



There's no one ring to rule them all

(DIGITAL TWIN IS NOT AN ANSWER TO YOUR QUESTION)

THERE'S NO ONE RING TO RULE THEM ALL

Introduction

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In 30 minutes

A general policy to apply climate measures does not work. And a Digital Twin is not an answer to your question. But combined with the right analyses, it does provide insight into the challenge. This is the way to level in a conversation with the stakeholders. Show what is possible and what the consequences are.



Who is IMAGEM?

We are translators

- From raw data to **immediately usable information, knowledge and insight**
- From GIS to **Location Intelligence**
- With standard technology to **user friendly solutions**
- **Hexagon geospatial technology**



What we do

Adding value to technology by using domain knowledge

Data automatisisation

- Mutatiesignalering & objectherkenning
- Machine Learning & Data science
- Big Data Management

Digital Twins

- Simulation systems
- Advanced Visual Analytics

Control information

- Asset Management
- Monitoring and enforcement
- Geospatial Intelligence



De basis hiervoor is Hexagon Geospatial technologie



In (less) then 30 minutes

1 Area

2 Models

3 Datatypes (Vector, Pointcloud, Raster)

4 Data sets



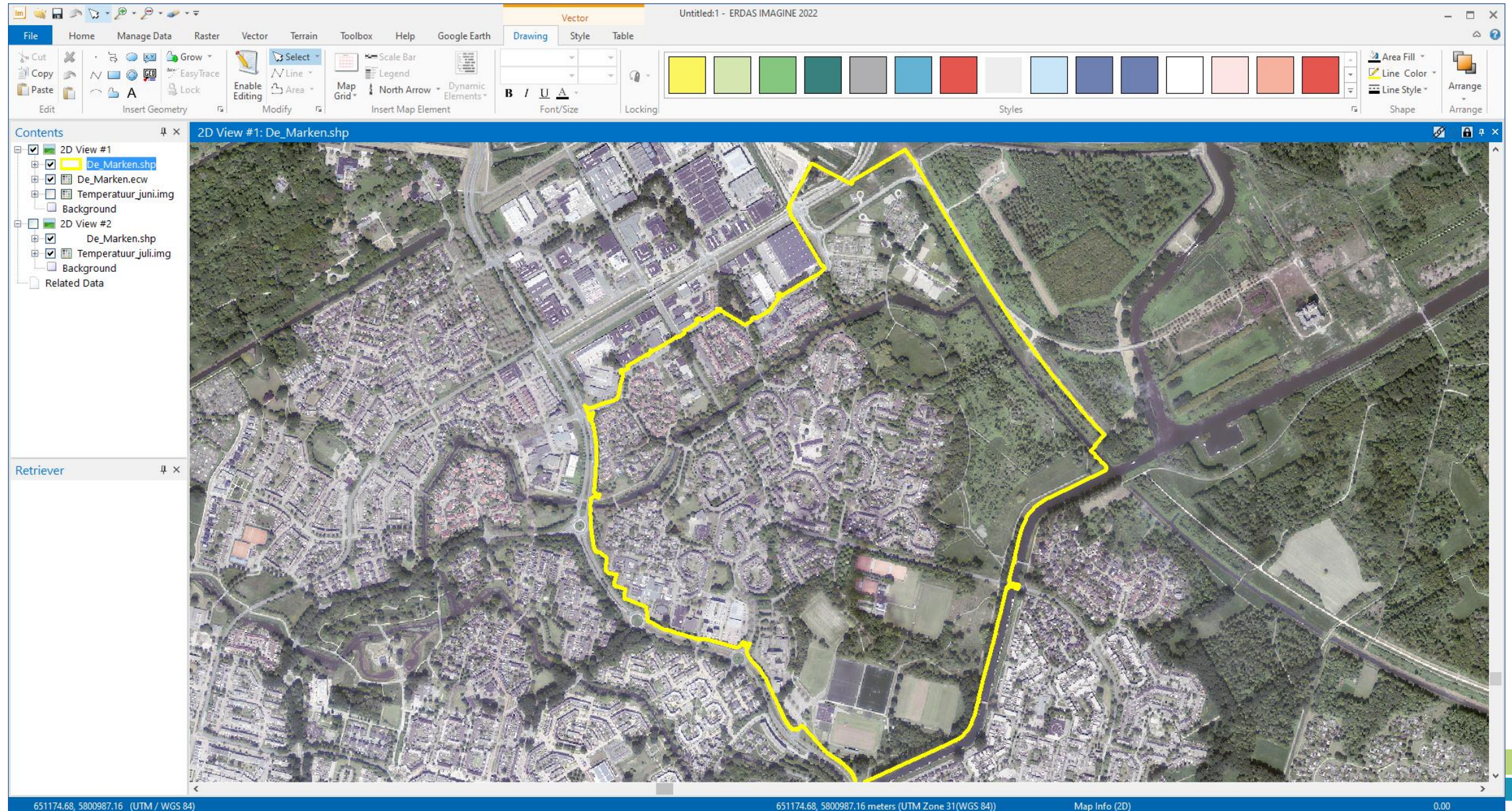
Insight in (possible) climate measures



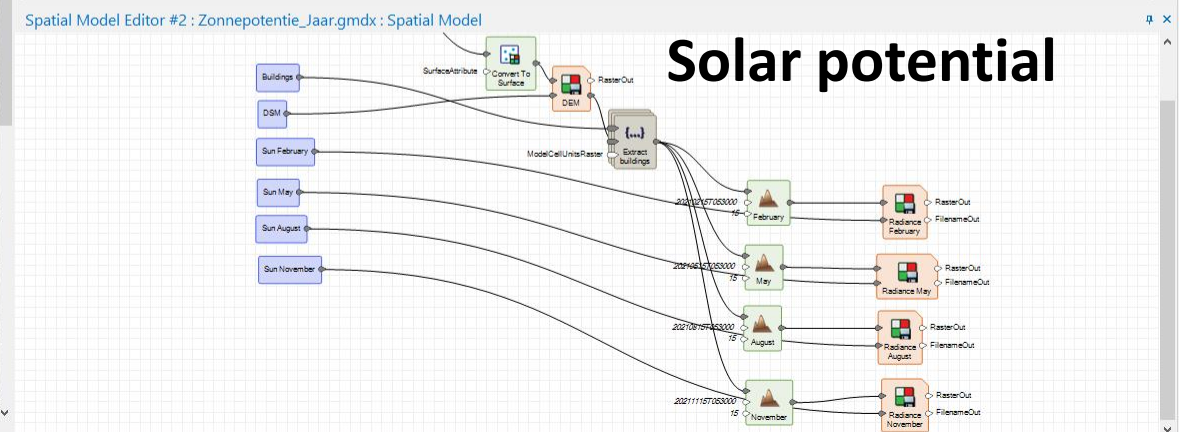
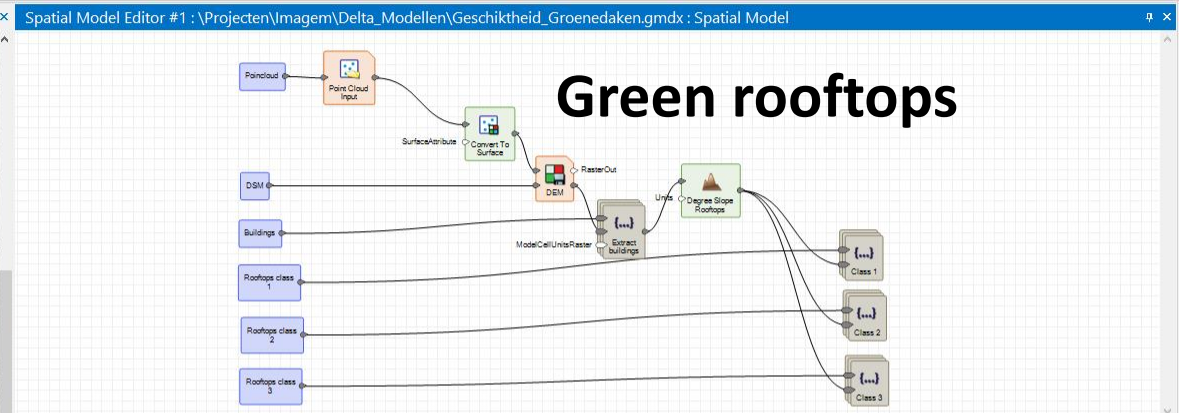
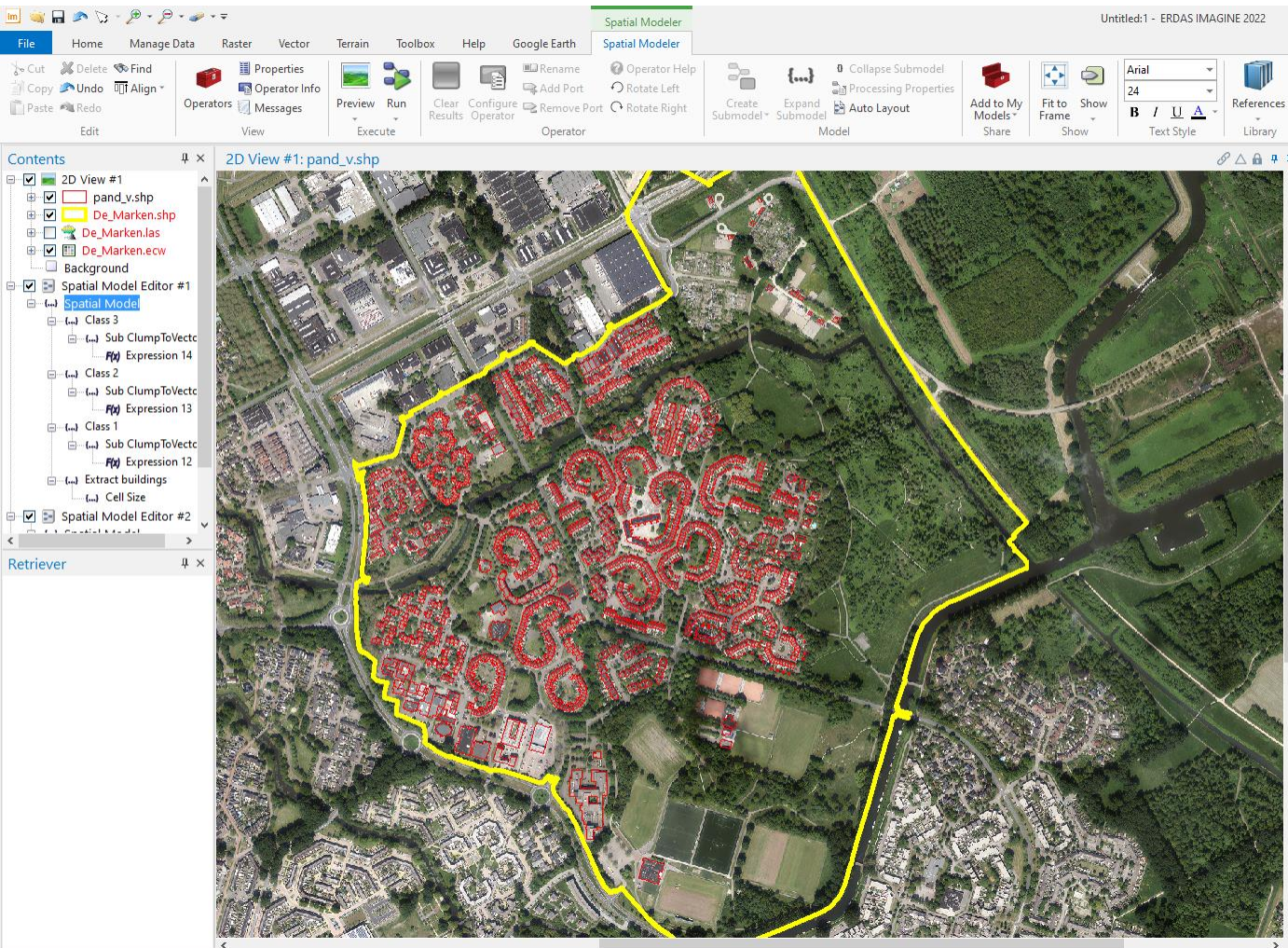
Using the digital twin



