

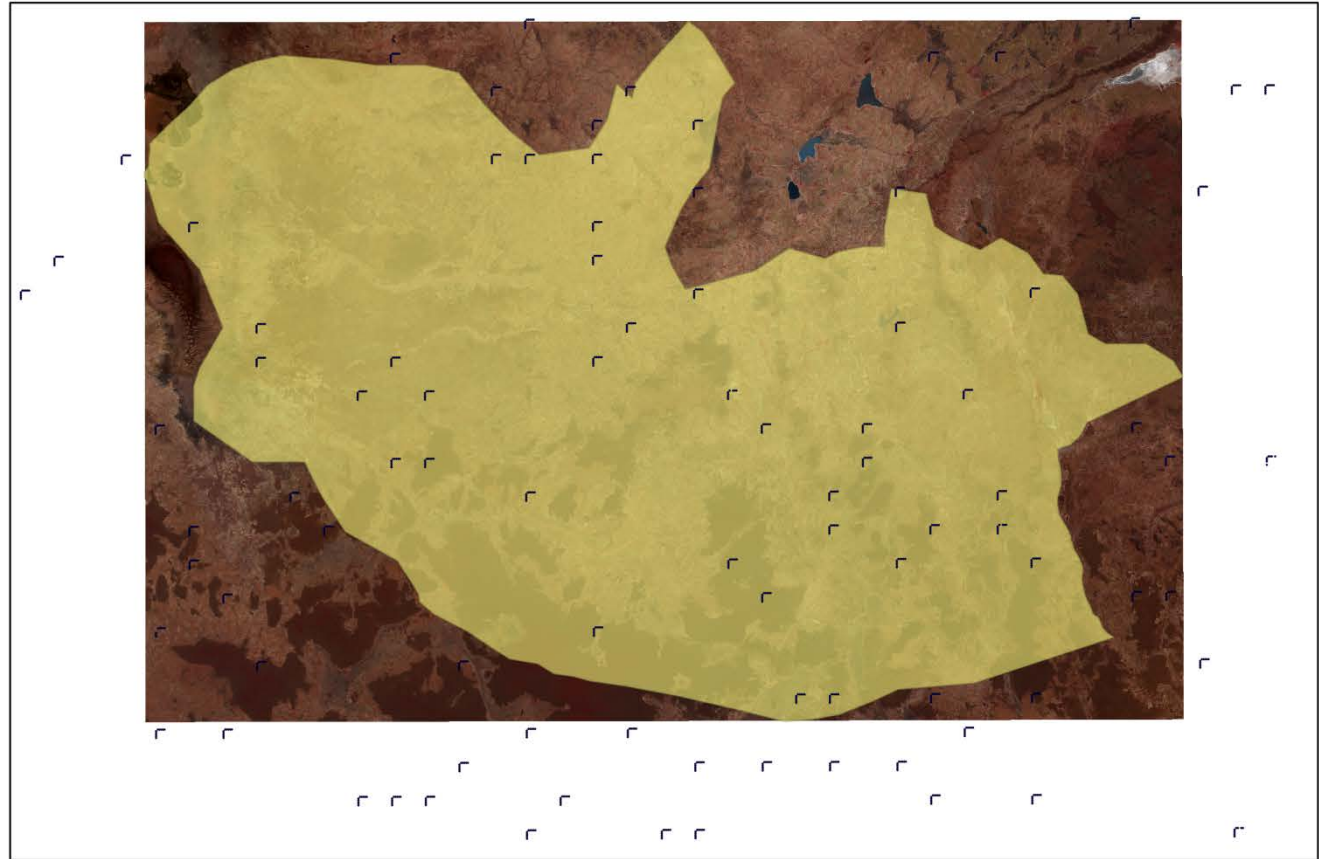


3D mapping in drylands monitoring

Anssi Pekkarinen
Forest Monitoring and Assessment Team
Forestry Department



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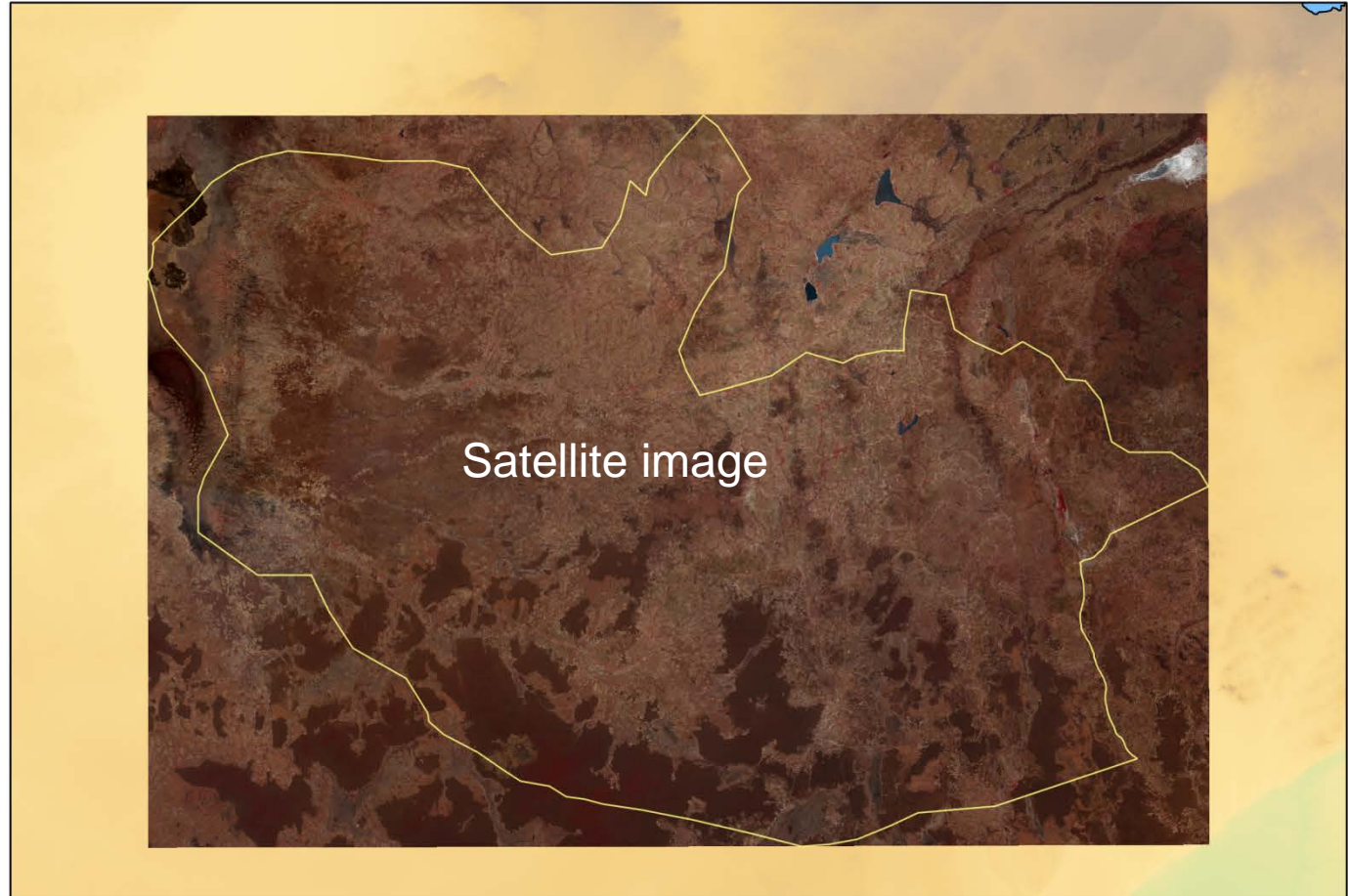
0 10 km

