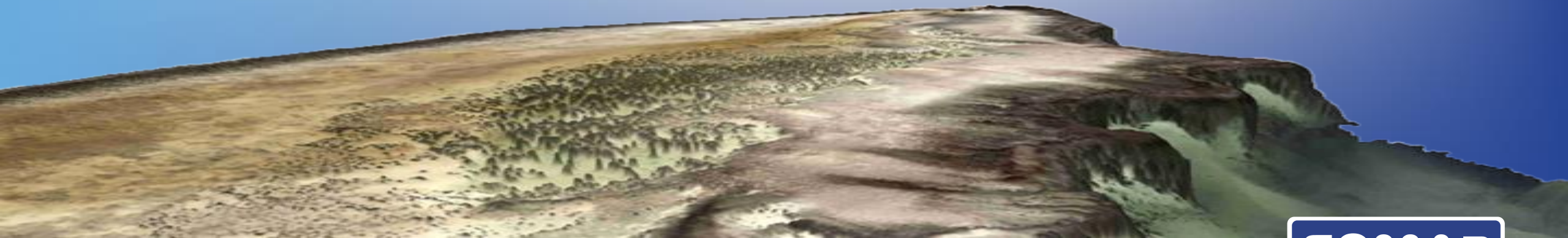


# Coastal and terrestrial Elevation Models Active and Passive Sensor capabilities

Water Days 2022

Presenter: Constantin Sandu

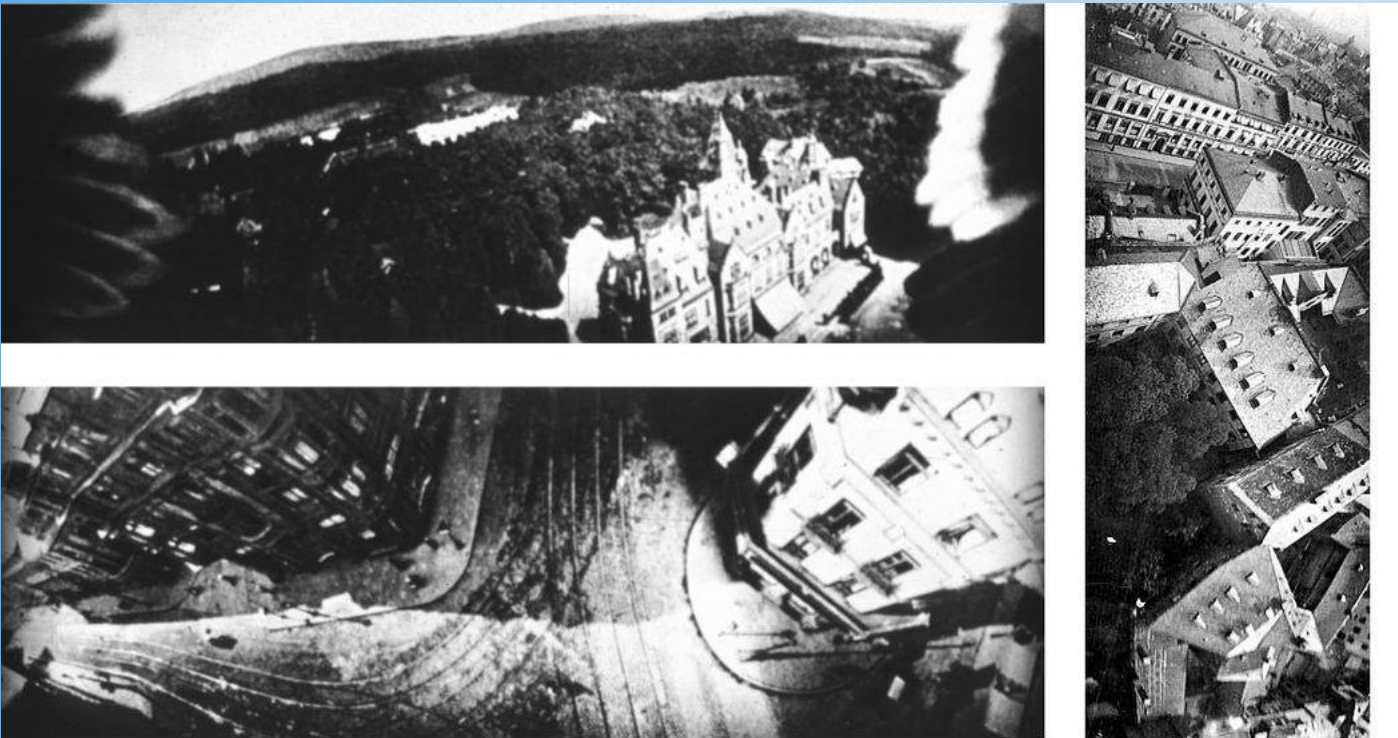


# Contents

1. Passive Sensors
2. Active Sensors
3. Terrain Modelling
4. Results

# 1. Passive Sensors

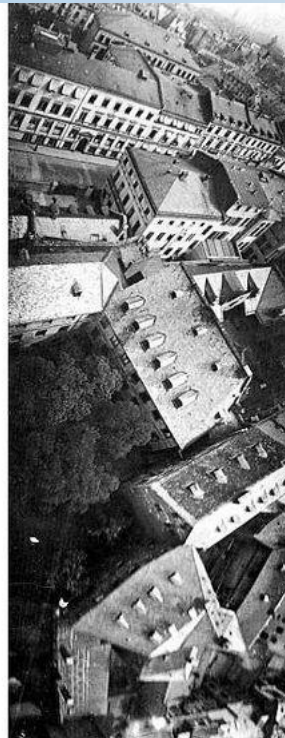
Julius Gustav Neubronner in 1903 commissioned aerial surveys around Frankfurt am Main



[https://it.wikipedia.org/wiki/Fotografia\\_aerea\\_con\\_i\\_piccioni](https://it.wikipedia.org/wiki/Fotografia_aerea_con_i_piccioni)