1 area "De Marken" in Almere



2 Models



3 Datatypes & 4 Datasets

1



Aerial Image – since 2021 (raster)

2



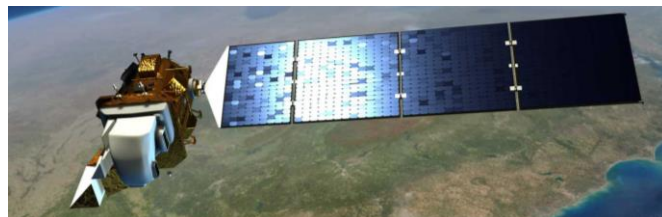
AHN4 – since 2020 (pointcloud)

3



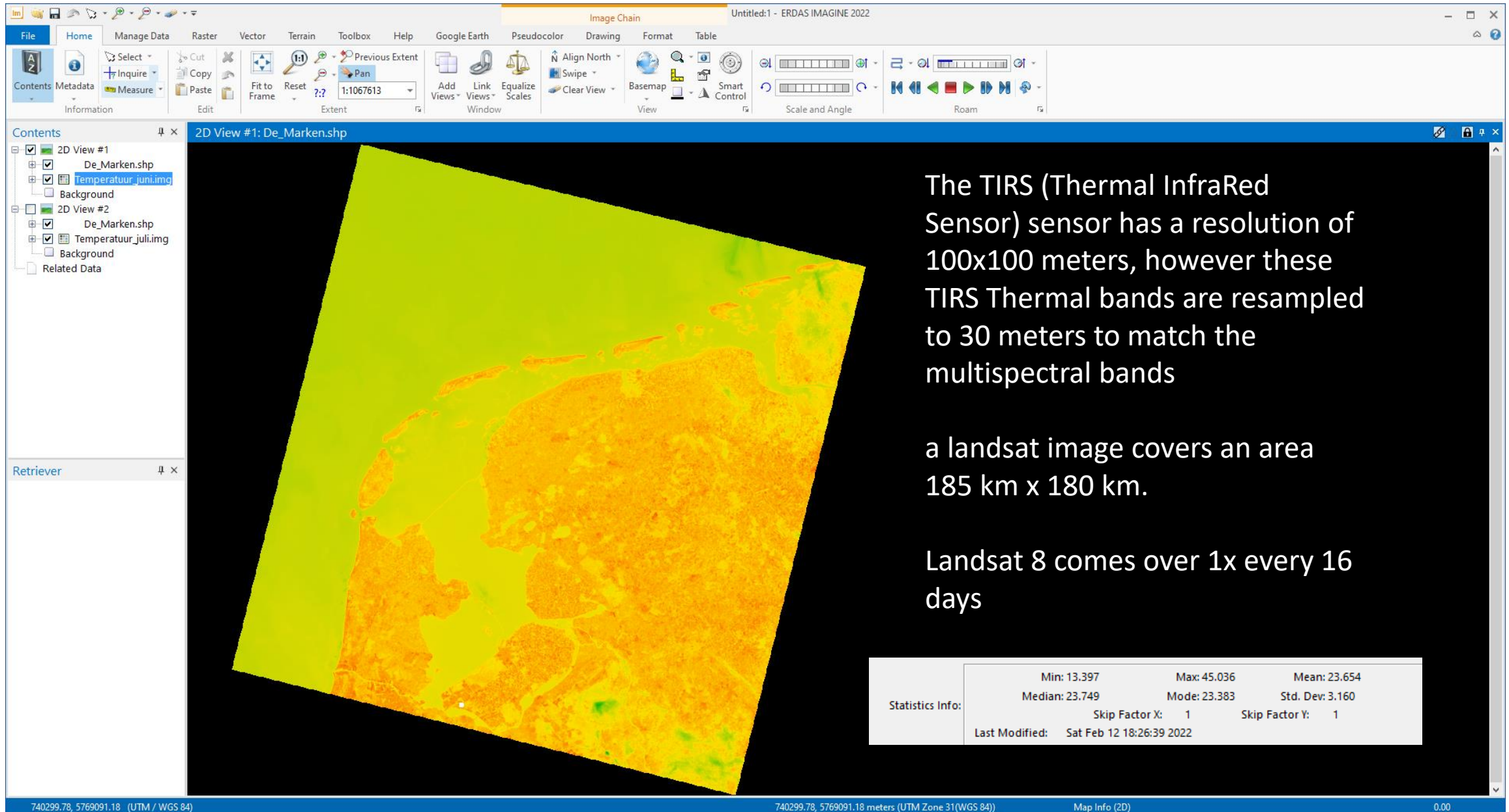
BGT – since 2016 (vector)

4



Landsat 8 – since 2013 (raster)

Landsat 8 – TIRS 2



The TIRS (Thermal InfraRed Sensor) sensor has a resolution of 100x100 meters, however these TIRS Thermal bands are resampled to 30 meters to match the multispectral bands

