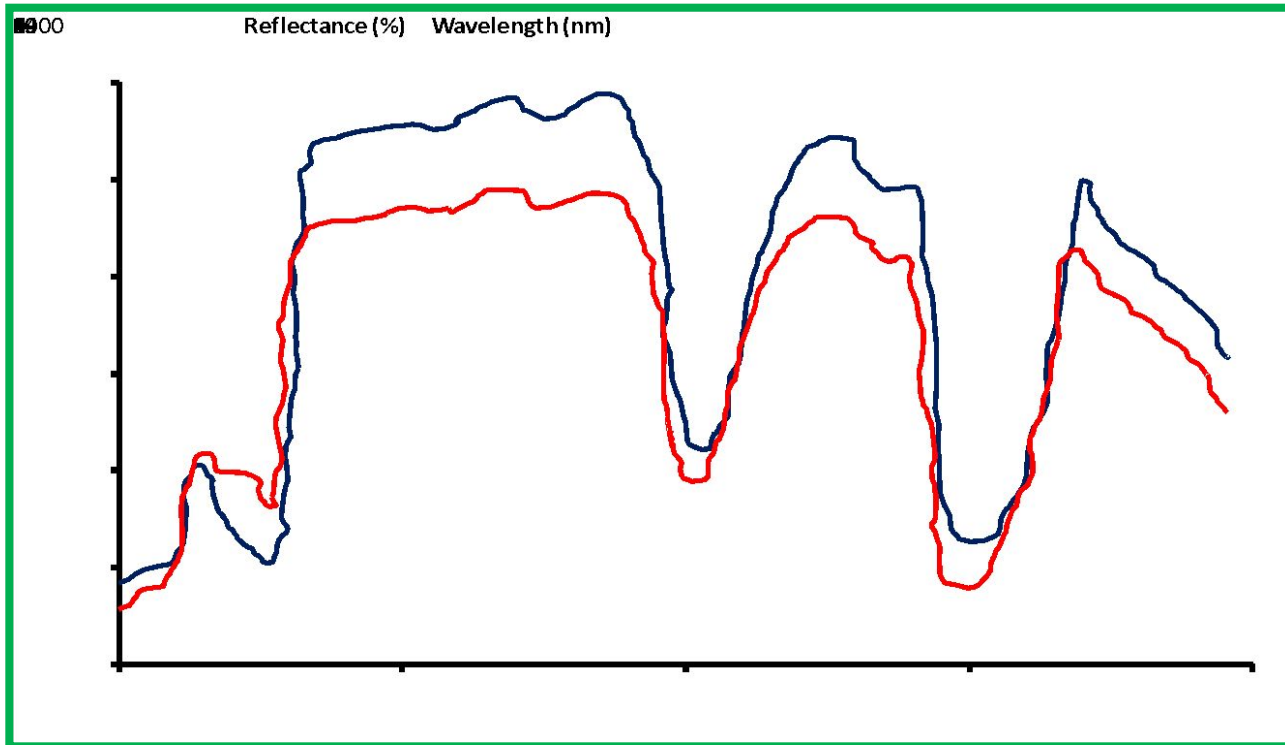
Reflectance shift towards red over spectrum, can be identified by aerial imagery

HC influence on vegetation reflectance



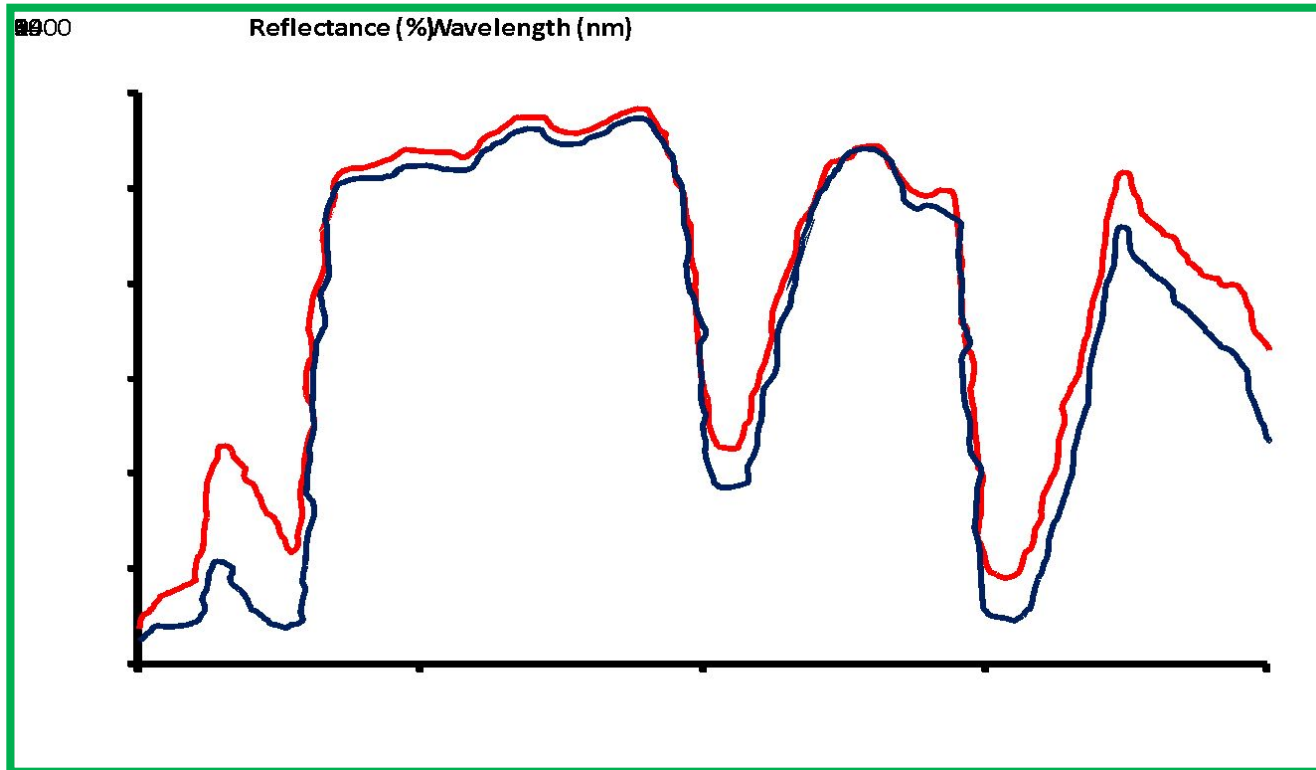
Discolouration of maize leaves (left) and wheat leaves (right)