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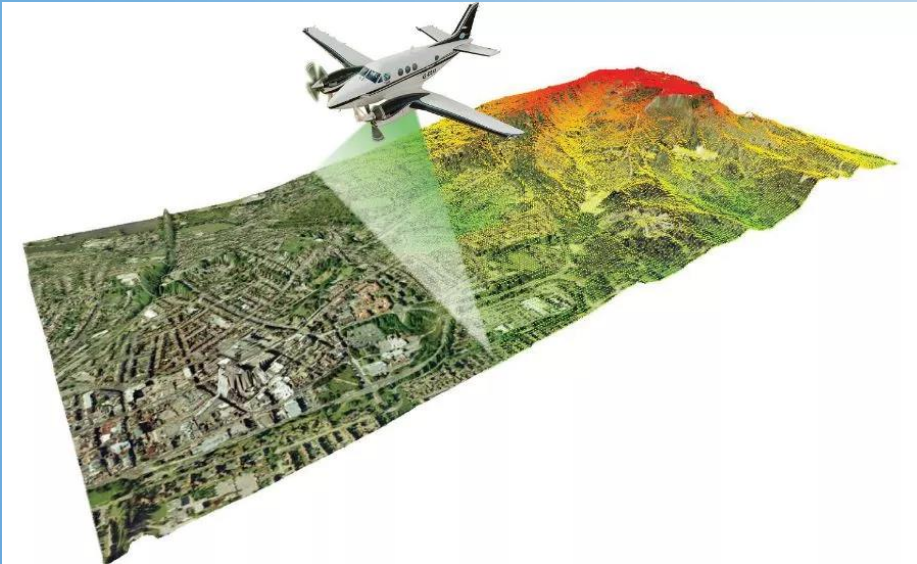


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# 1. Passive Sensors

## Aerial Surveys



<https://www.surgeinfratech.com/surveying-and-mapping/>

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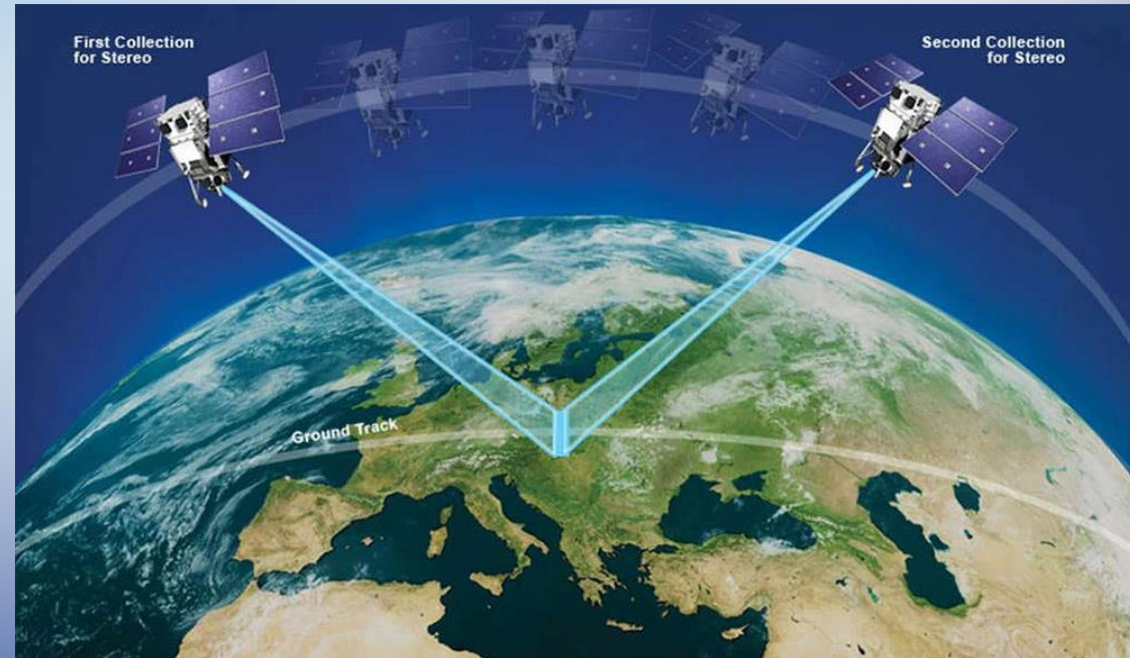
## Aerial Surveys



<https://www.surgeinfratech.com/surveying-and-mapping/>

## Passive Satellite Systems

Landsat-8, Sentinel-2, WorldView-3, Planet Doves



<https://www.pgc.umn.edu/guides/stereo-derived-elevation-models/introduction-to-stereoscopic-imagery/>

## 2. Active Sensors

Radar



[https://www.flaticon.com/de/kostenloses-icon/radar\\_196345](https://www.flaticon.com/de/kostenloses-icon/radar_196345)

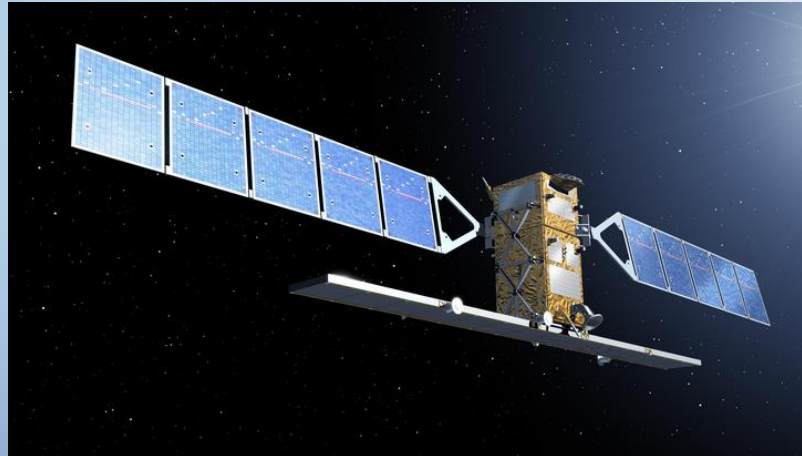
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Sentinel – 1 Satellite