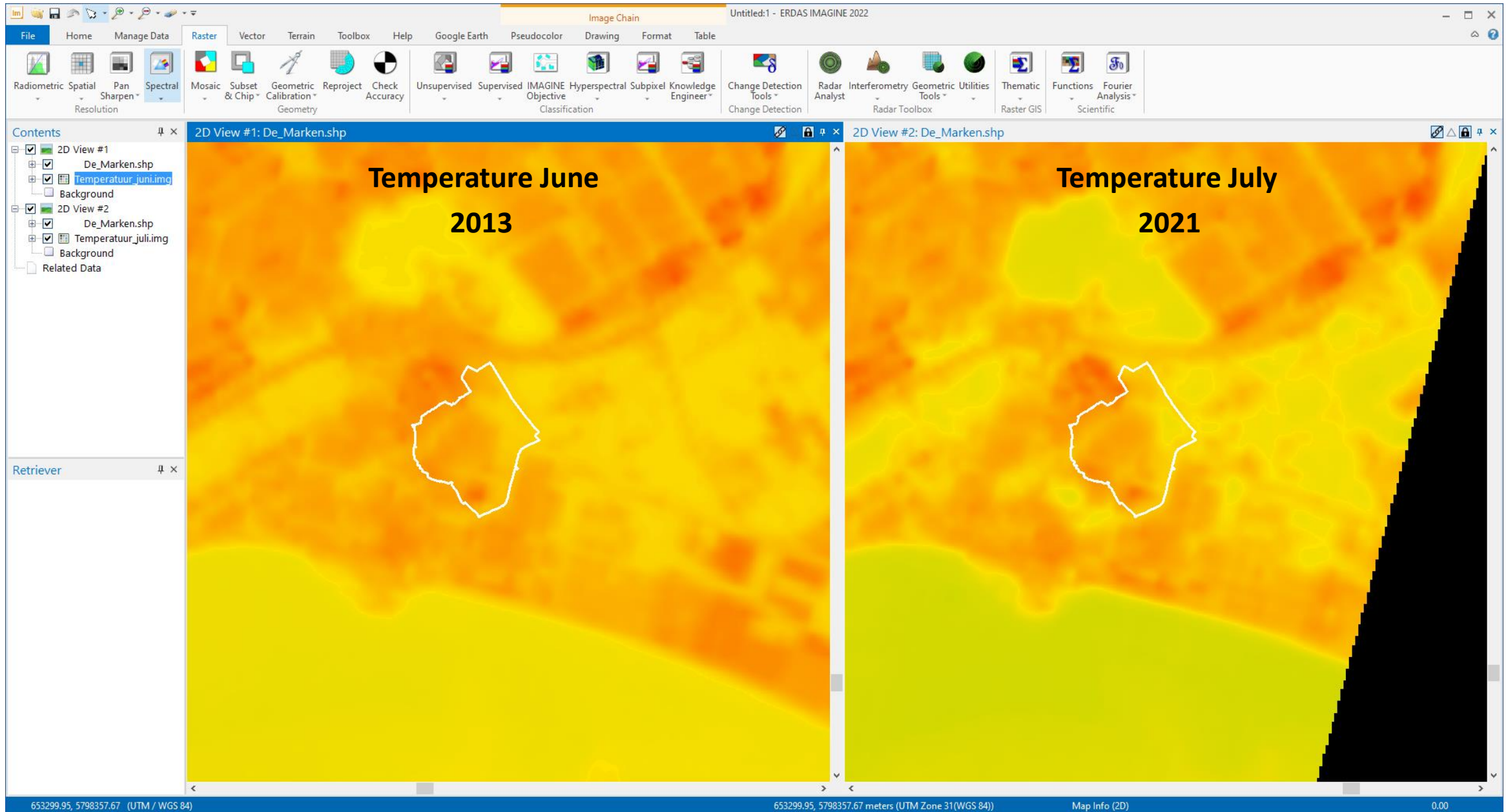
a landsat image covers an area 185 km x 180 km.

Landsat 8 comes over 1x every 16 days

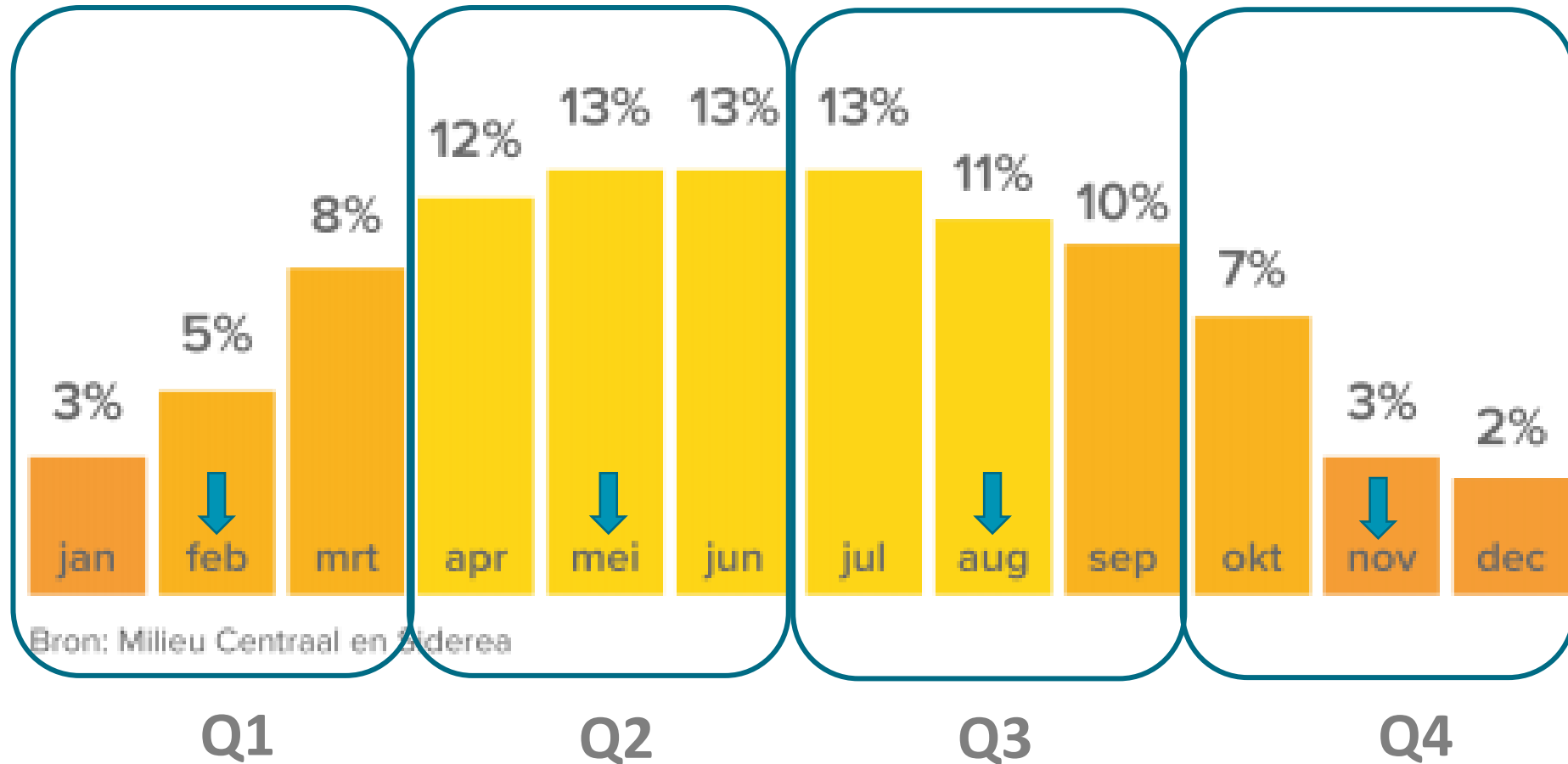
Statistics Info:	Min: 13.397	Max: 45.036	Mean: 23.654
	Median: 23.749	Mode: 23.383	Std. Dev: 3.160
	Skip Factor X: 1		Skip Factor Y: 1
	Last Modified: Sat Feb 12 18:26:39 2022		