HC influence on vegetation reflectance



Reflectance spectrum of maize leaves from a control plot and a gassed plot

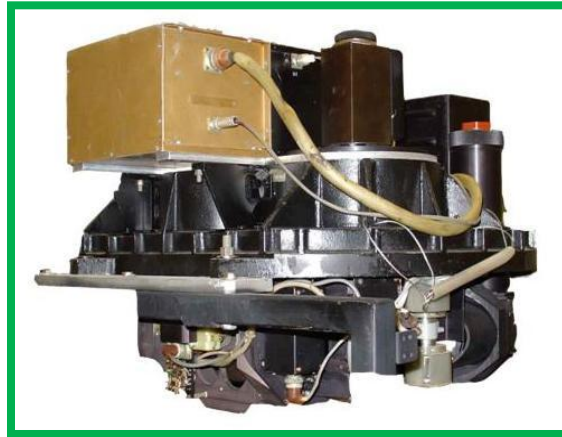
HC influence on vegetation reflectance



Reflectance spectrum of wheat leaves from a control plot and a gassed plot

«Eagle» multispectral airborne scanner

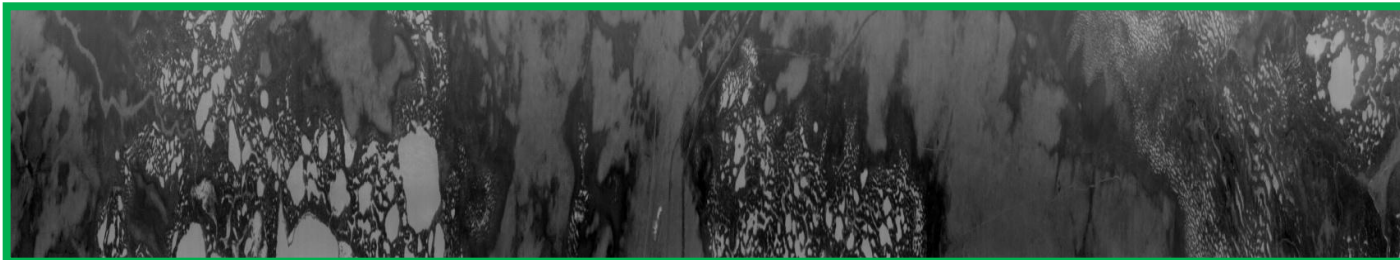
System destination is scanning of earth from aircraft and obtaining of images in several selectable spectral



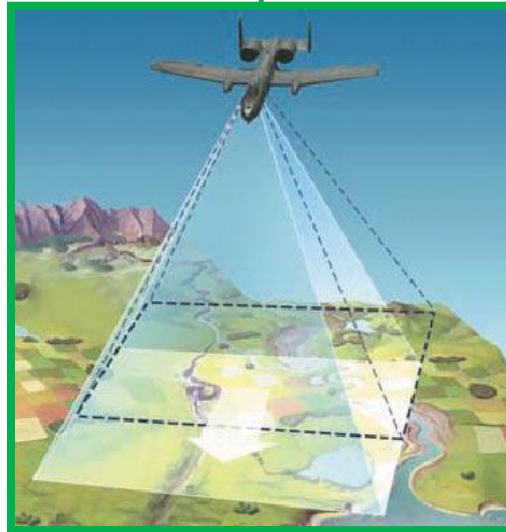
Technical parameters of «Eagle» scanner:

Information channels	26	Spectral range	0.43-12.5 μm
Instant viewing angle	5'	Operation mode	interactive
Scanning angle, no less	70°	Operation temperature range.....	-10°C... +40°C
Scanning frequencies	18, 36, 72 lines/sec	Cooling agent	liquid nitrogen

Example image



Advantages of aerial imaging for hydrocarbons exploration in comparison with satellite imaging



Choice the time of survey

Possible to make imaging of the reference object (satellite – not always)

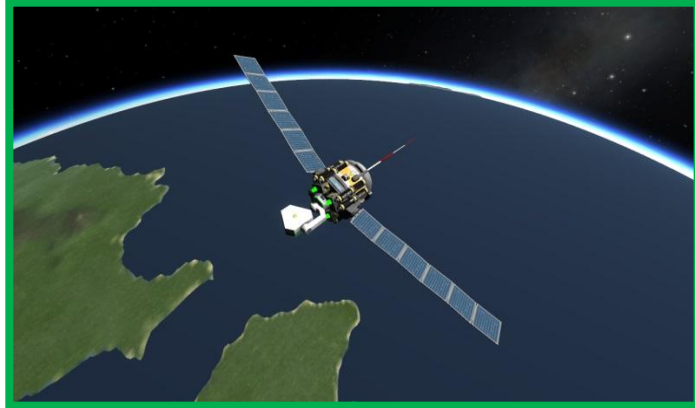
Exclude the clouds on images

The time of day with maximum prospecting signs

Hydrometeor scattering (haze), absorption of the reflected optical radiation

Absorption of radiation in the infrared rang

Advantages of aerial imaging for hydrocarbons exploration in comparison with satellite imaging



Satellite image resolution
70m x 70m

The spatial resolution of the satellite image
60m x 60m

The atmosphere makes optical distortion



Aerial image resolution
15m x 15m

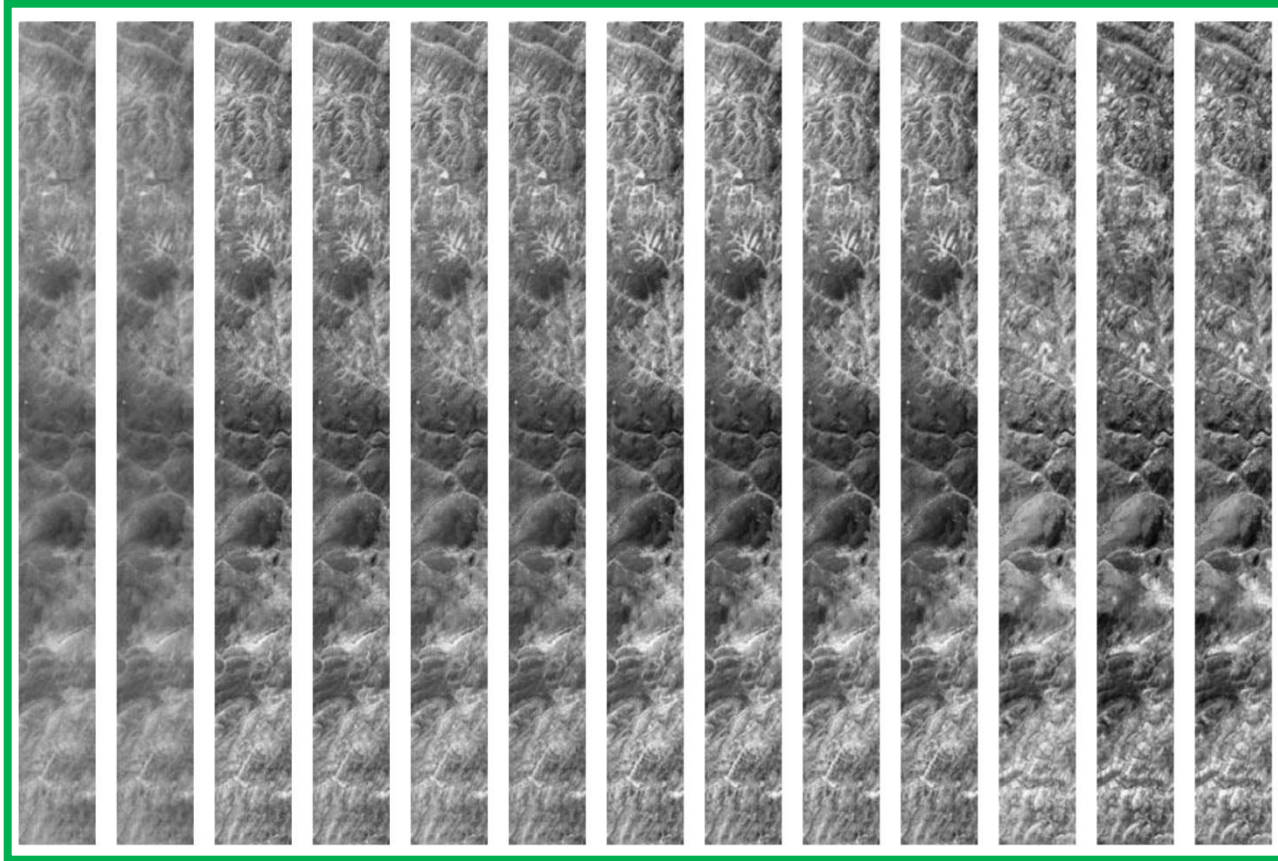
The spatial resolution of the aerial image
5m x 5m