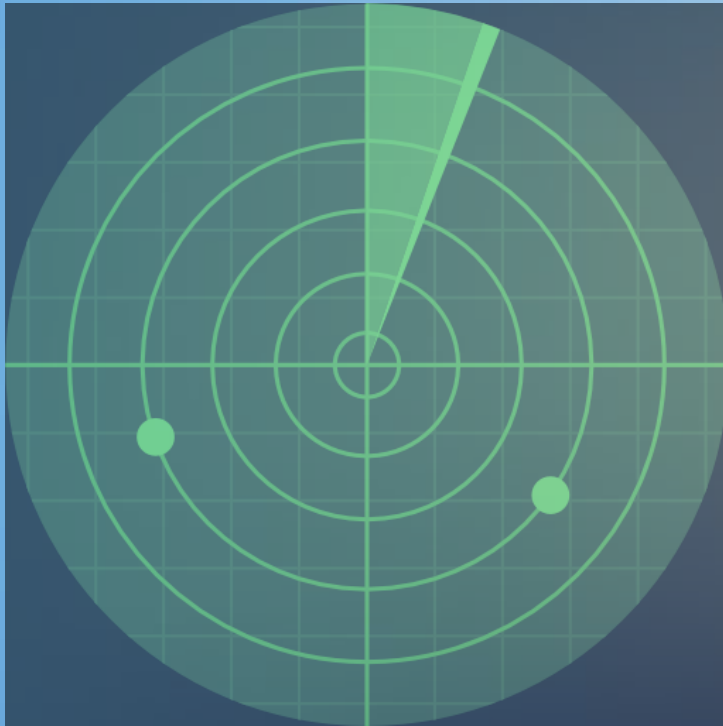


[https://www.d-copernicus.de/daten/satelliten/satelliten-details/news/sentinel-1/?tx\\_news\\_pi1%5Bcontroller%5D=News&tx\\_news\\_pi1%5Baction%5D=detail&cHash=667caece7ab6cd73f76a1bc0e56f8212](https://www.d-copernicus.de/daten/satelliten/satelliten-details/news/sentinel-1/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=667caece7ab6cd73f76a1bc0e56f8212)



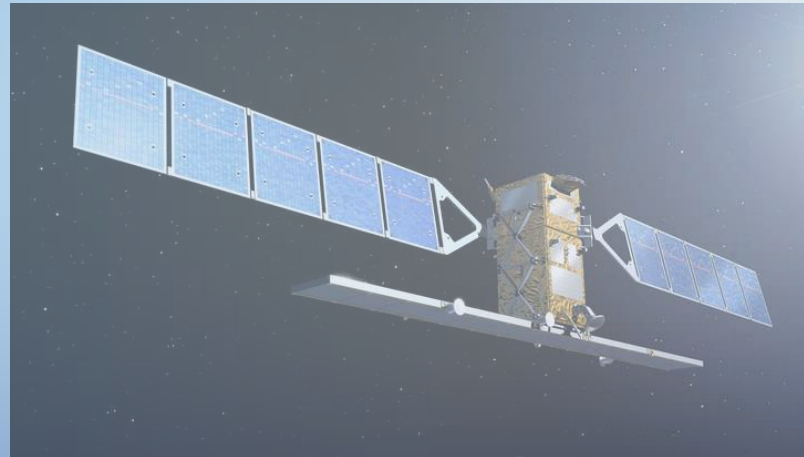
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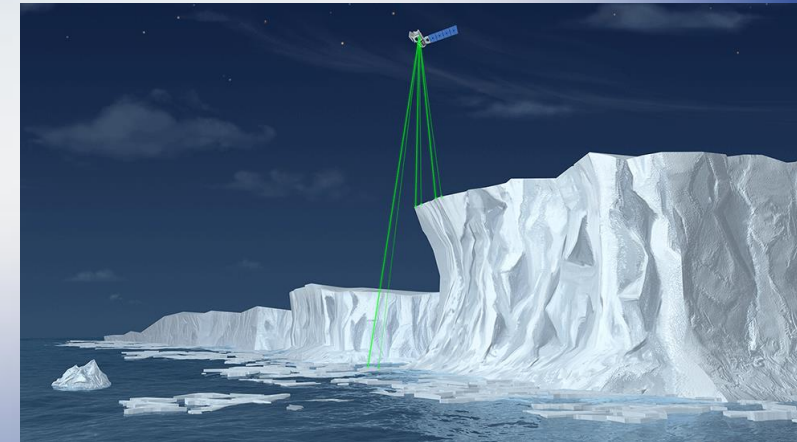
[https://www.flaticon.com/de/kostenloses-icon/radar\\_196345](https://www.flaticon.com/de/kostenloses-icon/radar_196345)

Sentinel – 1 Satellite



[https://www.d-copernicus.de/daten/satelliten/satelliten-details/news/sentinel-1/?tx\\_news\\_pi1%5Bcontroller%5D=News&tx\\_news\\_pi1%5Baction%5D=detail&cHash=667caece7ab6cd73f76a1bc0e56f8212](https://www.d-copernicus.de/daten/satelliten/satelliten-details/news/sentinel-1/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=667caece7ab6cd73f76a1bc0e56f8212)