740299.78, 5769091.18 (UTM / WGS 84) 740299.78, 5769091.18 meters (UTM Zone 31(WGS 84)) Map Info (2D) 0.00

Landsat 8 - Temperature

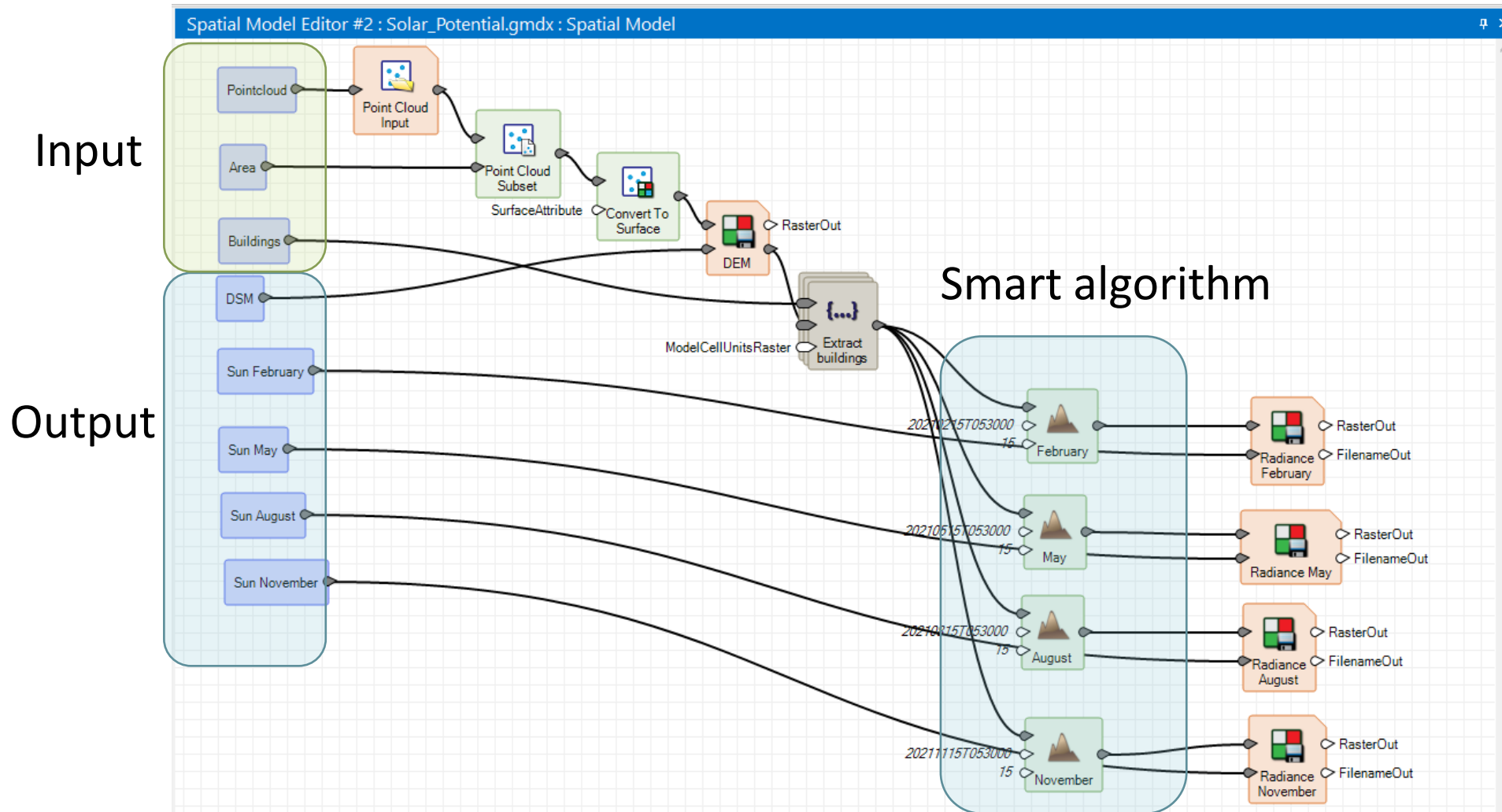


Solar potential in a year



Bron: Milieu Centraal en Alderea

Model solar potential



Solar potential

The screenshot displays the ERDAS IMAGINE 2022 software interface. The main workspace is divided into four panels, each showing a different month's solar potential map for a residential area. The maps are titled as follows:

- Top-left: Sun_February.img (:Convert To Raster.Raster_1)
- Top-right: Sun_May.img (:Convert To Raster.Raster_1)
- Bottom-left: Sun_August.img (:Convert To Raster.Raster_1)
- Bottom-right: Sun_November.img (:Convert To Raster.Raster_1)

The maps show a residential area with solar potential overlaid in yellow and orange colors. The software interface includes a menu bar (File, Home, Manage Data, Raster, Vector, Terrain, Toolbox, Help, Google Earth, Pseudocolor, Drawing, Format, Table), a toolbar with various tools (Reset, View Model, Layer as Image, Stretch Panel, Adjust Radiometry, Live Update, Color Table, Subset & Chip, Spectral Profile, Count Features, Transform & Ortho, Control Points, Single Point, Check Accuracy, Recode, Fill, Offset), and a contents pane on the left. The contents pane shows a tree view of the project files, including 2D View #1 through #4, Sun_February.img, Sun_May.img, Sun_August.img, Sun_November.img, De_Marken.shp, De_Marken.las, De_Marken.ecw, and Background. The status bar at the bottom indicates the map's coordinates (143936.76, 484883.35 meters) and the projection (Double Stereographic(Bessel)).

