Earth Observatory

Det europæiske rumfartsagentur ESA har opsendt en masse satellitter med navnene *Sentinel XX*, hvor XX er et nummer på satellitten. Selve programmet hedder *Copernicus-programmet*, og du kan læse mere om programmet på linket i fodnoten[1] herunder. Programmet går ud på at observere Jorden oppe fra rummet, og på den måde lære mere om Jorden og dens vejr og klima.

Nogle af dataene er tilgængelige på et websted, som du kan besøge. Webstedet står i fodnoten[2] herunder. Du kan oprette en konto på webstedet, som er gratis at benytte.

a) Følg den skærm-vejledning, som fremkommer på skærmen første gang, du besøger webstedet. Kom du til at slukke for den, så tryk på **i**-symbolet øverst til højre på skærmen.
b) Start med at vælge et område - f. eks. et landområde i nærheden af din bopæl.
c) Vælg en satellit og vælg et billede, der ikke er fyldt med skyer. (På figur 1 er valgt et område lidt syd for Vejle.) Du kan bruge skydebaren til at vælge billeder, der ikke er totalt dækket ind af skyer. Ved at trykke på det lille spørgsmålstegn til højre for satellittens navn, kan du se, hvad sattelitten måler.

d) Tryk på knappen *Visualisation* og vælg f. eks. *False Colour*. Så får du et IR-billede, som er godt til at vise vegetation. Grunden til at IR-billeder er gode til at vise vegetation, er at planter reflekterer store mængder varmestråling. I tabellen herunder er der forklaringer på, hvad filtrene er gode til at vise. Teksten er taget fra webstedet lv.eosda.com.
e) Forsøg at finde så megen information som muligt om det område, du har valgt, ved at vise området i forskellige farveområder.
f) I 2019 har der været megen snak om afbrænding af regnskoven i Brasilien og Bolivia. Prøv at dokumentere, at der er brande i et af de to lande.
g) Er der skovbrande i den afrikanske jungle?