ICESat-2



<https://www.bbc.co.uk/newsround/52484993>

### 3. Terrain Modelling

Stereo Pair: two images of the same geolocation  
taken from different perspectives  
We can simulate a camera and do  
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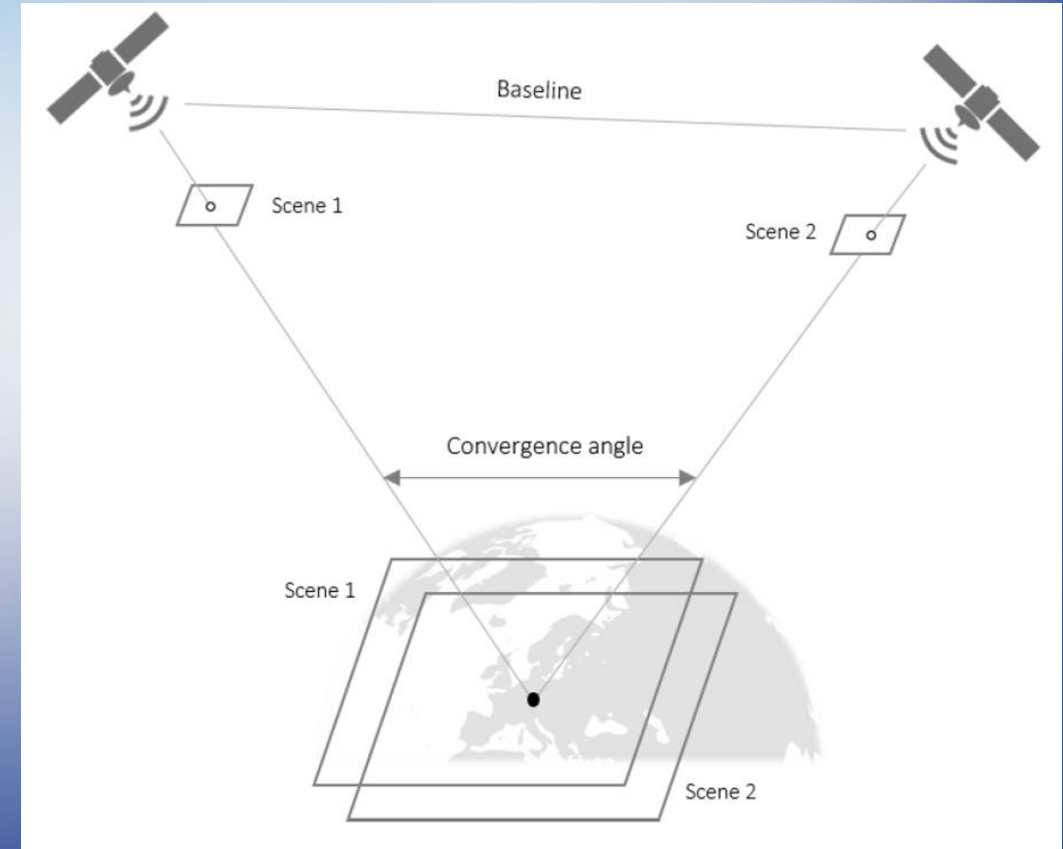
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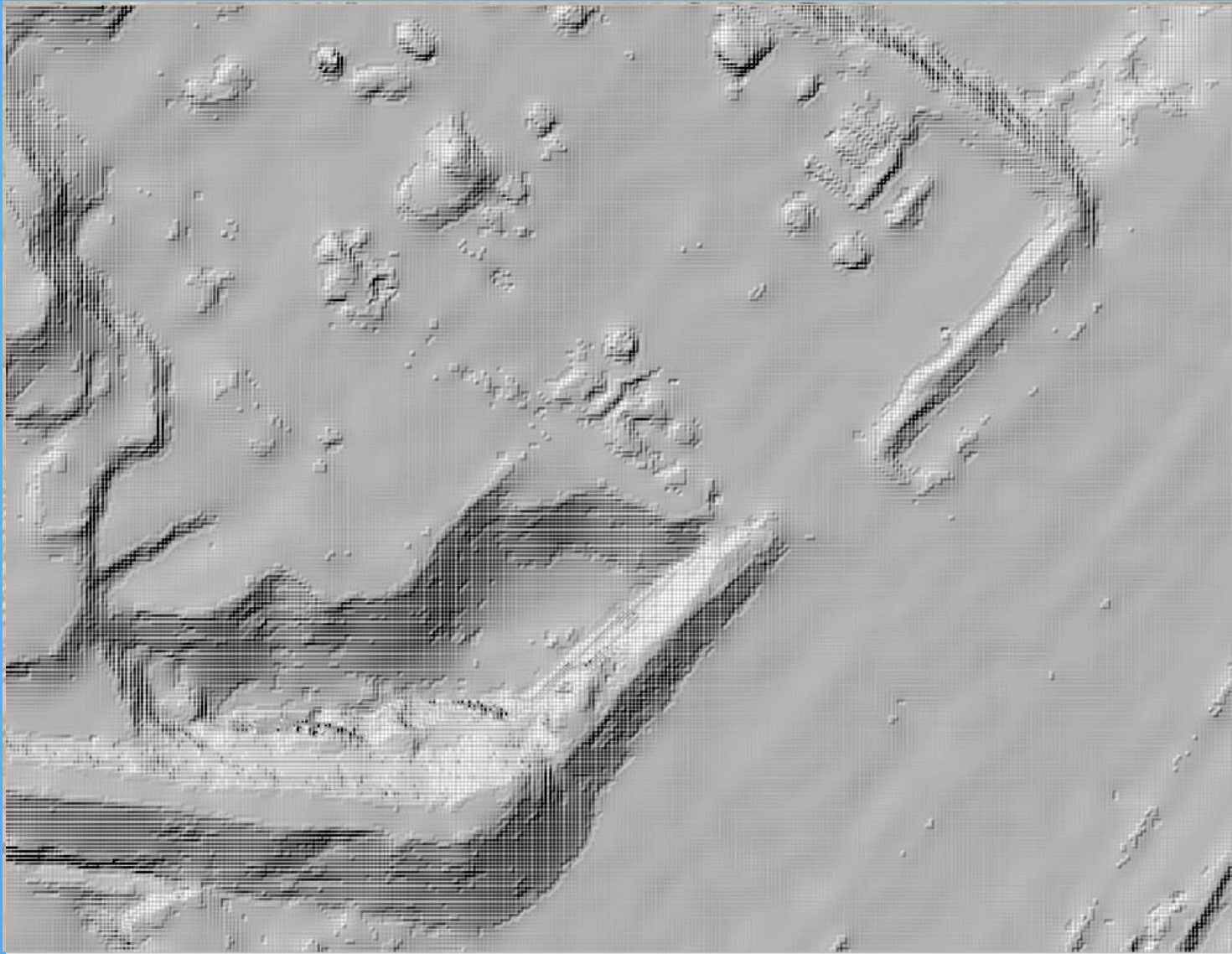