Solar potential detail

The screenshot displays the ERDAS IMAGINE 2022 software interface. The top menu bar includes File, Home, Manage Data, Raster, Vector, Terrain, Toolbox, Help, Google Earth, Pseudocolor, Drawing, Format, and Table. The toolbar below contains various processing tools such as Radiometric Resolution, Spatial Resolution, Pan Sharpen, Spectral, Mosaic, Subset & Chip, Geometric Calibration, Reproject, Check Accuracy, Unsupervised Classification, Supervised Classification, IMAGINE Objective Classification, Hyperspectral, Subpixel Knowledge Engineer, Change Detection Tools, Radar Analyst, Interferometry, Geometric Utilities, Thematic Raster GIS, Functions, and Fourier Analysis.

The Contents pane on the left shows a project structure with four 2D Views:

- 2D View #1
 - Sun_February.img
 - pand_v.shp
 - De_Marken.shp
 - De_Marken.las
 - De_Marken.ecw
 - Background
- 2D View #2
 - Sun_May.img
 - De_Marken.ecw
 - Background
- 2D View #3
 - Sun_August.img
 - De_Marken.ecw
 - Background
- 2D View #4
 - Sun_November.img
 - De_Marken.ecw
 - Background

The main workspace contains four map windows, each showing an aerial photograph of a residential area with a color-coded solar potential overlay. The windows are titled:

- Sun_February.img (:Convert To Raster.Raster_1)
- Sun_May.img (:Convert To Raster.Raster_1)
- Sun_August.img (:Convert To Raster.Raster_1)
- Sun_November.img (:Convert To Raster.Raster_1)

The status bar at the bottom indicates the coordinates 144128.30, 484185.04 meters (Double Stereographic(Bessel)) and the map info (2D) 0.00.