Minimizing atmosphere influence, higher
spatial resolution

RECEIVED DATA PROCESSING ASSESSMENT

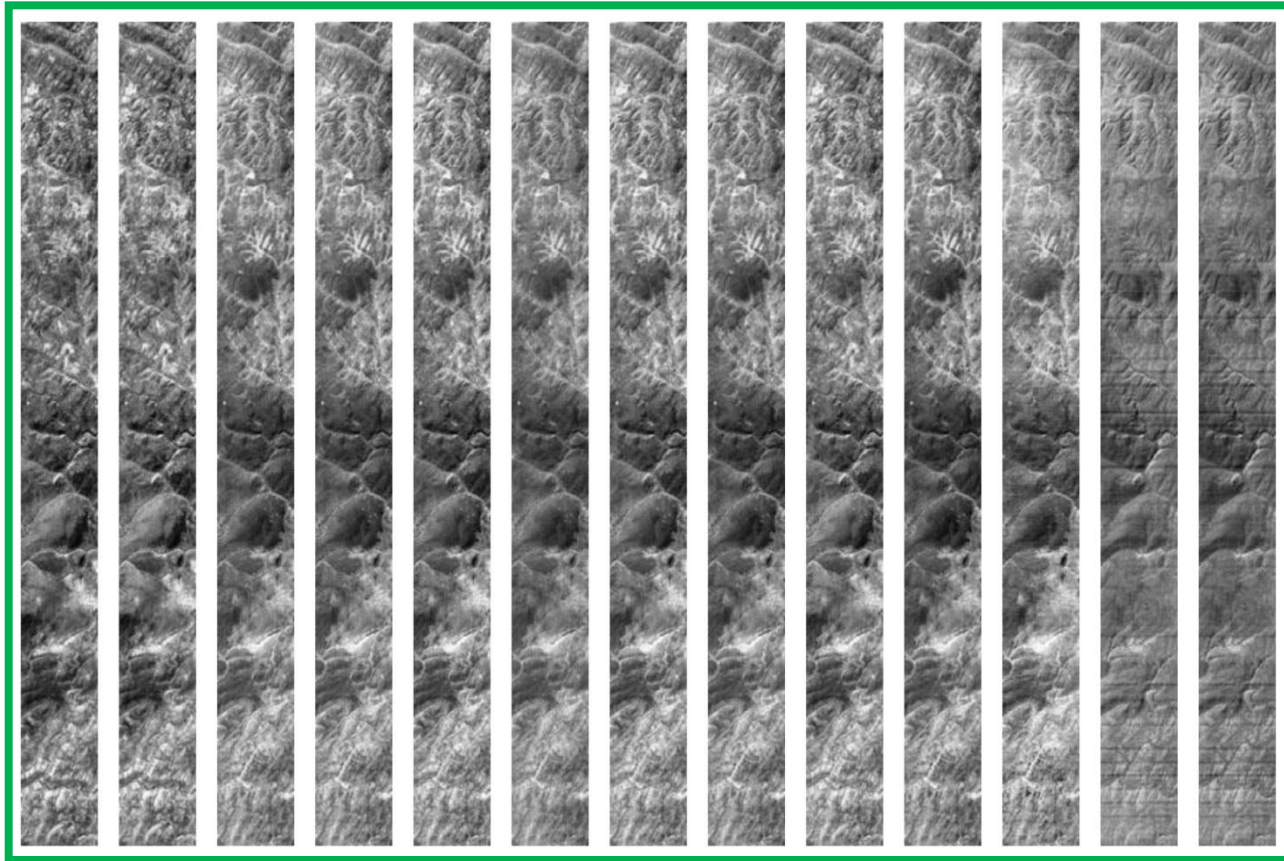


Spectral channels 1-13, route 1



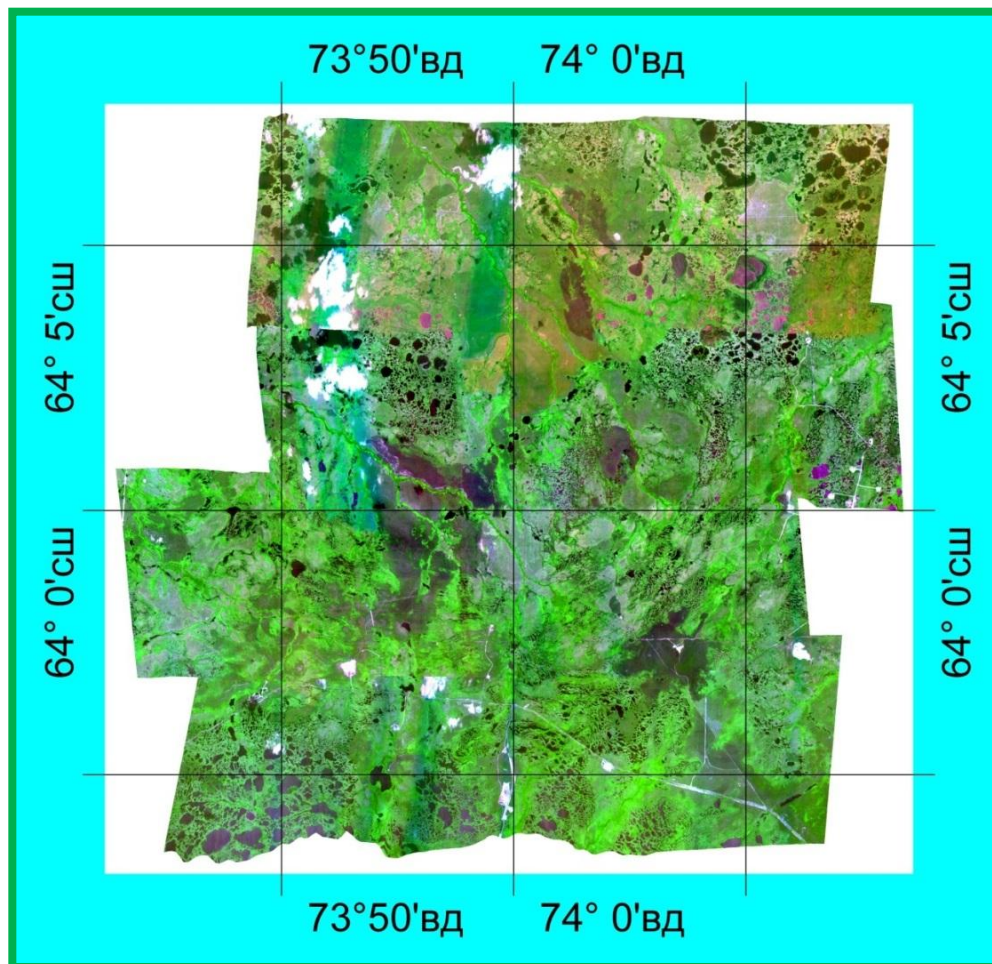
26 spectral channels aerial

Spectral channels 14-26, route 1



26 spectral channels aerial

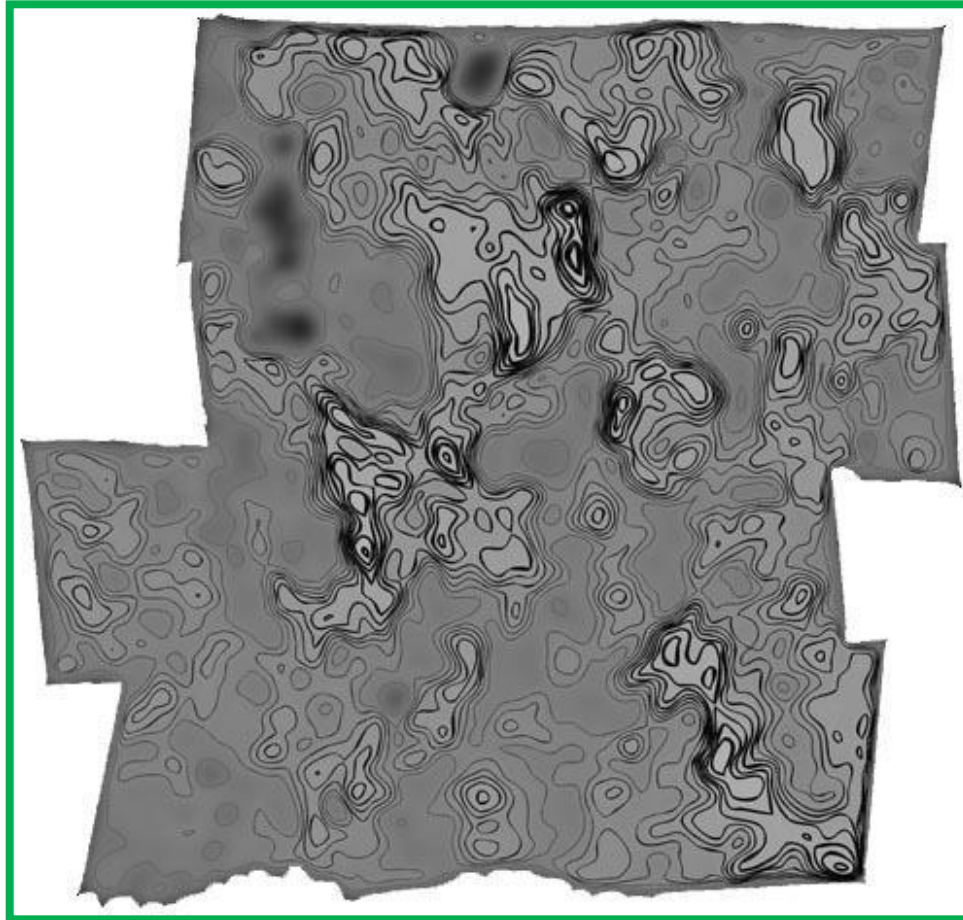
Digital pseudo-color image linked to geographical coordinates