## 4. Results

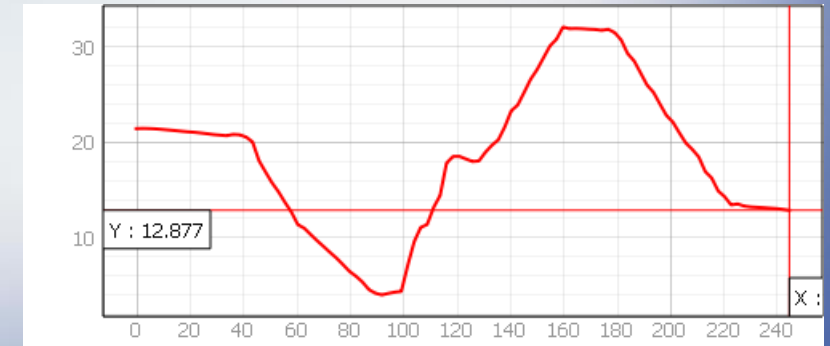
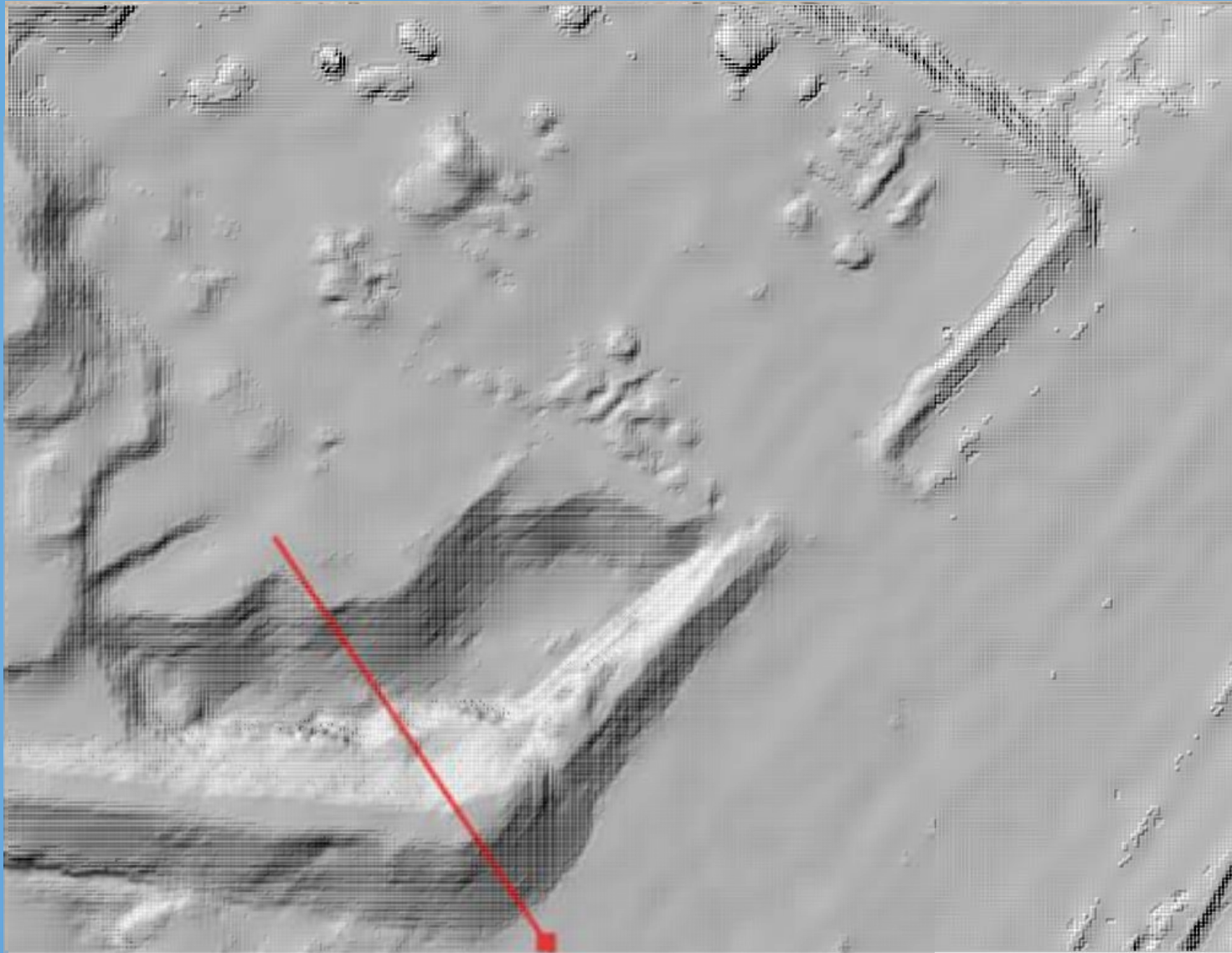


## 4. Results





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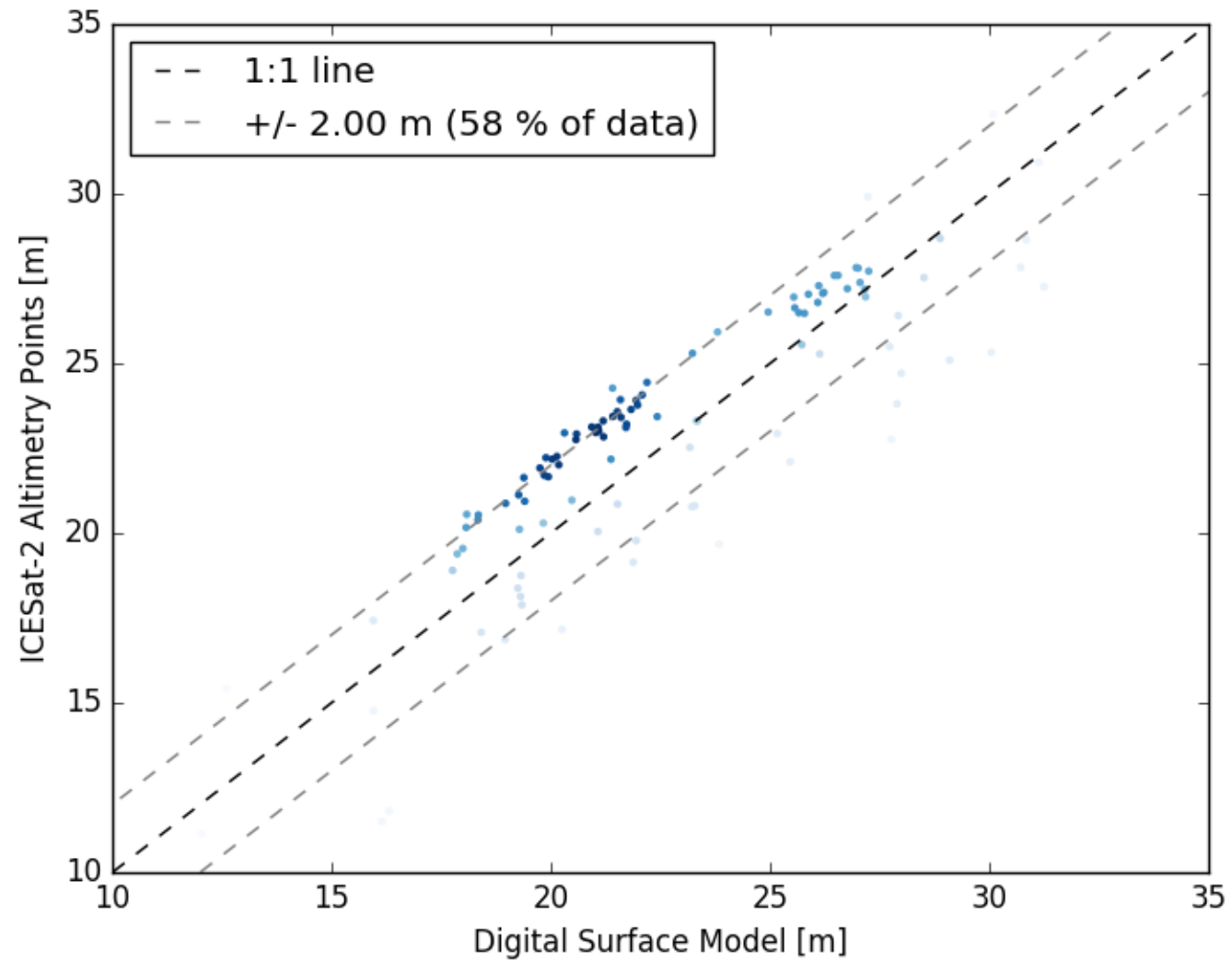
ICESat-2