Forest inventory setup



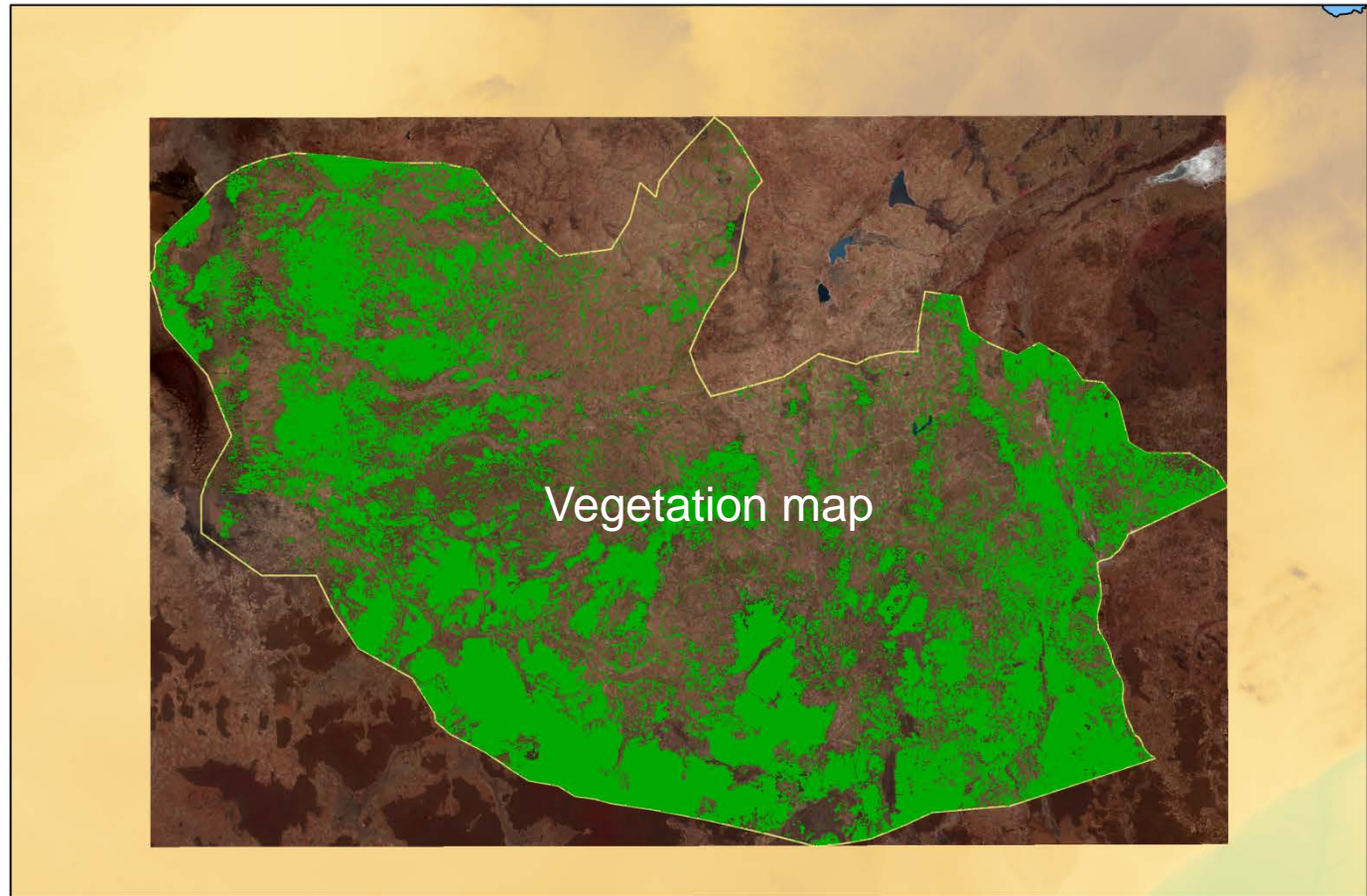


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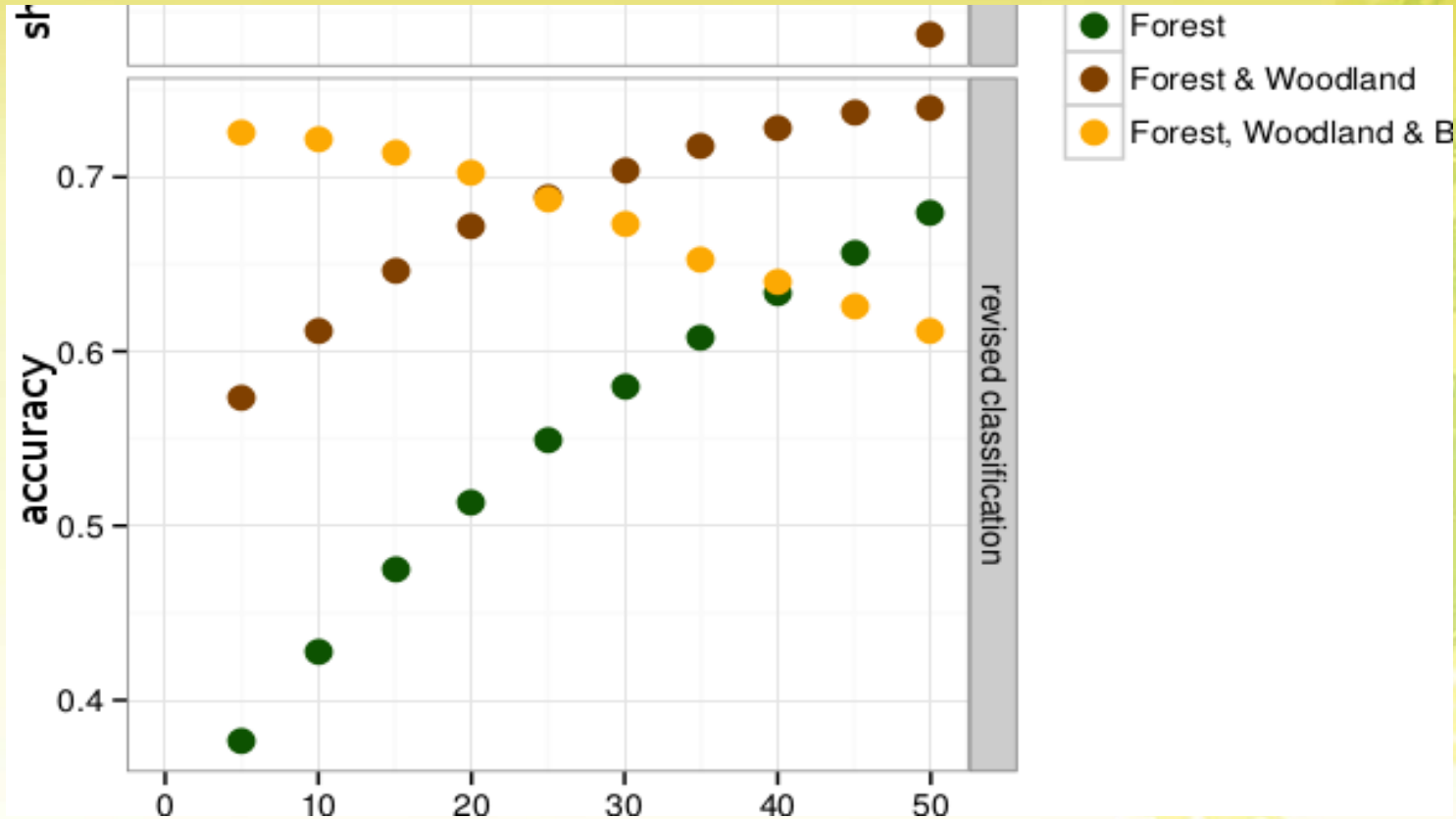