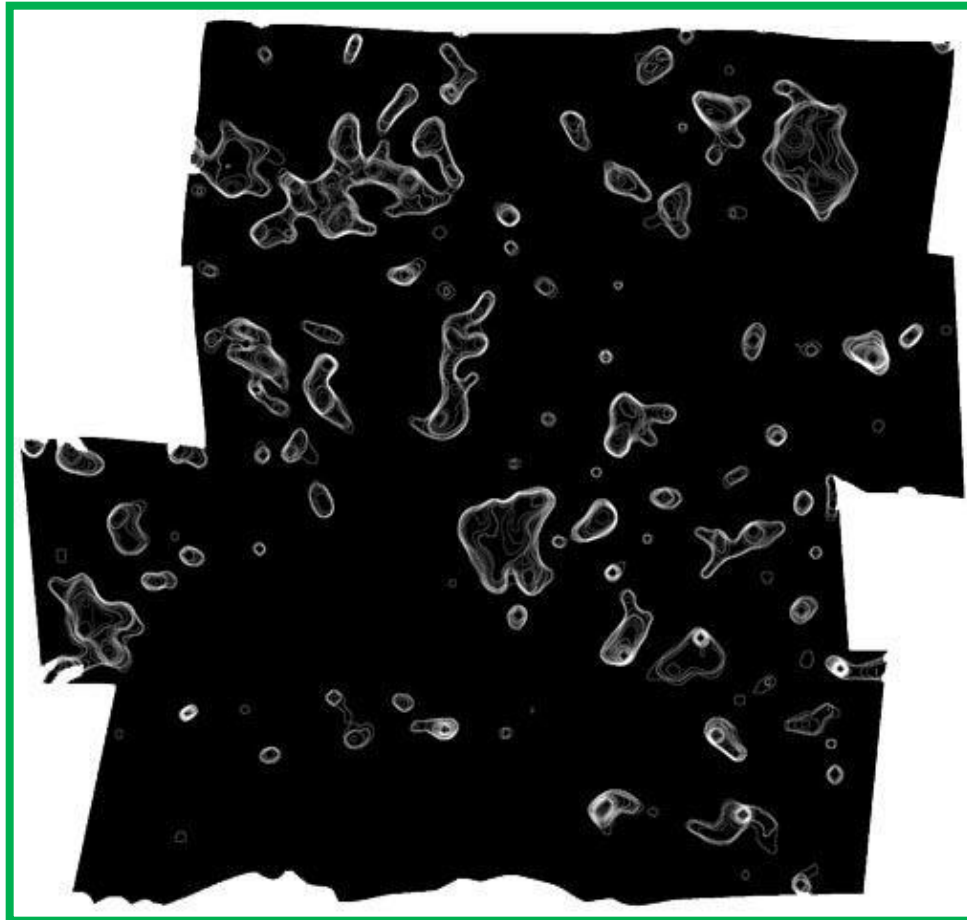
RECEIVED DATA PROCESSING ASSESSMENT



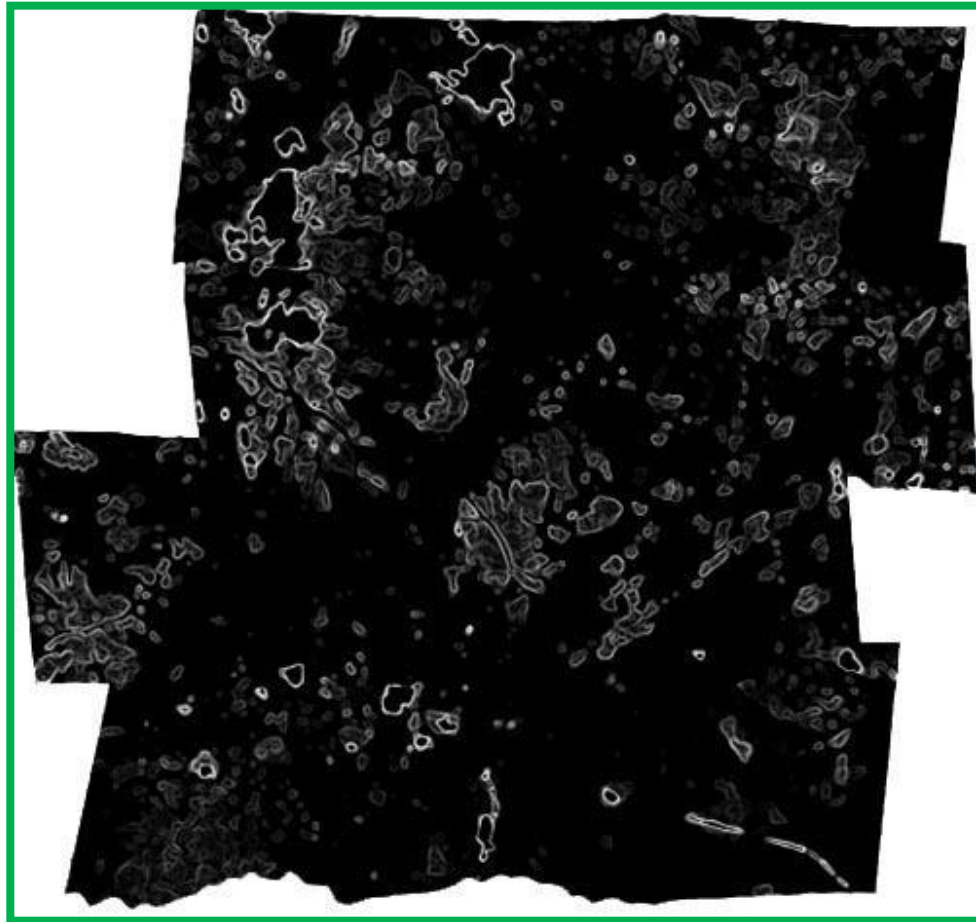
Distribution of thermal fields