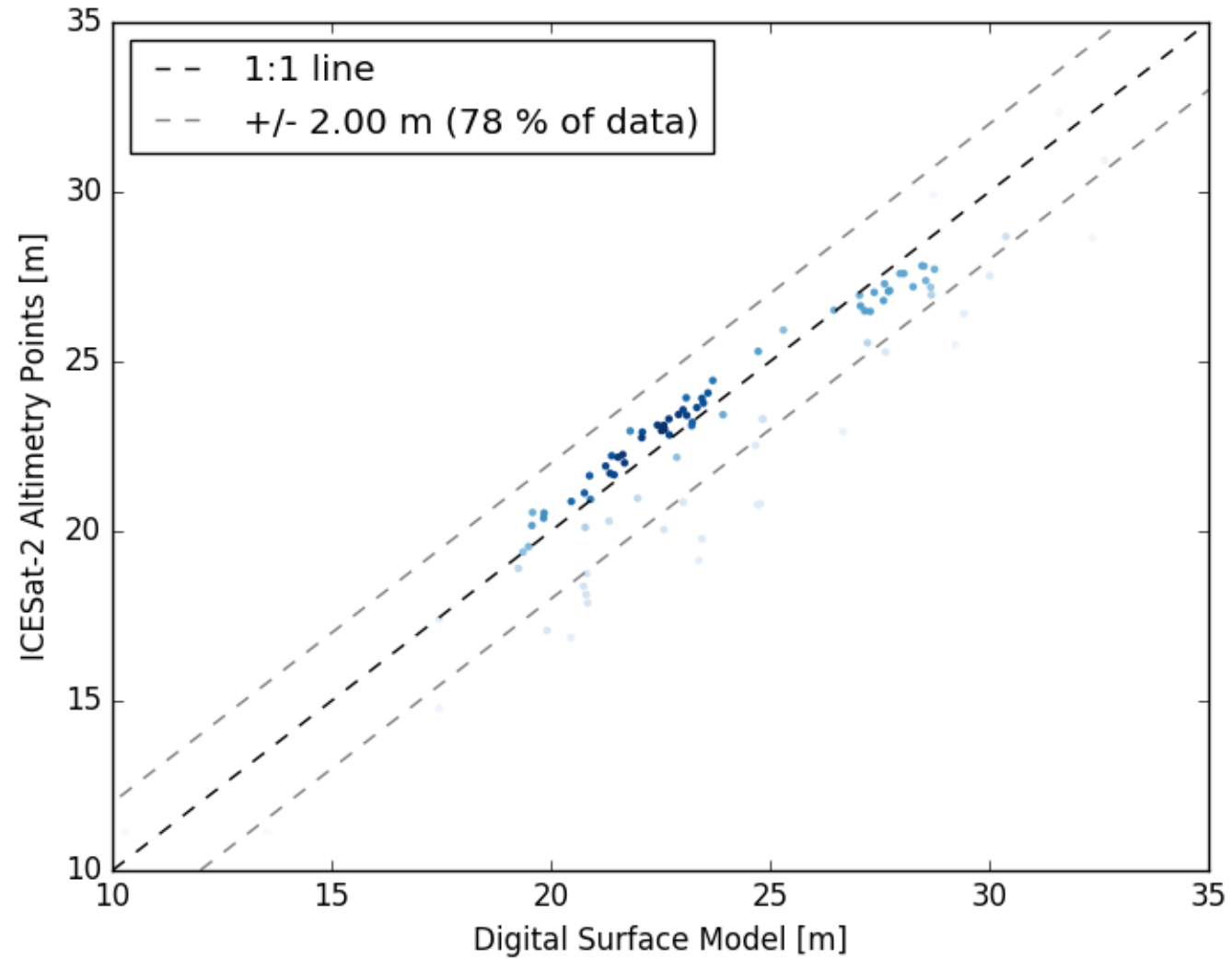
# 4. Results

ICESat-2



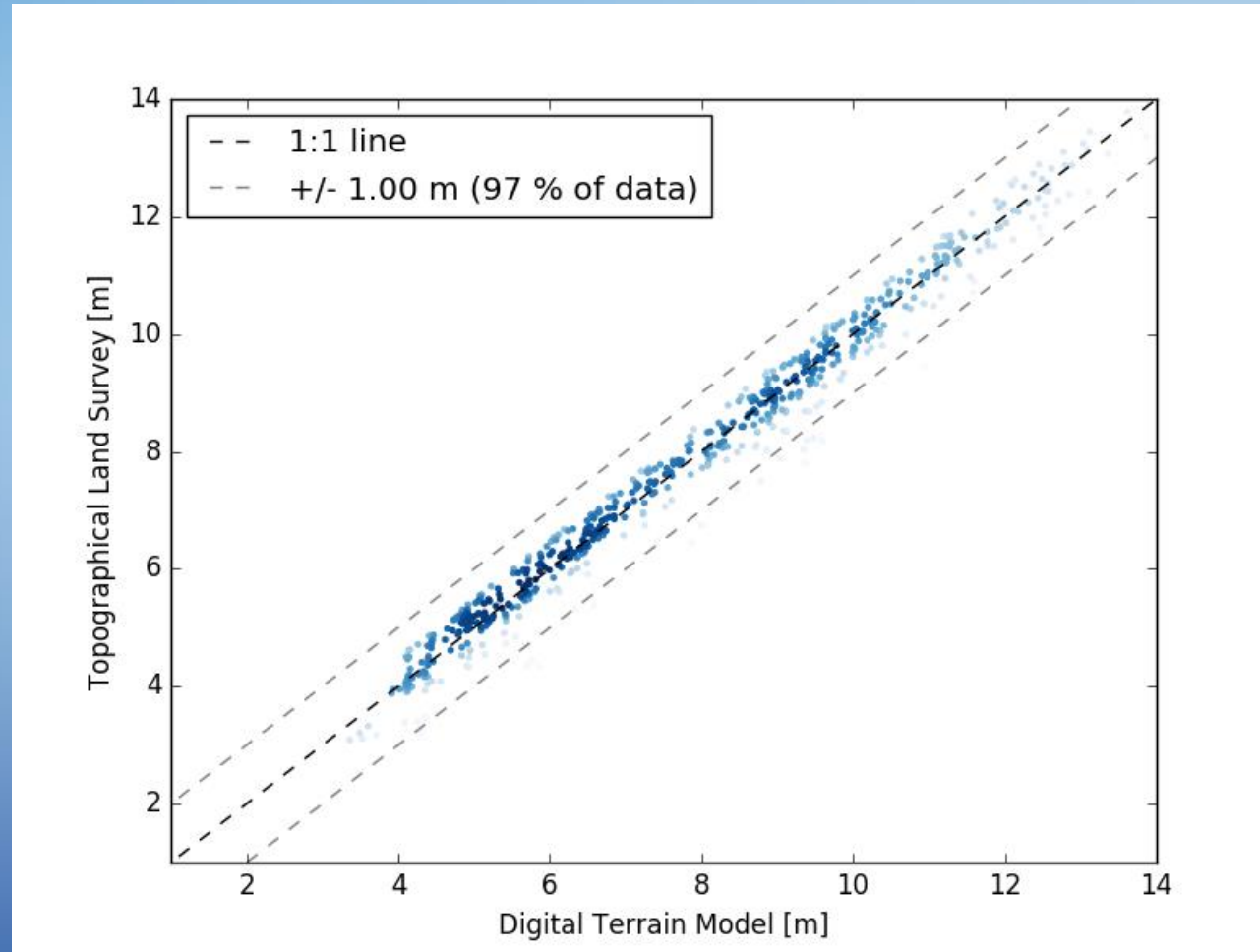
# 4. Results

ICESat-2



## 4. Results

Topographic Land Survey used to calibrate DTM model from satellite imagery



## 4. Results

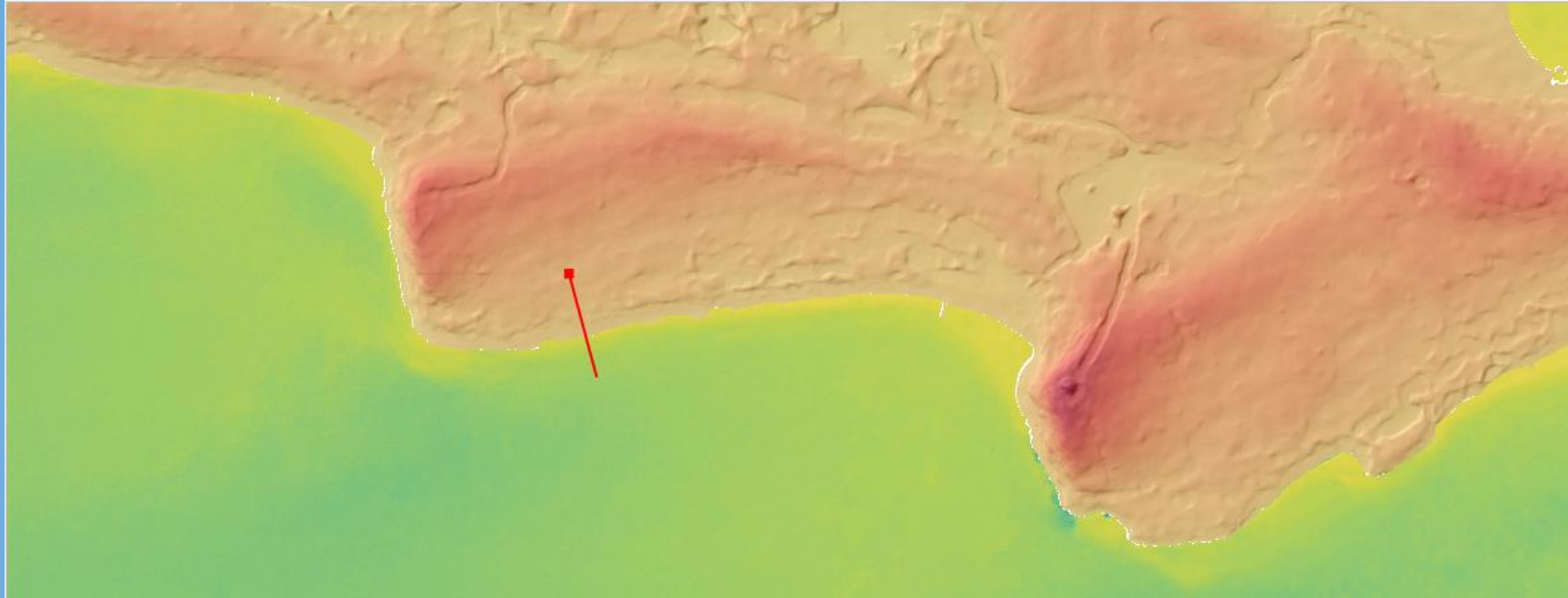


Bahamas Region

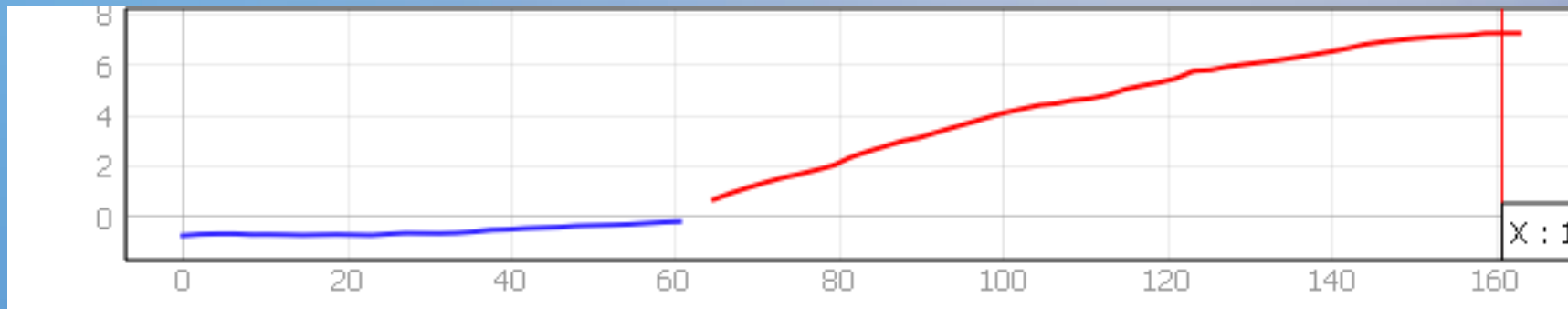
© CNES/ Pleiades Imagery