0 20 km





2D is nice but ...

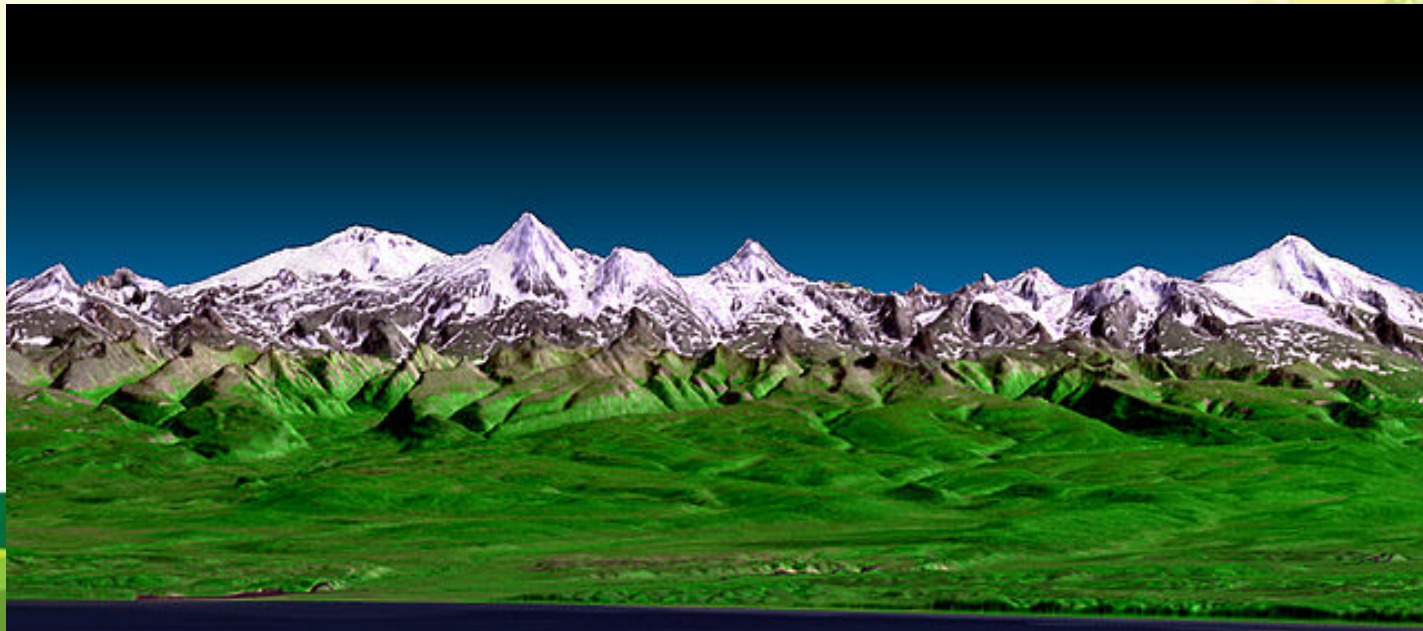


It can't see the topography nor the **height** of the vegetation ...