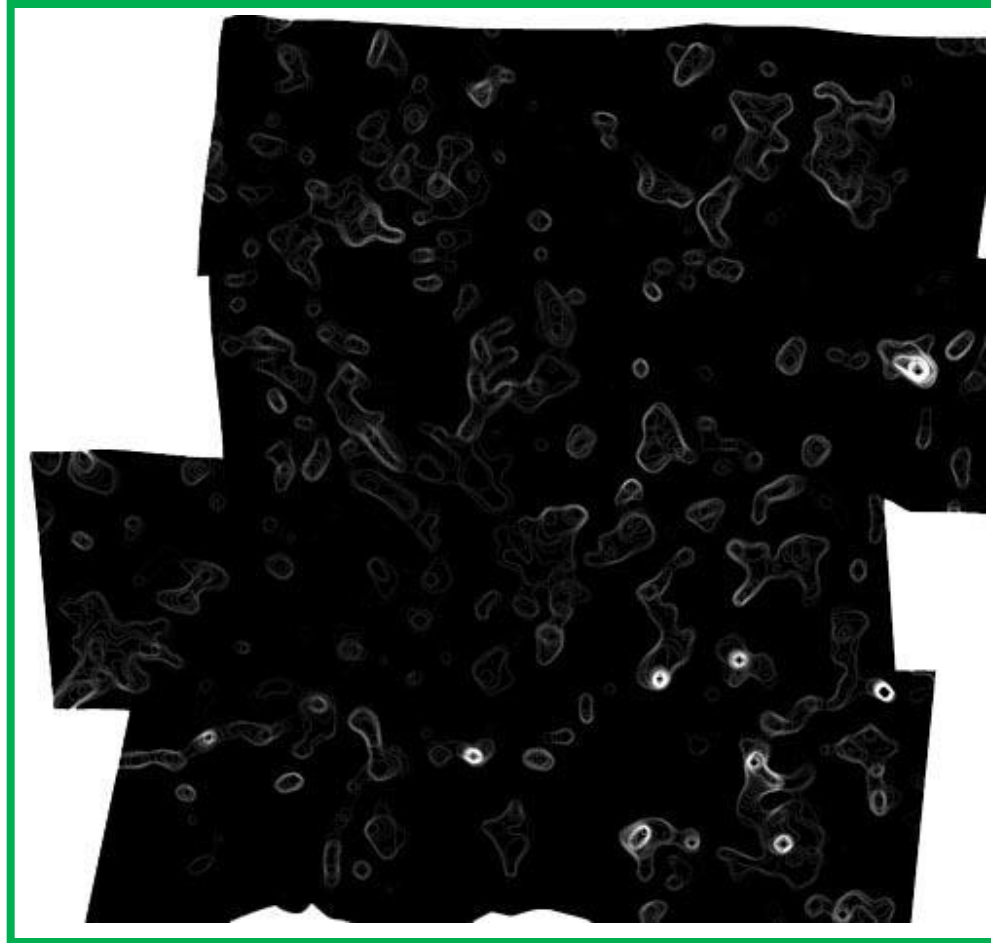
Soil anomalies example



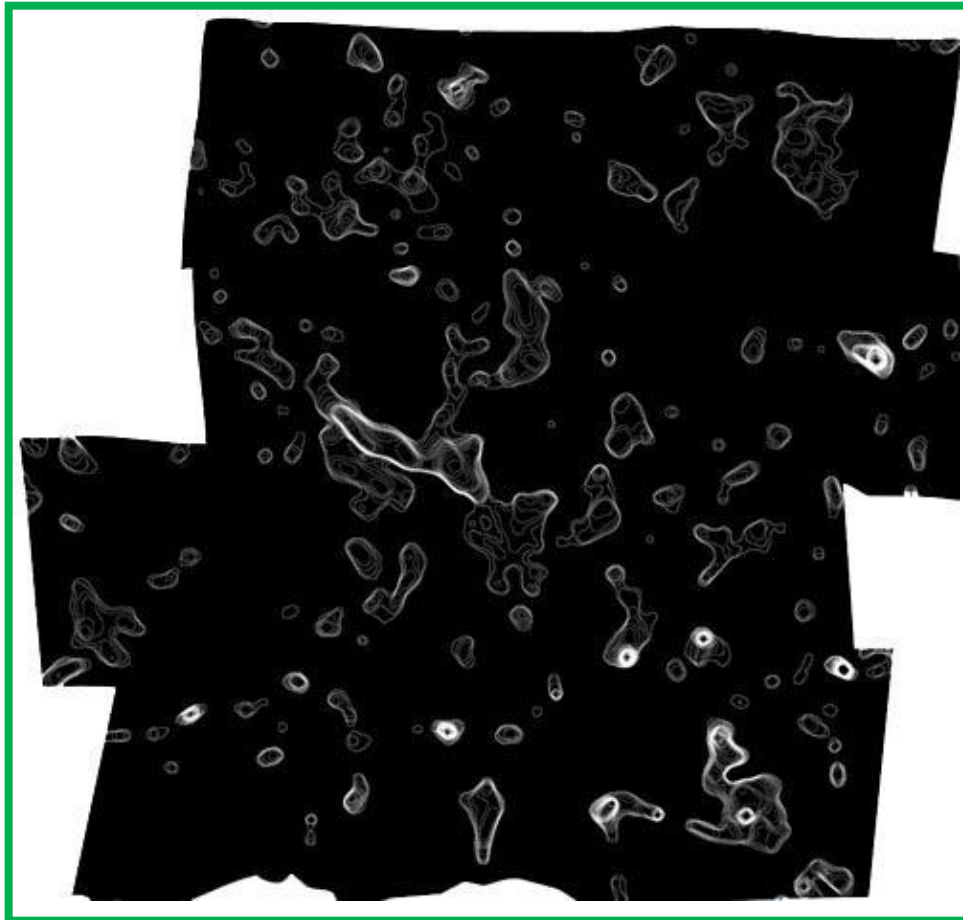
Vegetation anomalies example



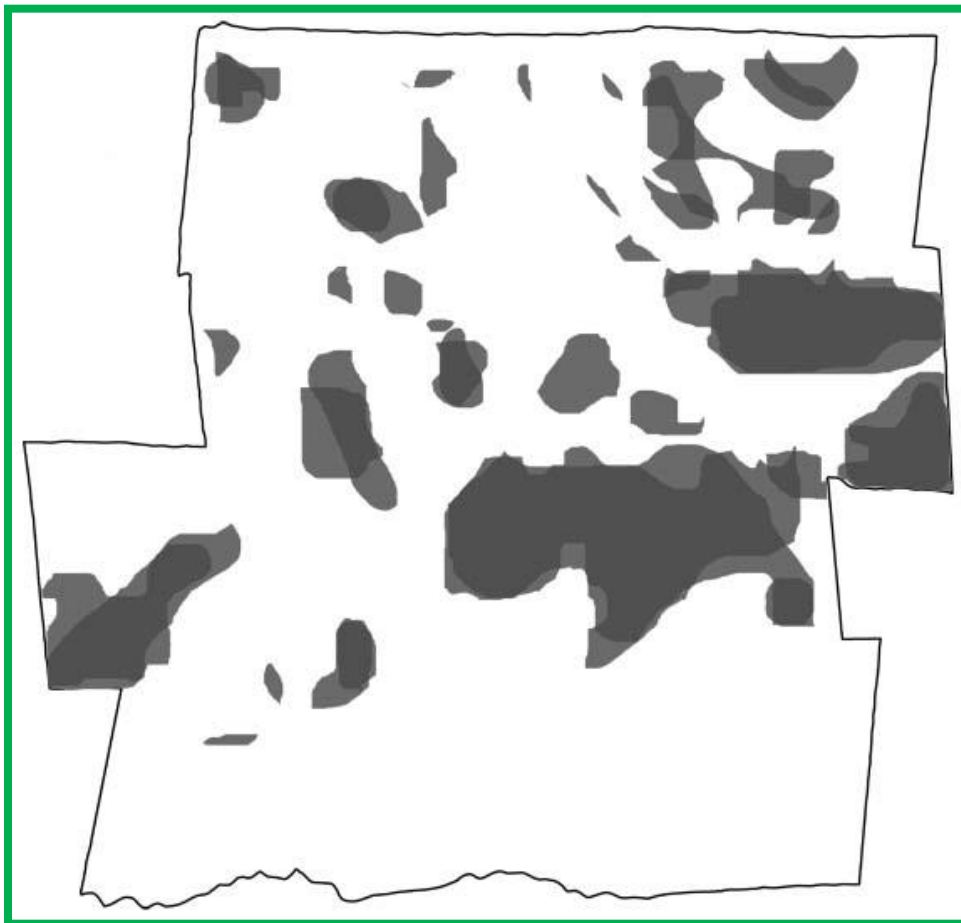