## 4. Results



Bahamas Region



# 4. Results

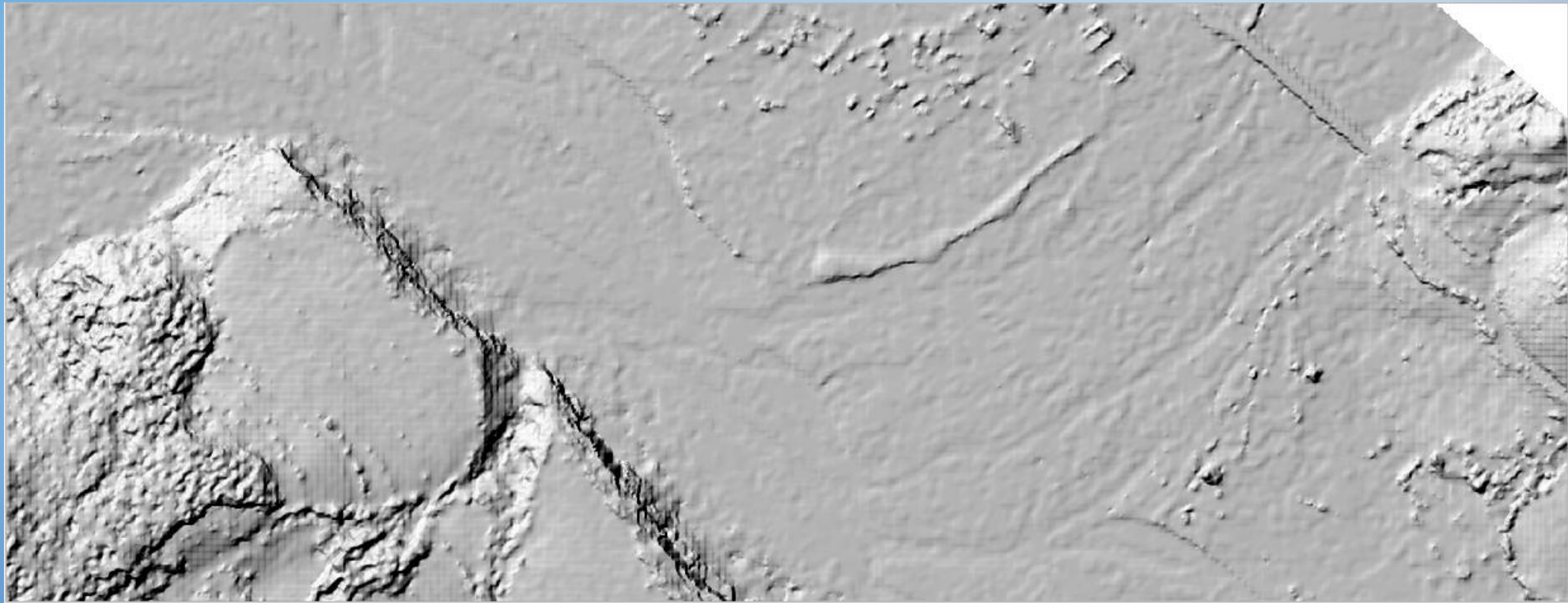
Central Europe



© Maxar Technologies

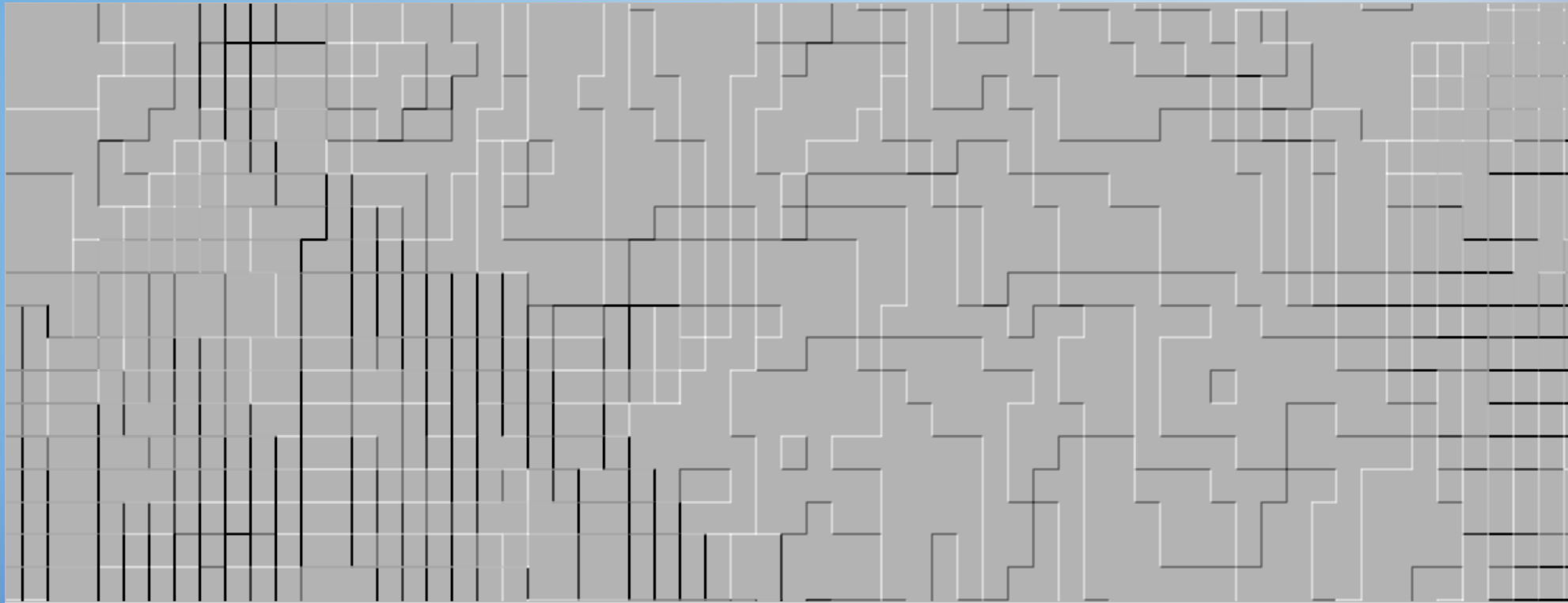
# 4. Results

Central Europe – 1m GSD Digital Surface Model



# 4. Results

Central Europe – 30m GSD Digital Surface Model





## 4. Results

1. Digital elevation models obtained from VHR satellite Imagery are relatively easy to generate and have good relative accuracies;
2. Absolute accuracies are improved using active sensors like ICESat-2;
3. Digital elevation models are useful for many tasks  
Water flow movement, relief maps, terrain analysis, line of sight analysis, etc.
4. Contact us if you are interested

# Questions?