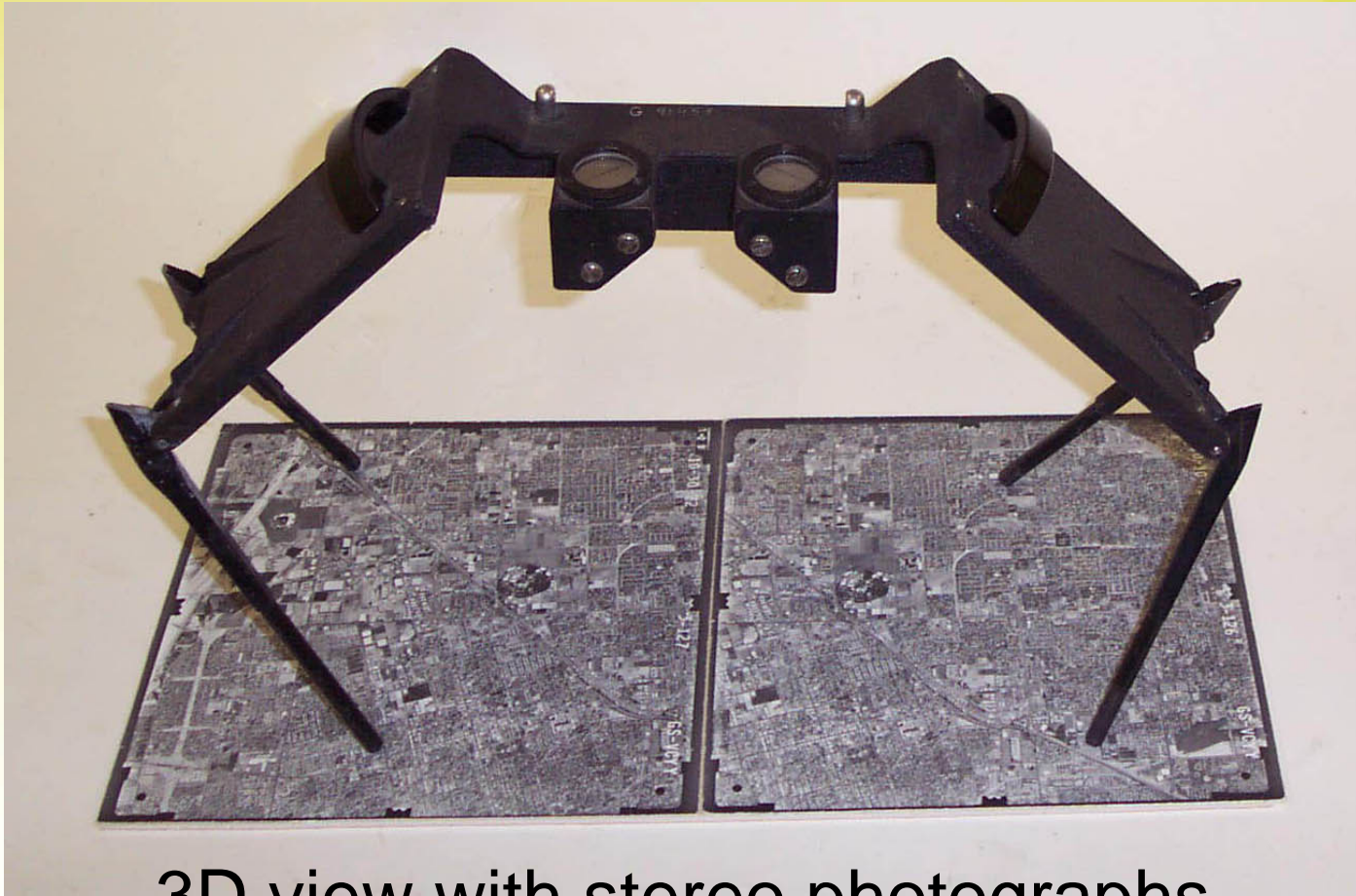
3D remote sensing

- Three main approaches
 - Photogrammetry
 - Laser Scanning
 - Radar interferometry





Photogrammetry

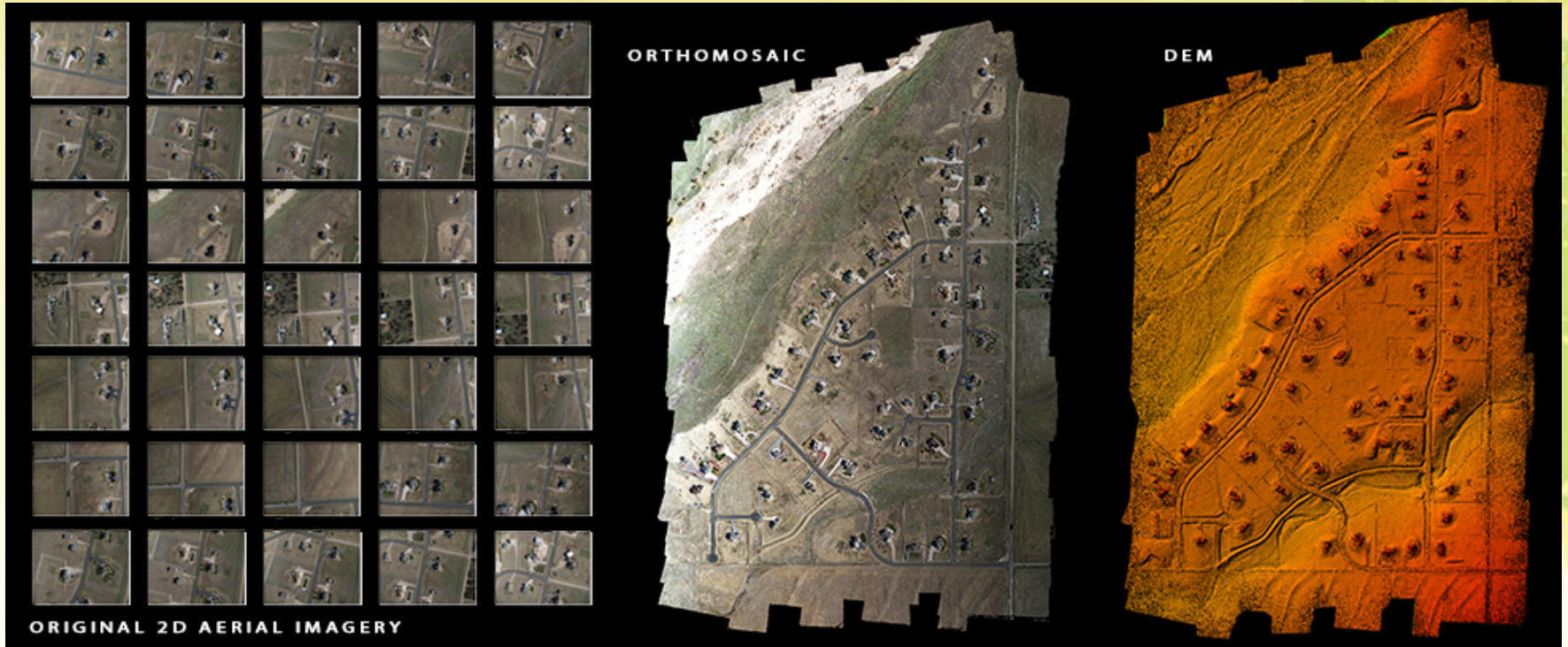


3D view with stereo photographs