Texture anomalies example



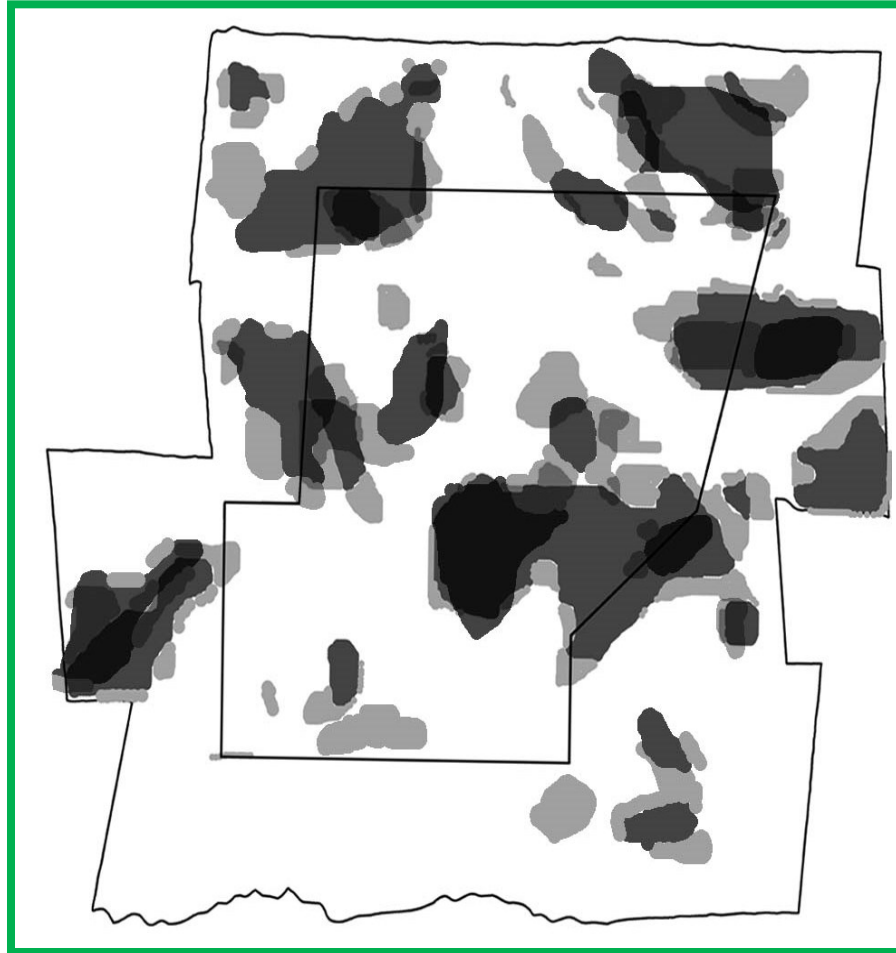
Bacterial anomalies example



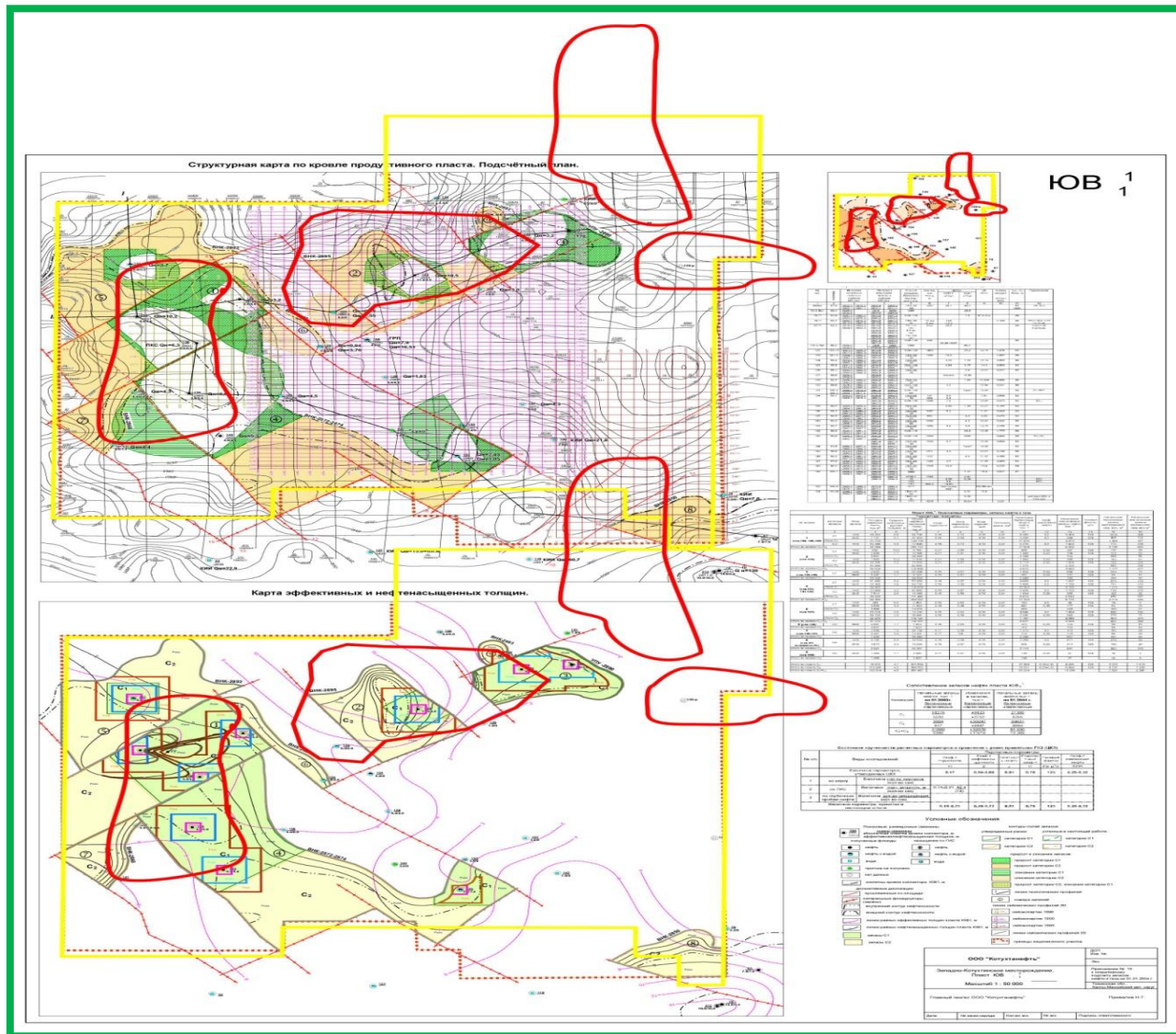
Summing-up of prospecting features