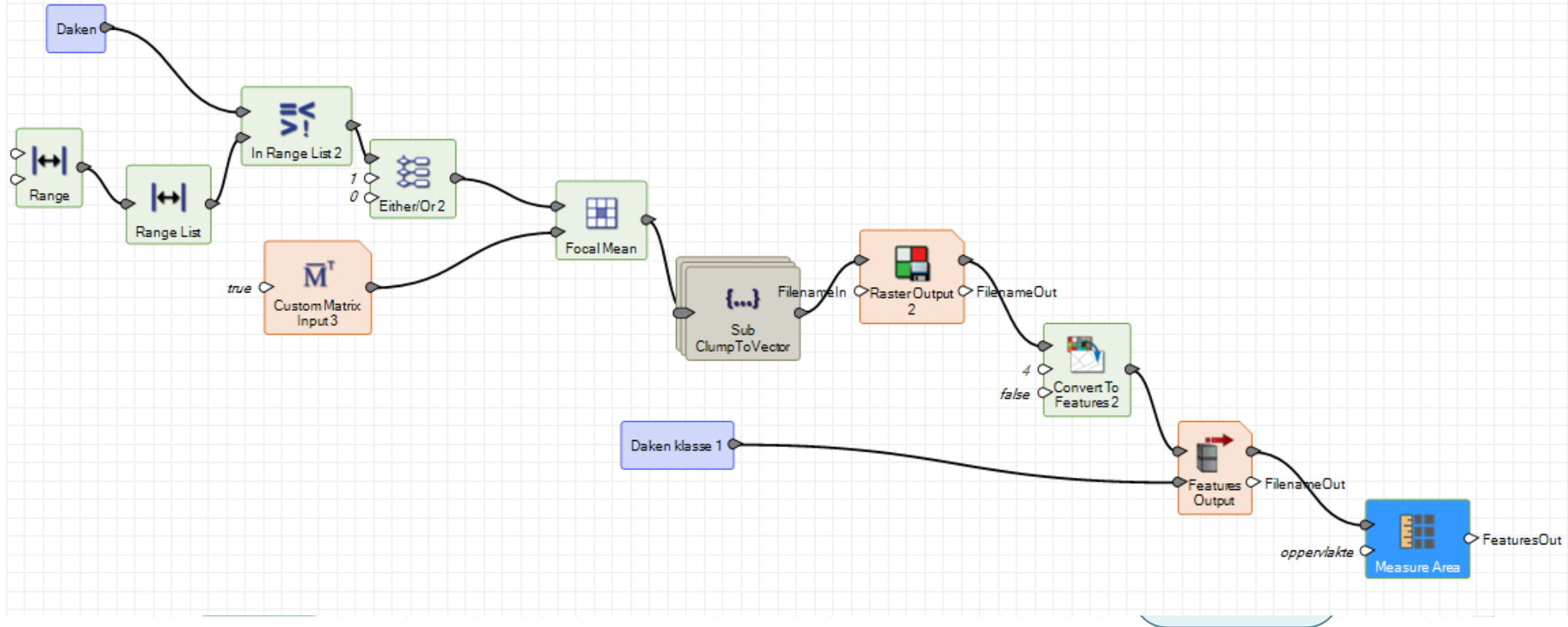


Zonintensiteit W/m² De Streep - Landgraaf Zonintensiteit d.d. 15 juli

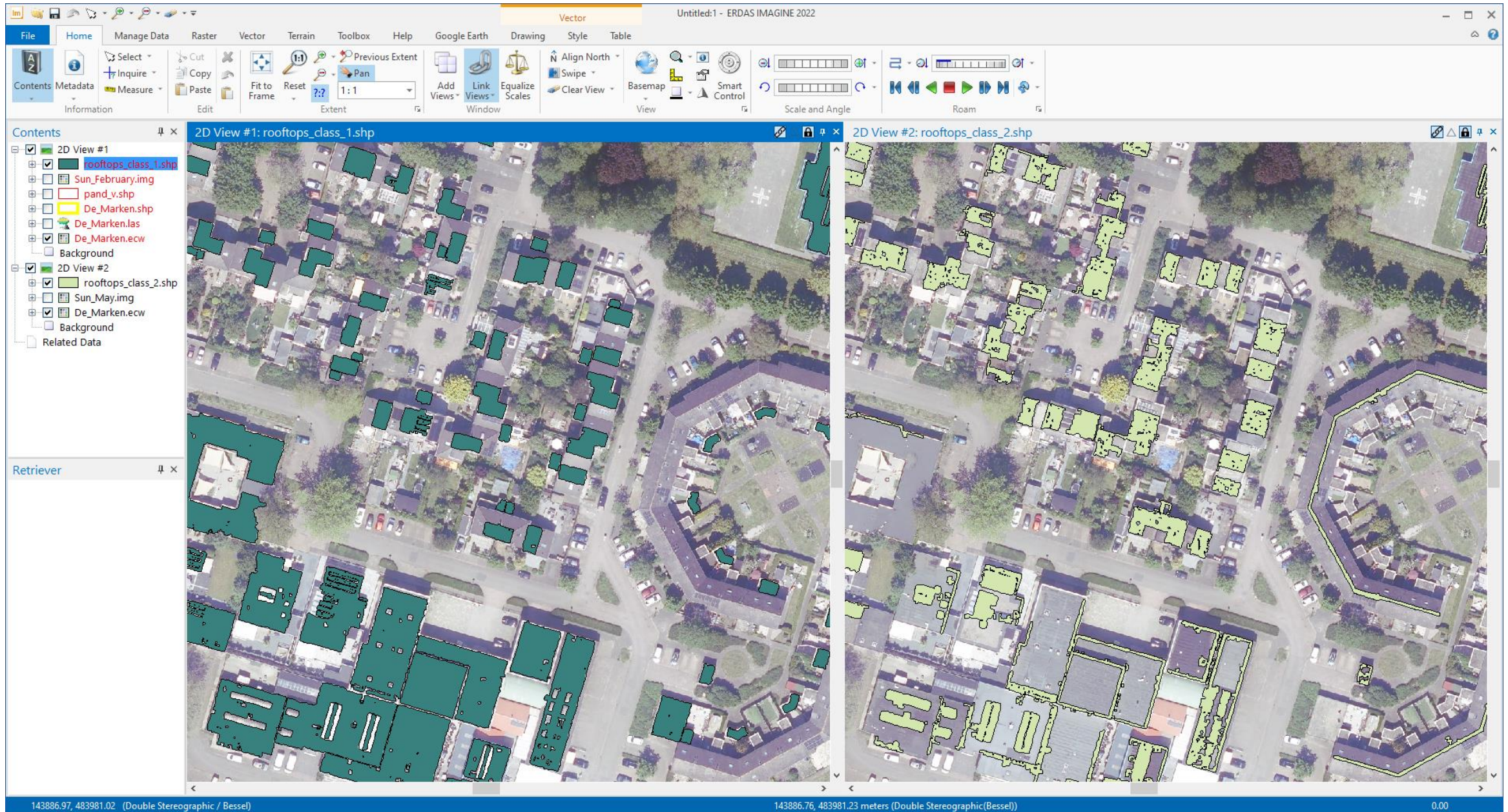


Model green rooftops potential

Spatial Model Editor #1 : \Projecten\Ruimteschepper\Greenrooftops_Potential.gmdx : Spatial Model > Class 1



Green rooftops potential class 1 & class 2



Green rooftop classes

Class 1 (0 – 8,5 degree): Suitable for recreation, easy to maintain

Class 2 (8,5 – 35 degree): Construction and maintenance is becoming more intensive