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And the same digitally ...



<http://dronemapper.com/>



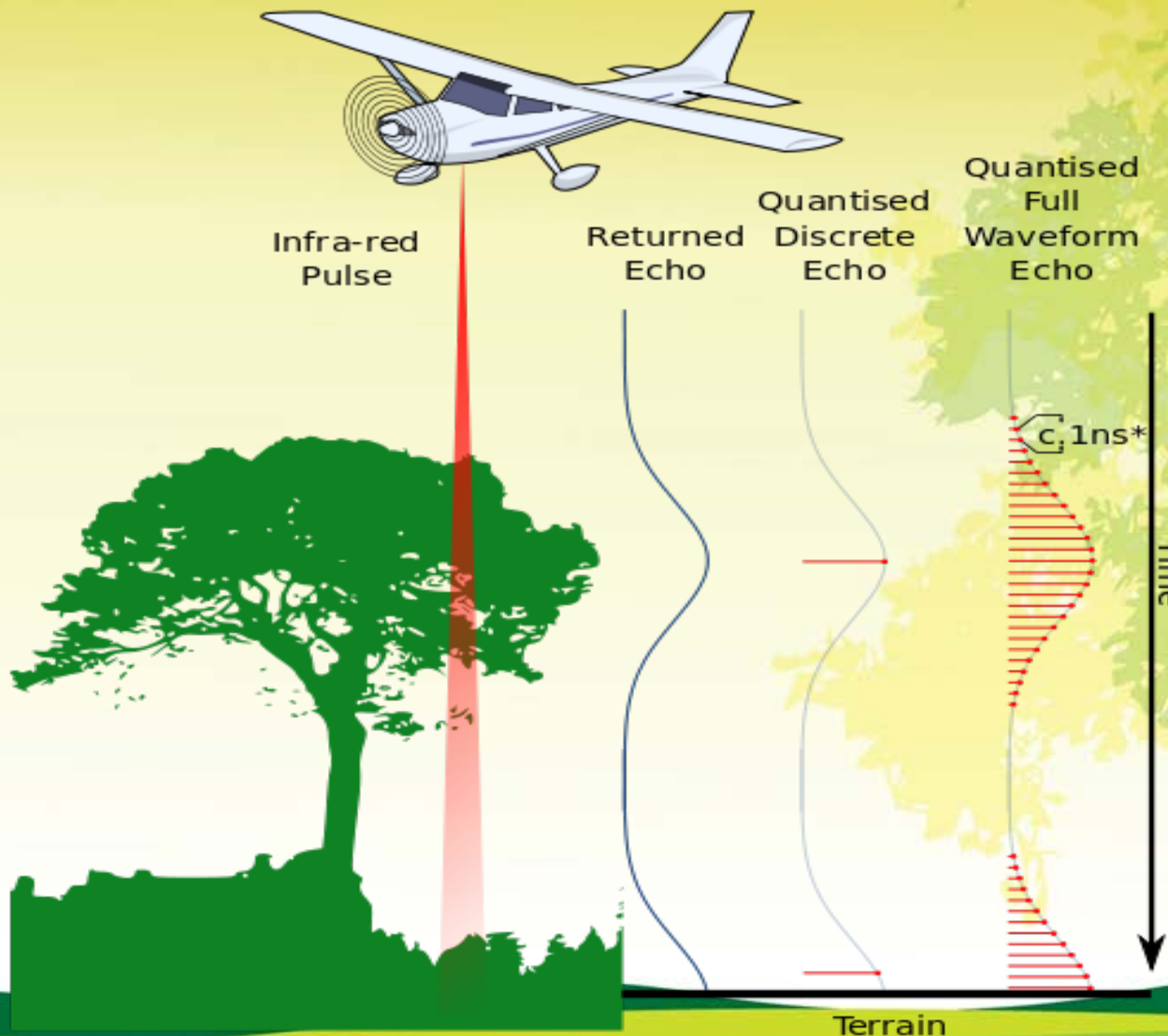
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Surface model