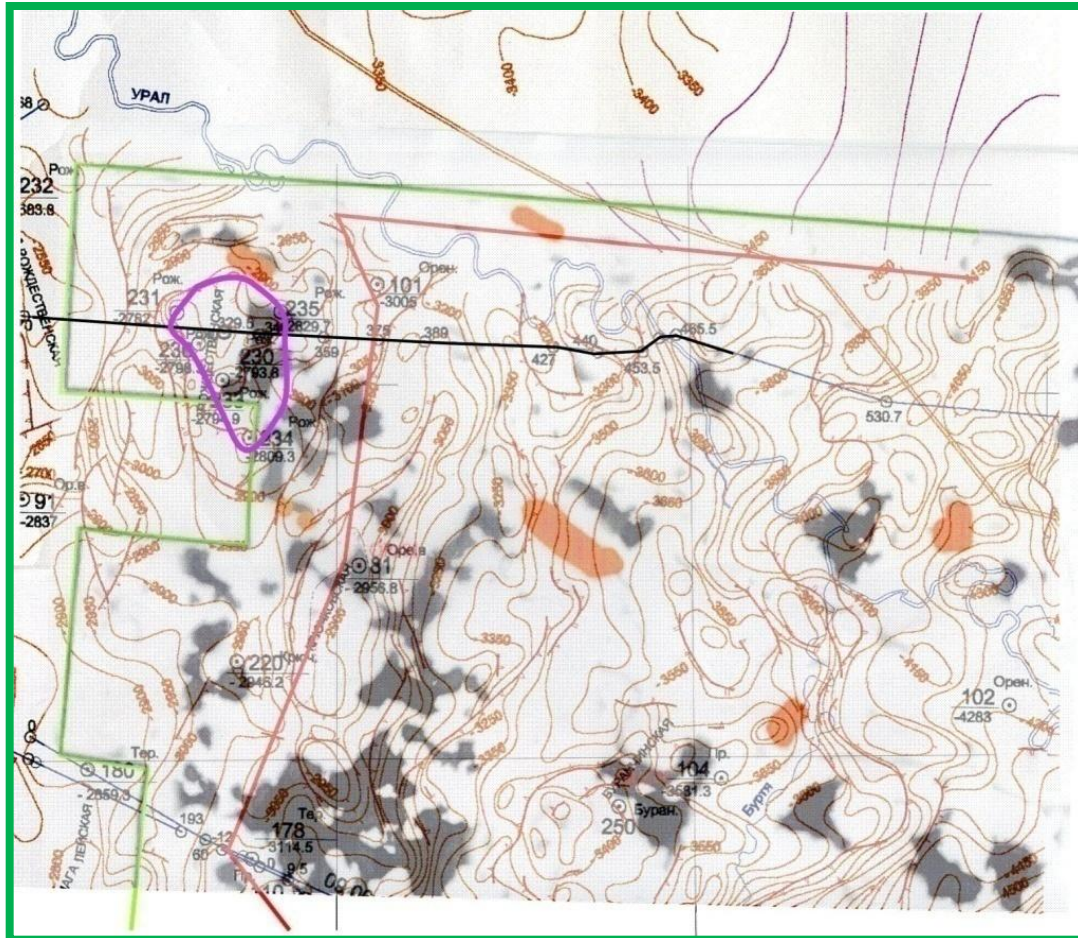
Complex analysis of the data



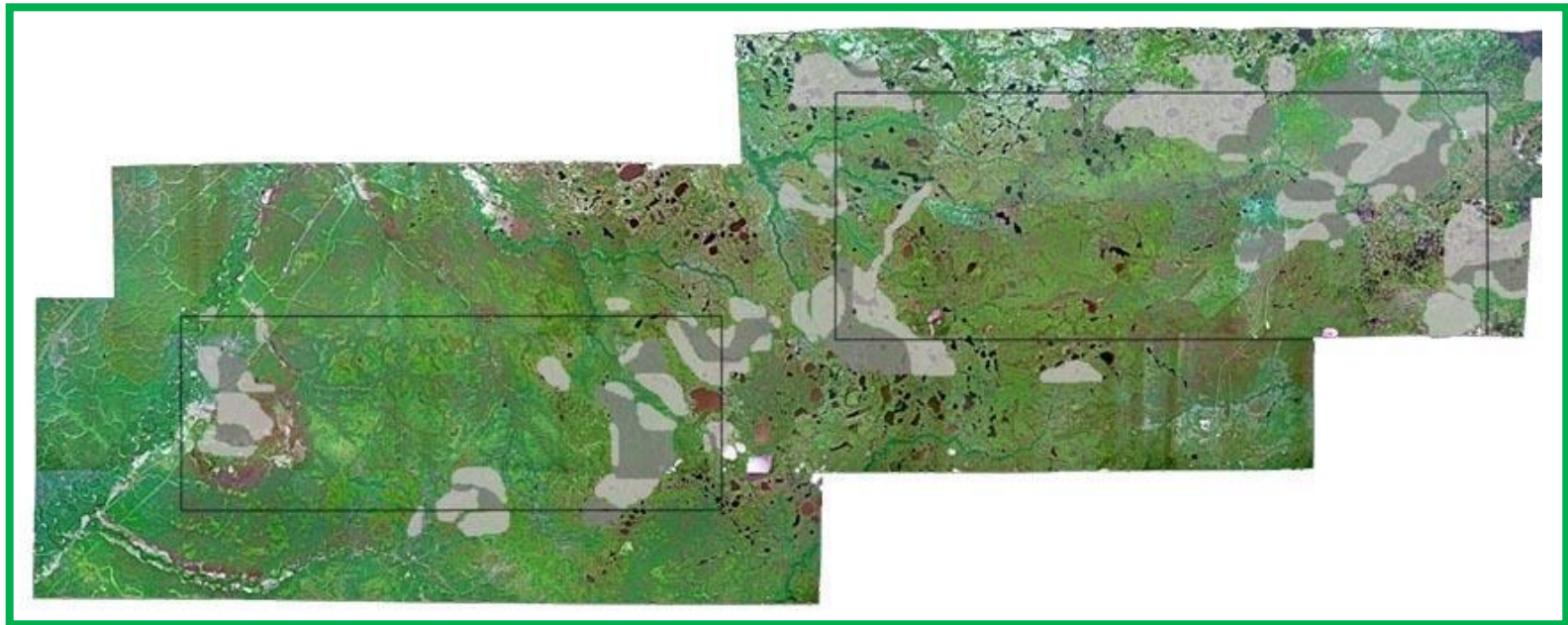
Seismic exploration and remote sensing data overlay example