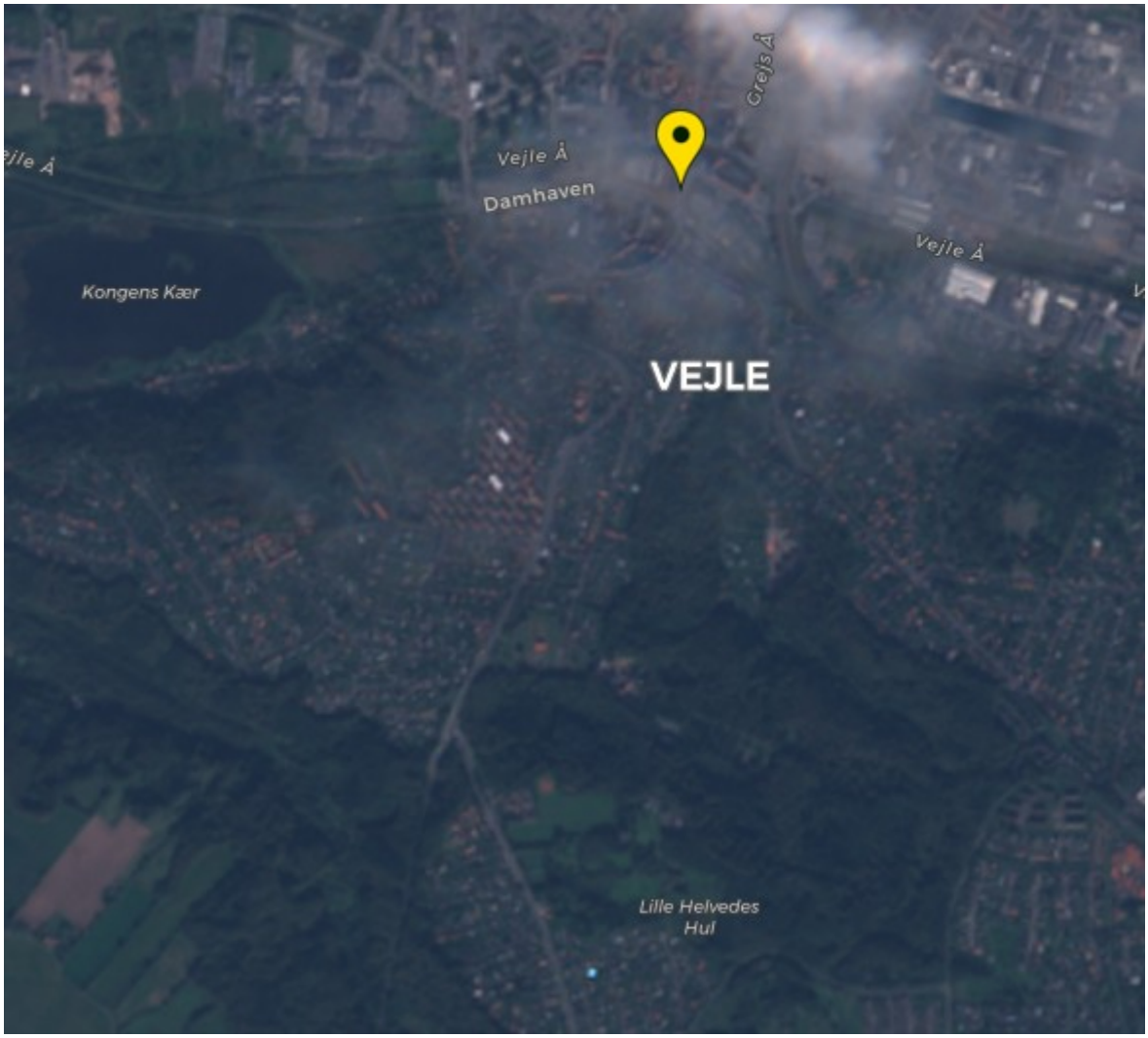
Filtres betydning

Filterets navn	Betydning
False Colour - Visual interpretation of vegetation	The standard "false color" composite. Vegetation appears in shades of red, urban areas are cyan blue, and soils vary from dark to light browns. Ice, snow and clouds are white or light cyan. Coniferous trees will appear darker red than hardwoods. This is a very popular band combination and is useful for vegetation studies, monitoring drainage and soil patterns and various stages of crop growth. Generally, deep red hues indicate broad leaf and/or healthier vegetation while lighter reds signify grasslands or sparsely vegetated areas. Densely populated urban areas are shown in light blue. This band combination gives results similar to traditional

1 http://www.esa.int/Applications/Observing_the_Earth/Copernicus
2 https://apps.sentinel-hub.com/eo-browser/?lat=55.7113&lng=9.5364&zoom=10

	color infrared aerial photography.
Moisture index	
NDSI - Normalized Difference Snow Index	The Normalized Difference Snow Index is a spectral band ratio that takes advantage of the spectral differences of snow in short-wave infrared and visible spectral bands to identify snow versus other features in a scene. At visible wavelengths snow cover is just as bright as clouds, and is therefore difficult to distinguish from cloud cover. However, at 1.6 microns, snow cover absorbs sunlight, and therefore appears much darker than clouds. This allows the effective discrimination between snow cover and clouds. Values of NDSI > 0.4 typically indicate the presence of snow.
NDVI – Vegetation index	The Normalized Differential Vegetation Index is often used to monitor drought, monitor and predict agricultural production, assist in predicting hazardous fire zones, and map desert encroachment. The NDVI is a standardized vegetation index which allows us to generate an image showing the relative biomass. The chlorophyll absorption in Red band and relatively high reflectance of vegetation in Near Infrared band (NIR) are using for calculating NDVI.
NDWI – Shortwave-infrared index	The Normalized Difference Water Index makes use of reflected near-infrared radiation and visible green light to enhance the presence of such features while eliminating the presence of soil and terrestrial vegetation features. It is suggested that the NDWI may also provide researchers with turbidity estimations of water bodies using remotely-sensed digital data.
SWIR - Shortwave-infrared index	SWIR1: This band combination good for picking out land from water. In this false color image, land appears in shades of orange and green, ice stands out as a vibrant magenta color, and water appears in shades of blue. SWIR2: This band combination is very useful for vegetation studies, where reflectance in the SWIR region is due primarily to moisture content in the leaf or soil. Thus, vigorous and irrigated vegetation, and riparian areas are displayed in bright green while dryland and natural areas are dull green. Coniferous forest appears as a deep rich green and deciduous

	forest is bright green. Soils appear as tan, brown and mauve. This band combination is suited for studying vegetation health and stress, change detection, disturbed soils, soil type, and camouflage detection.
True Colour - Visual interpretation of land cover.	The "natural color" band combination. Because the visible bands are used in this combination, ground features appear in colors similar to their appearance to the human visual system, healthy vegetation is green, recently cleared fields are very light, unhealthy vegetation is brown and yellow, roads are gray, and shorelines are white. This band combination provides the most water penetration and superior sediment and bathymetric information. It is also used for urban studies.



Figur 1: Billede fra Vejleområdet.