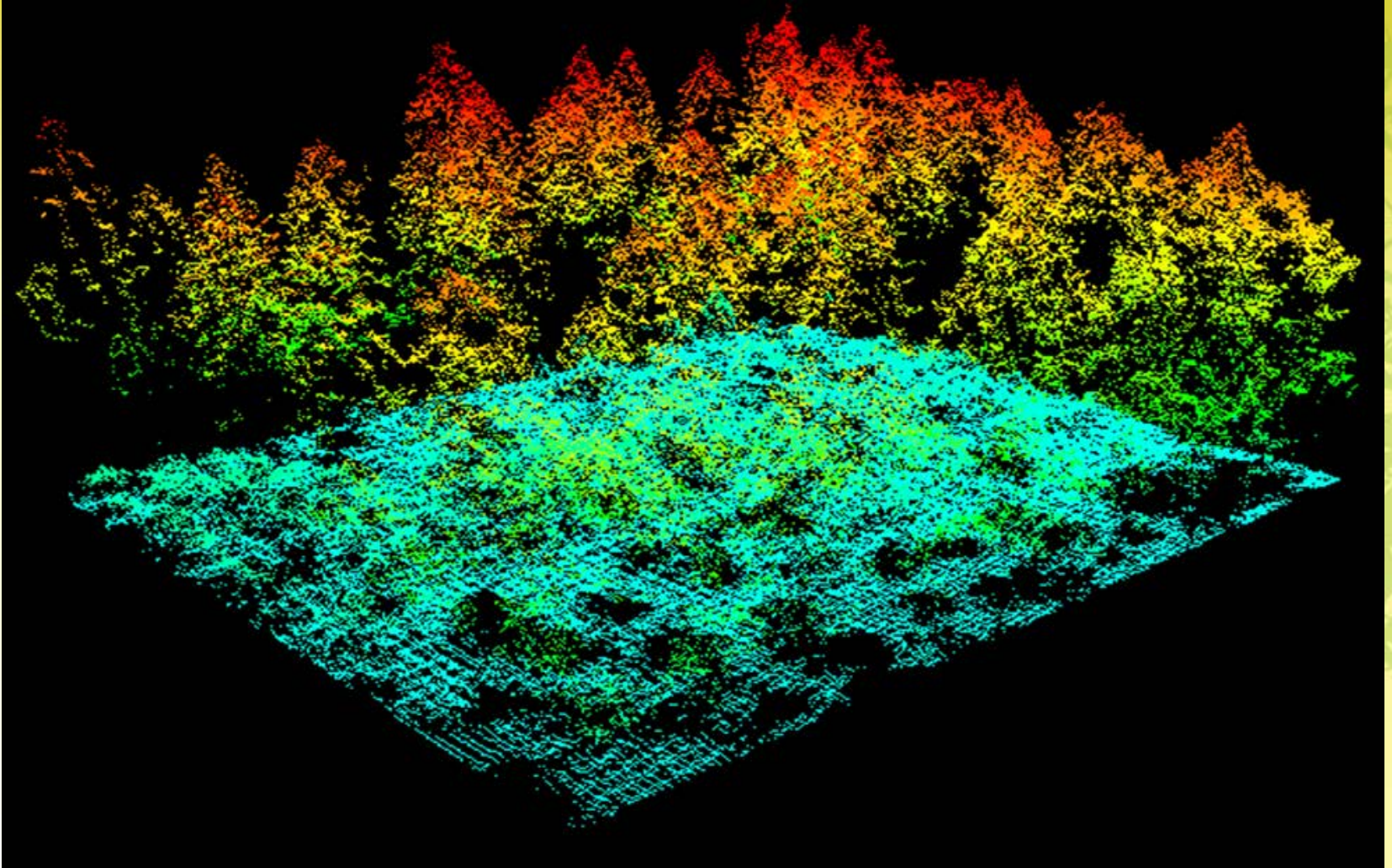
Lidar



* In a vacuum light will travel approximately 0.3m in 1ns



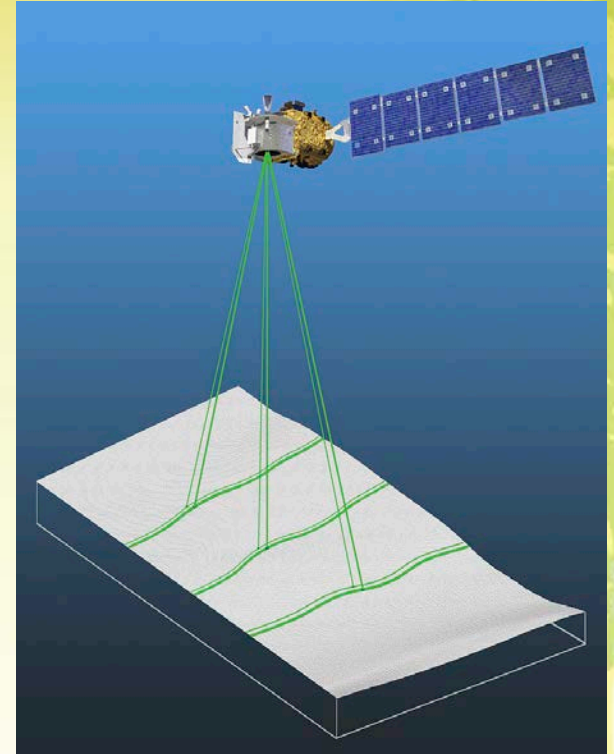
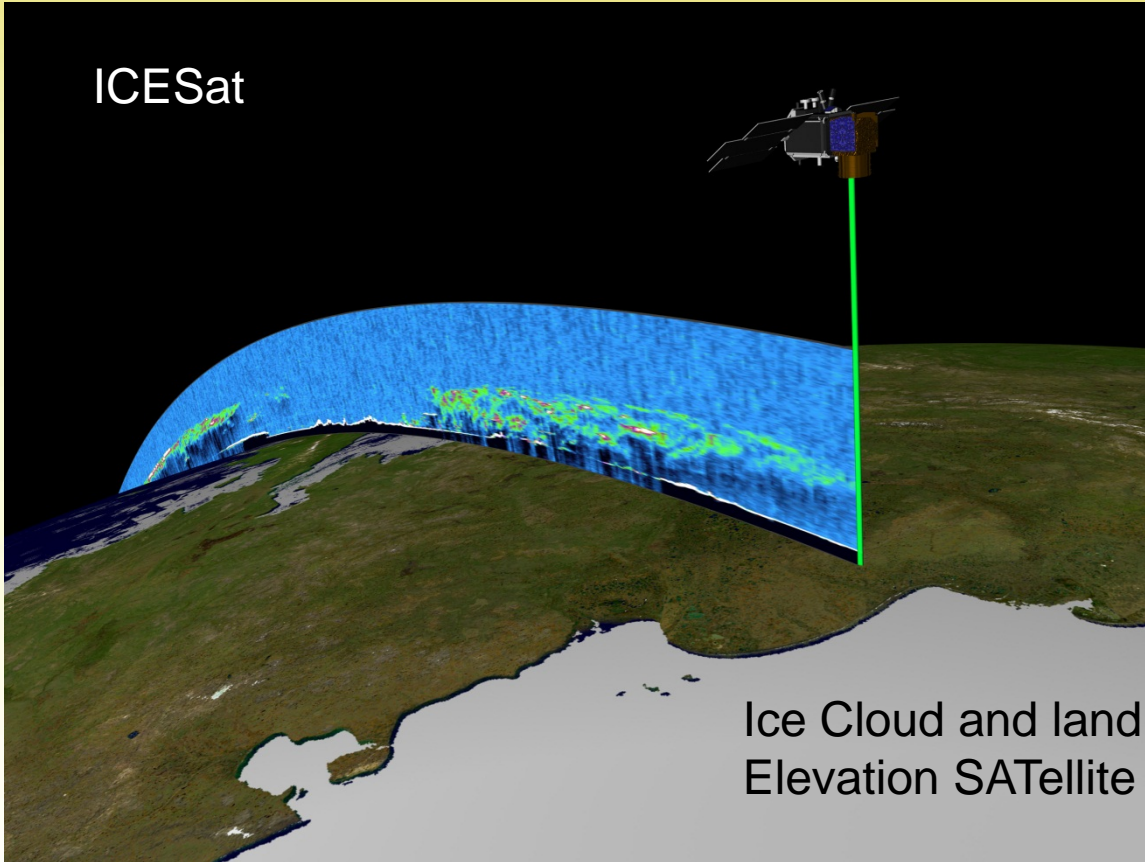
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<http://www.forestinventory.no/>