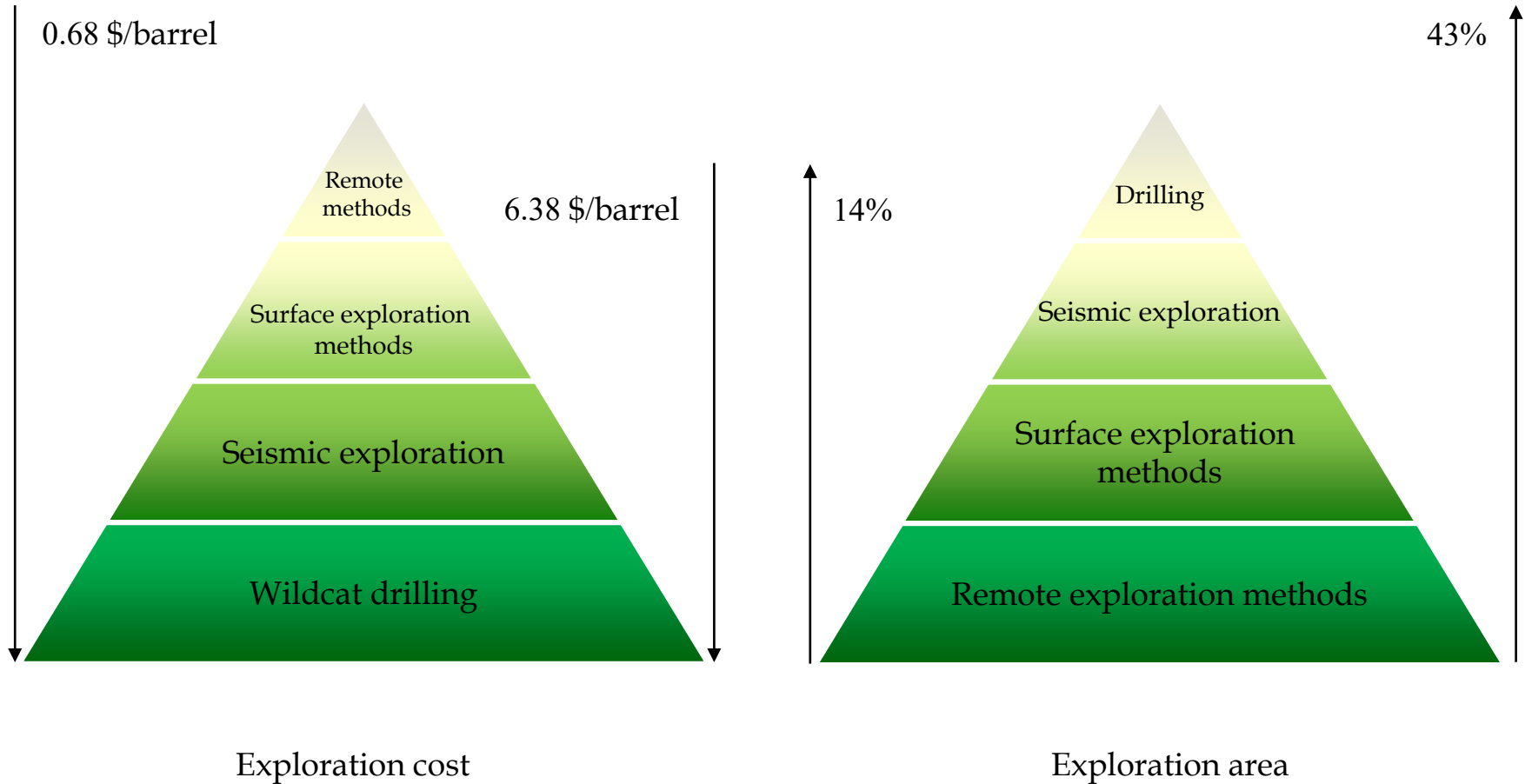
Seismic exploration and remote sensing data overlay example



Remote sensing detected hydrocarbon anomalies and scanned stitched digital pseudo-color image overlay example

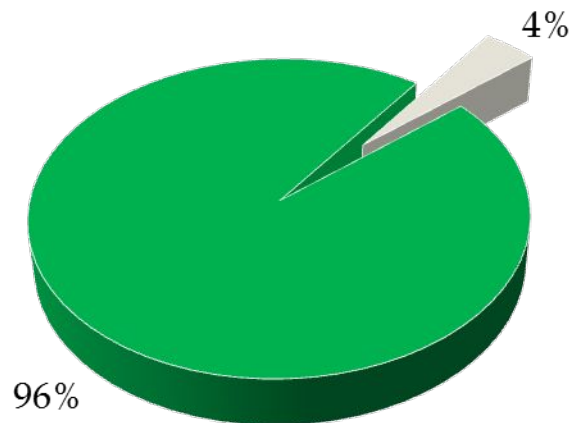


Economy prospects



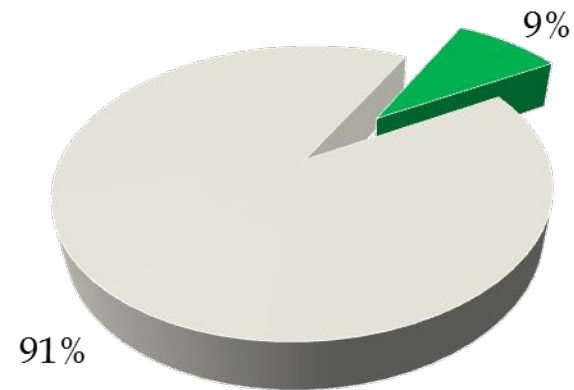
Summary

(2774 wells, various companies, various basins, various methods)



■ Dry holes ■ Discoveries

1430 wells drilled



■ Discoveries ■ Dry holes

1344 wells drilled

Source:

Schumacher, D., L. Clavareau, and D. C. Hitzman, 2010, Integrating hydrocarbon microseepage data with seismic data doubles exploration success, in Proceedings Indonesian Petroleum Association, Jakarta, IPA10-G-104, 11 pp.