Class 3 (35 – 45 degree): Special attachment, more difficult to maintain



Flat, biodiverse



Flat, shadow



Combined with solar panels

Biodivers opportunities

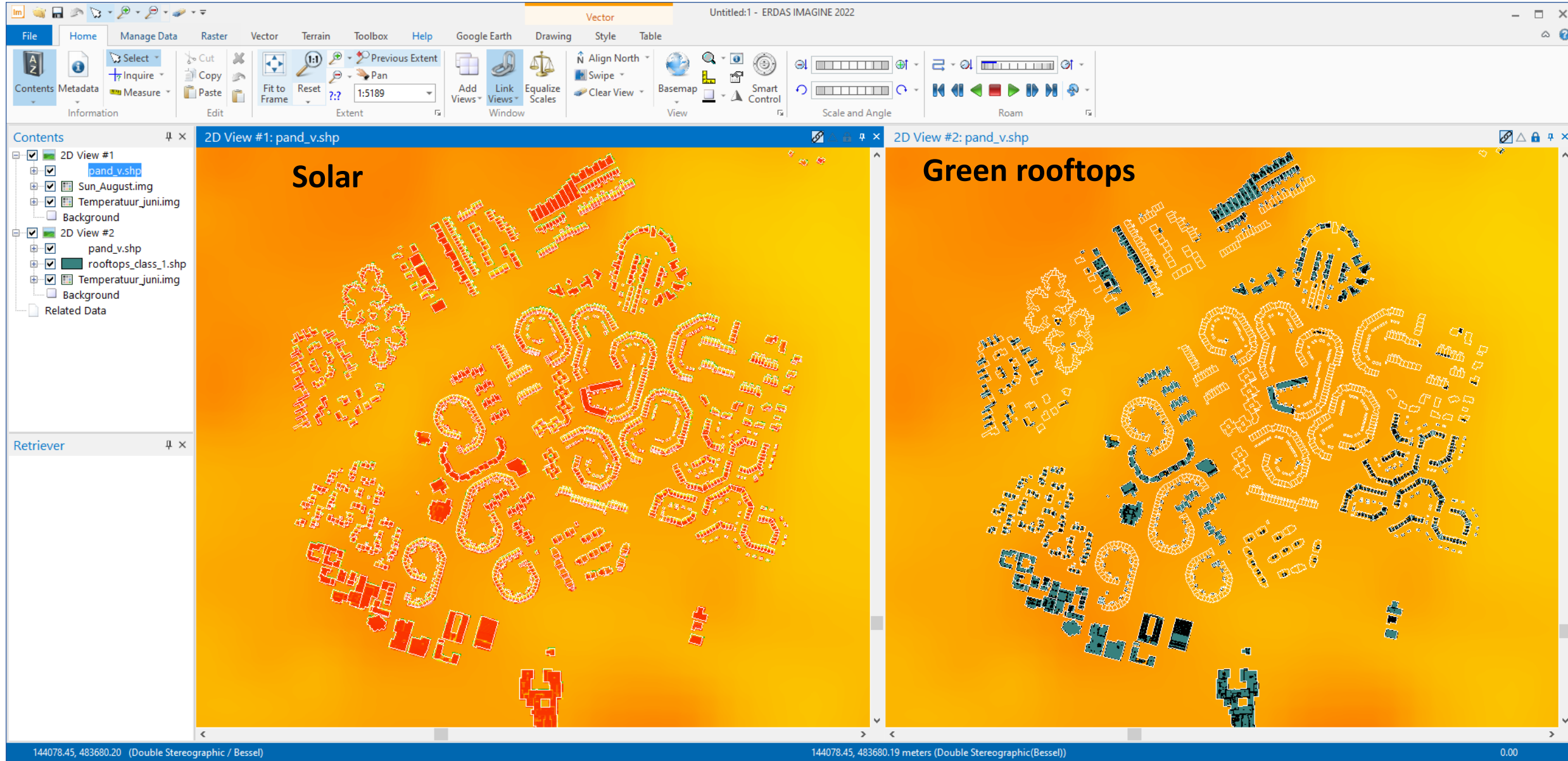


Cultivar



Domestic

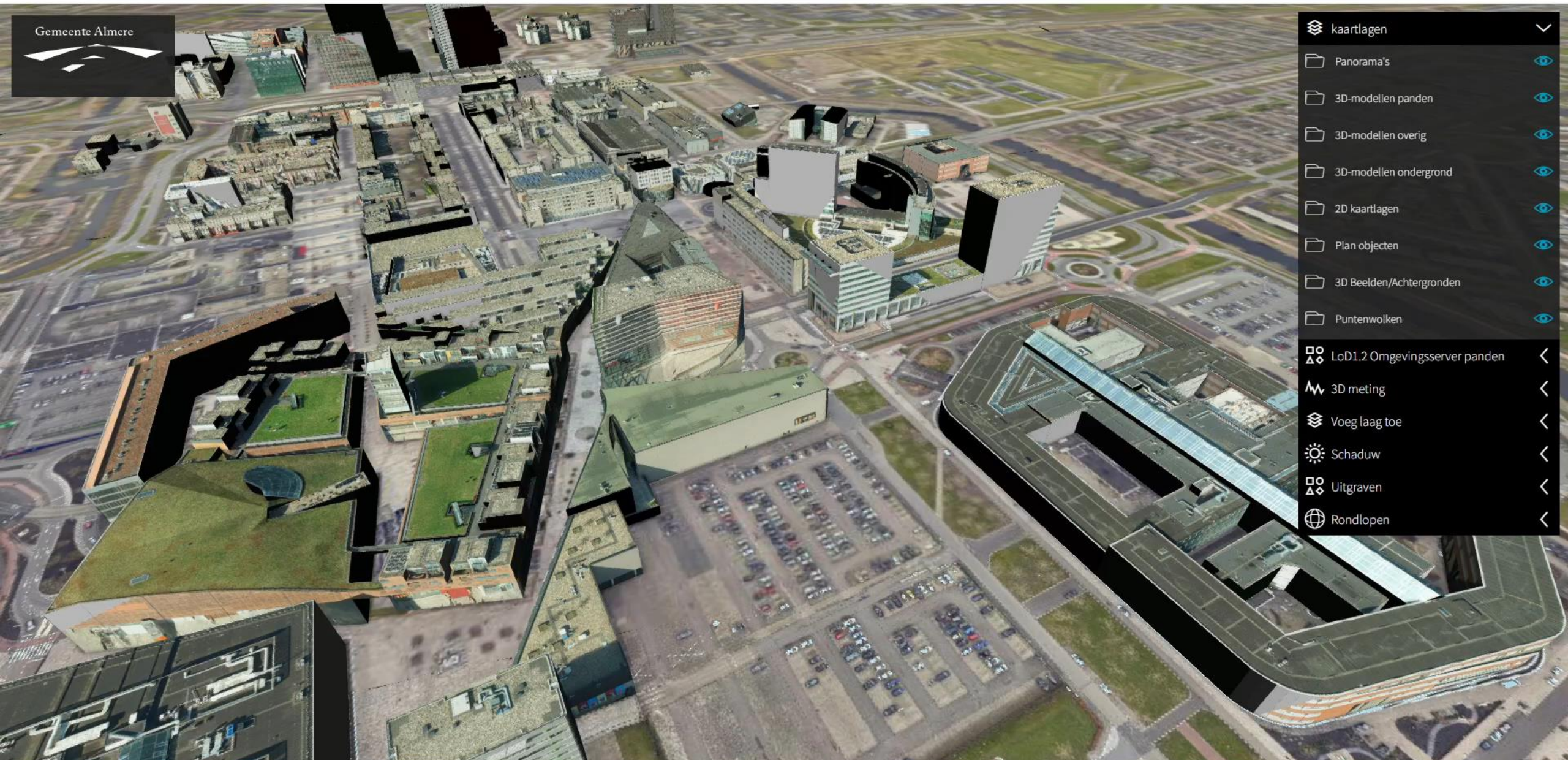
Results



Solar potential | Green rooftops | Digital Twin



Gemeente Almere



- kaartlagen
- Panorama's
- 3D-modellen panden
- 3D-modellen overig
- 3D-modellen ondergrond
- 2D kaartlagen
- Plan objecten
- 3D Beelden/Achtergronden
- Puntenwolken
- LoD1.2 Omgevingsserver panden
- 3D meting
- Voeg laag toe
- Schaduw
- Uitgraven
- Rondlopen

THERE'S NO ONE RING TO RULE THEM ALL

*There is still a lot to **learn**, both for the **computer** and for **us** to use the existing data and put the results into **practice!***



An aerial photograph showing a large metal power line tower situated in a vast, brown, tilled agricultural field. The field is marked with numerous parallel furrows. To the left, a strip of vibrant green grass borders the field. Several high-voltage power lines stretch across the scene from the top left towards the tower. The tower's shadow is cast long and dark across the field to the right. The overall scene is captured from a high angle, looking down.

Many Thanks

www.imagem.nl

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