And from space

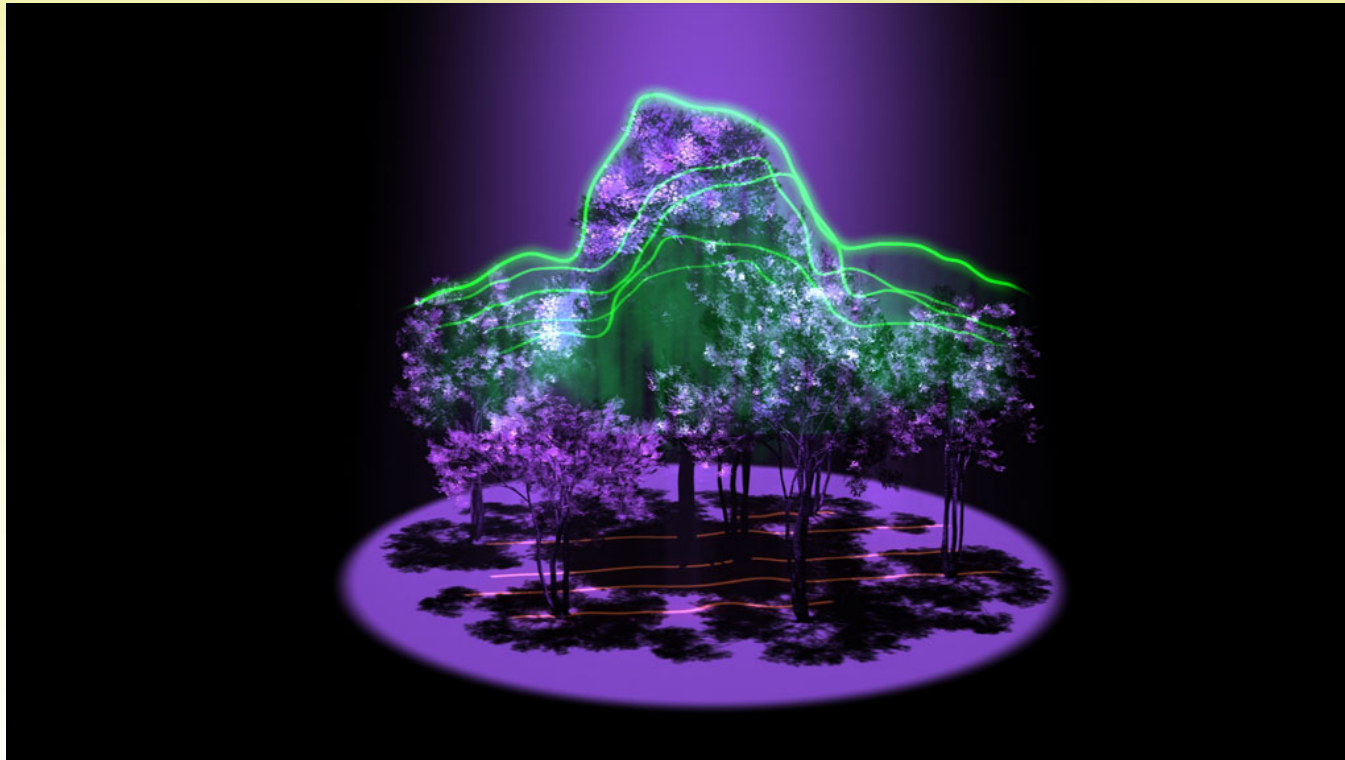


ICESat2 2017->



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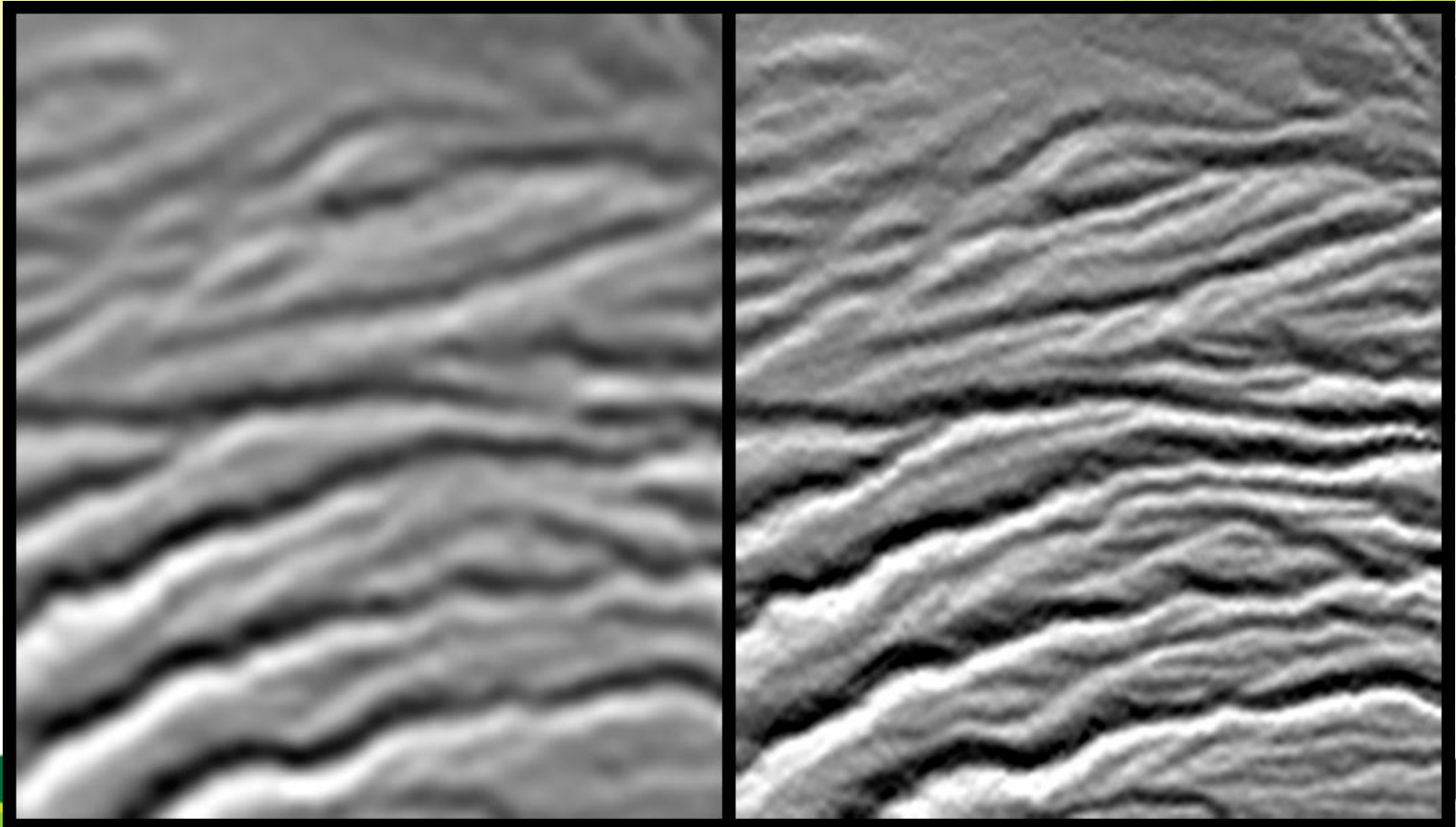
GEDI 2018 ->





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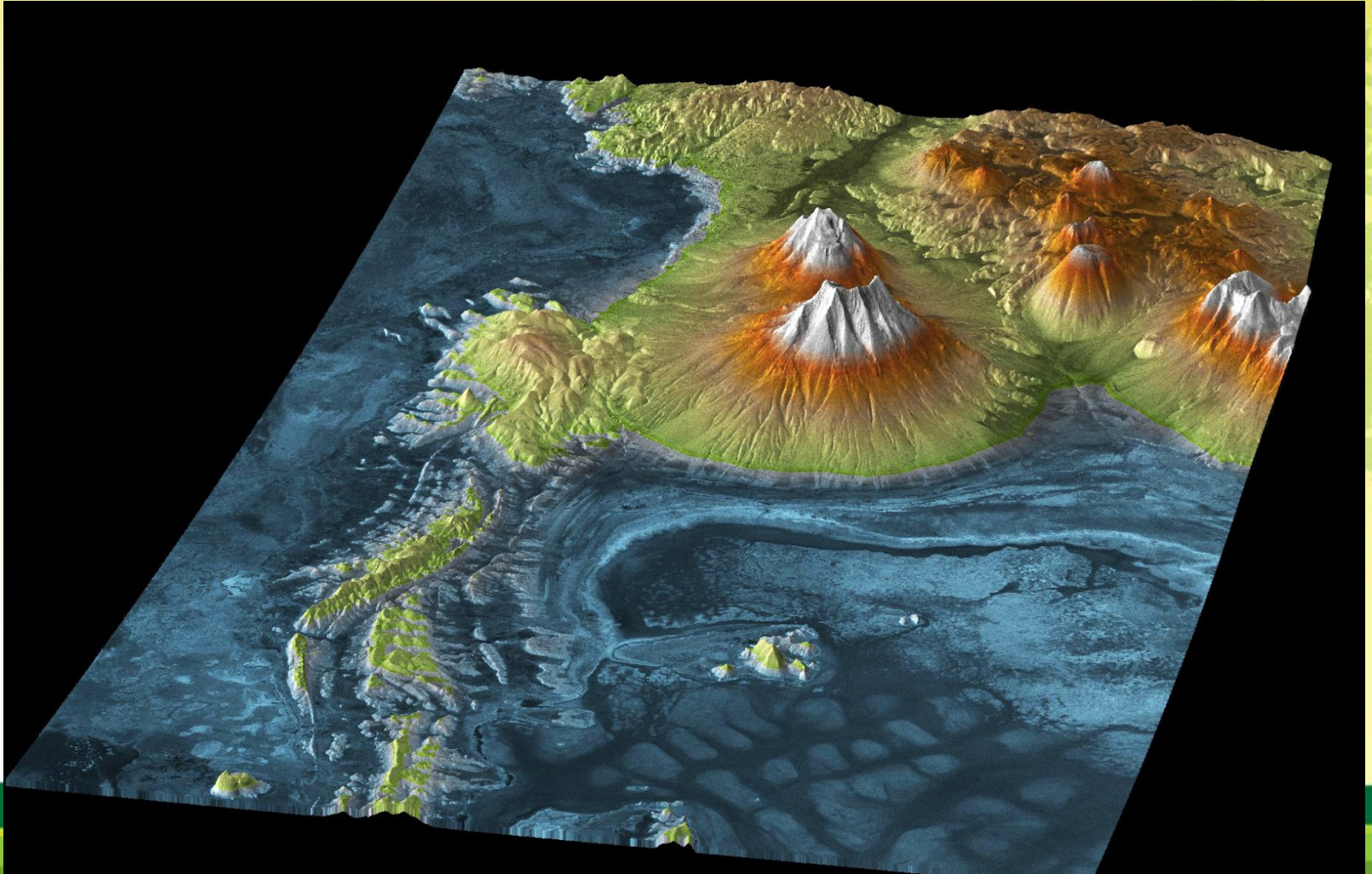
Shuttle Radar Topography Mission





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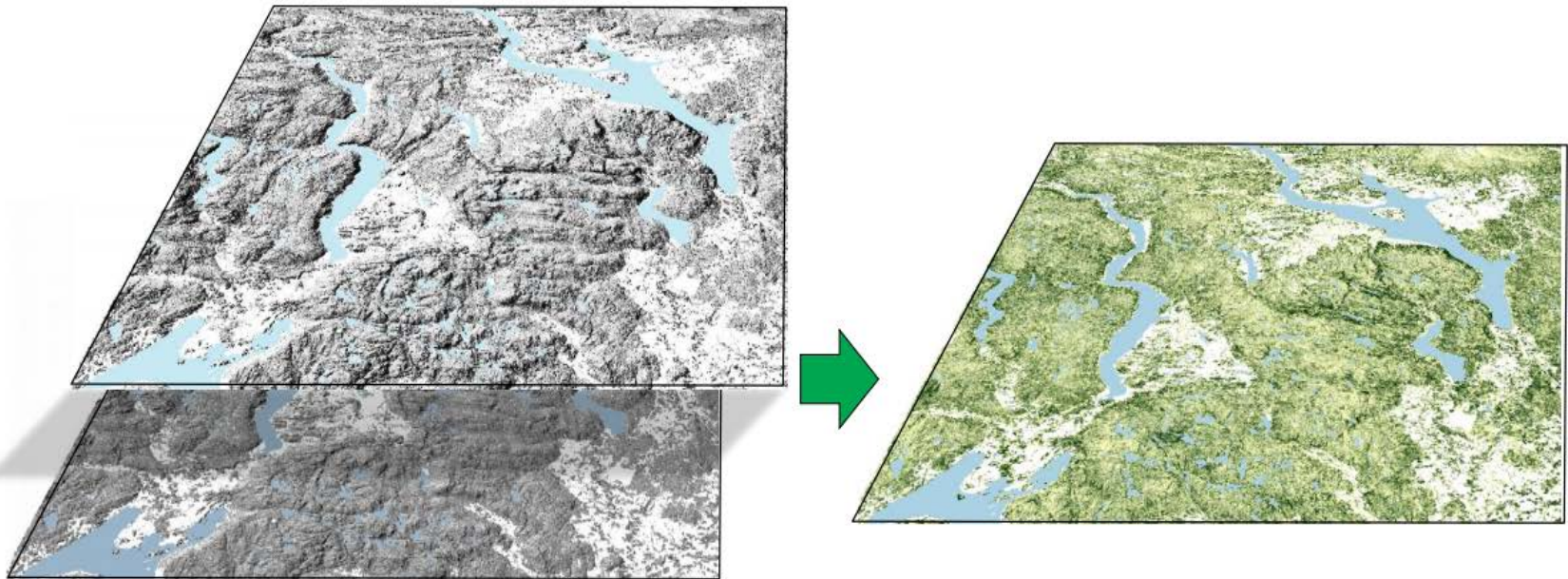
Tandem-X





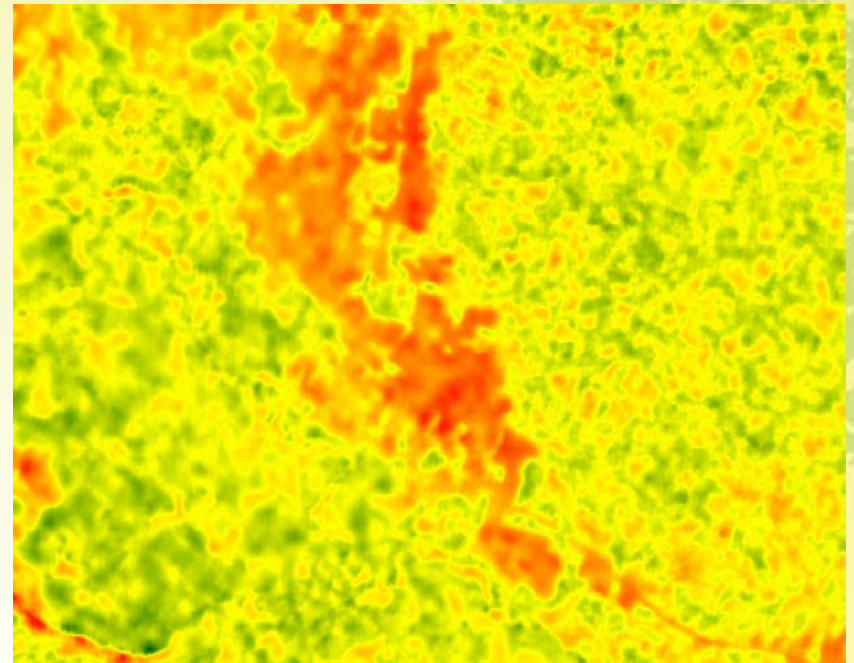
Tree and forest detection

Surface model – terrain model = canopy height





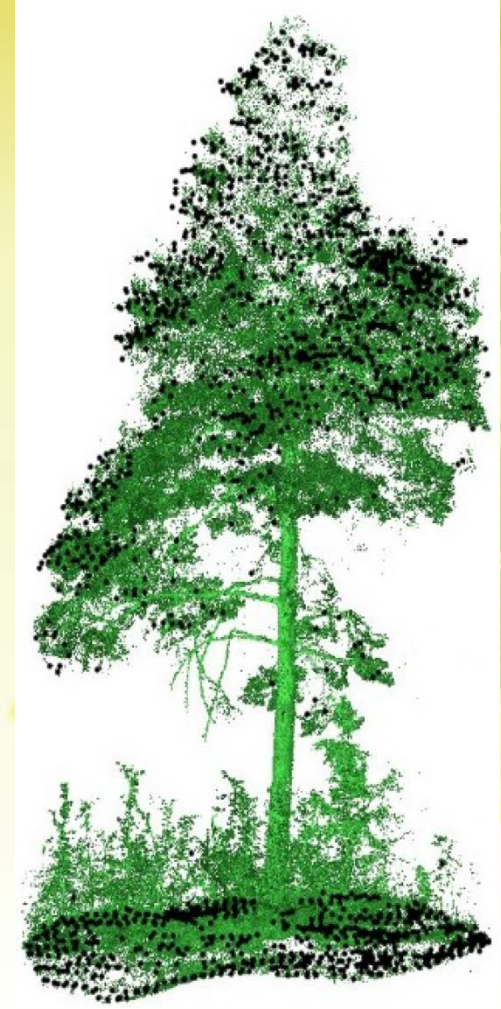
Changes



Svein Solberg & Tor Peder Lohne. IUFRO 2014.



Terrestrial LS



Holopainen, Mikko Vastaranta and Hyyppä



And even more

- Mobile devices
 - 3D mapping + crowdsourcing
- Terrestrial LS
 - Vehicles
 - Backpacks
- Cloud computing
- ...

