Coordinating and integRating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East and Balkans and Developing Links with GEO related intiatives toward GEOSS

GEO-CRADLE Project Meeting 2
16th November, 2016
(T4.2)

The role of precision agriculture in vineyard management

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GOLAN HEIGHTS WINERY

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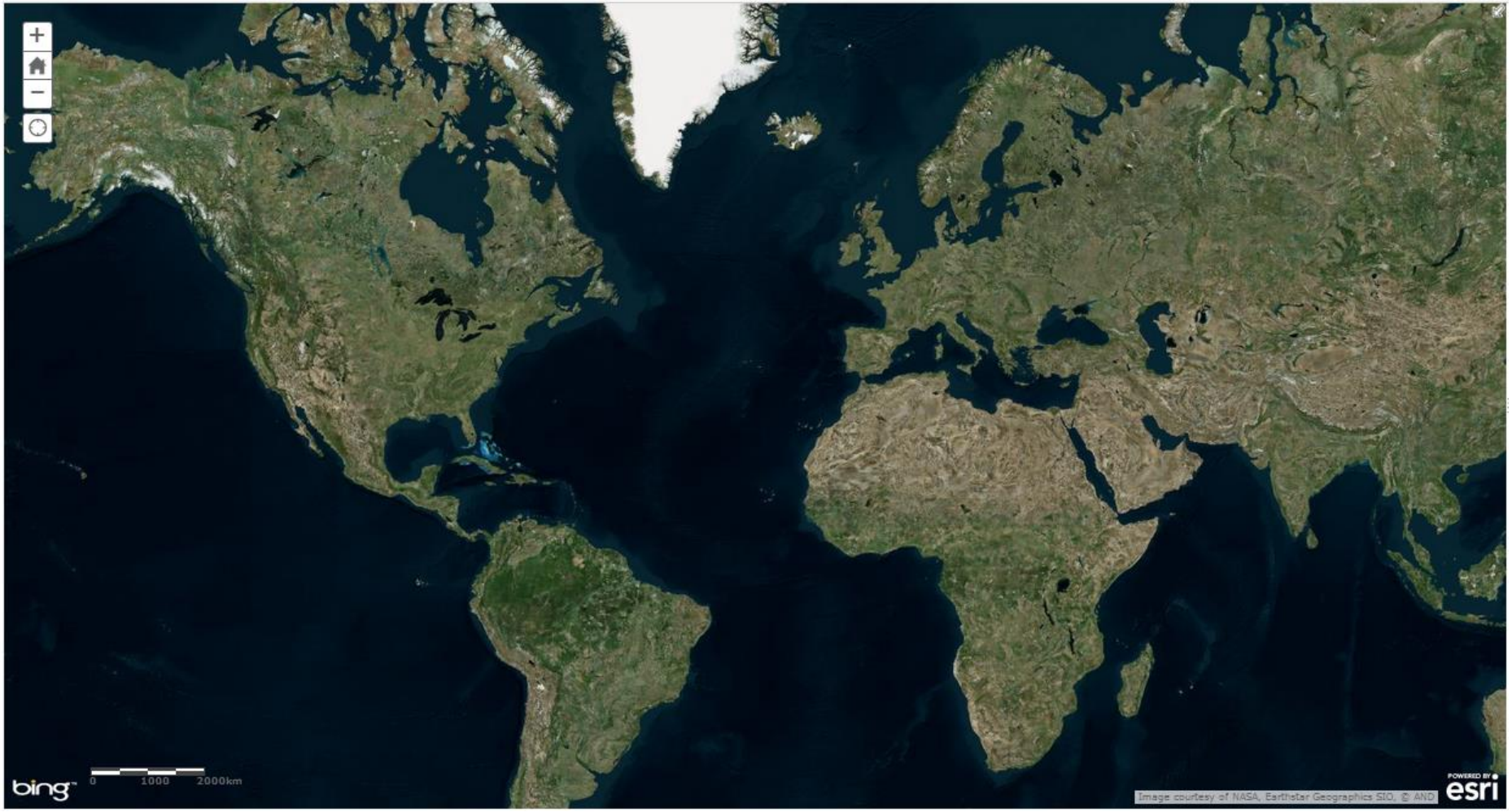
The GEO-CRADLE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690133.

Where Are We?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Where Are We?


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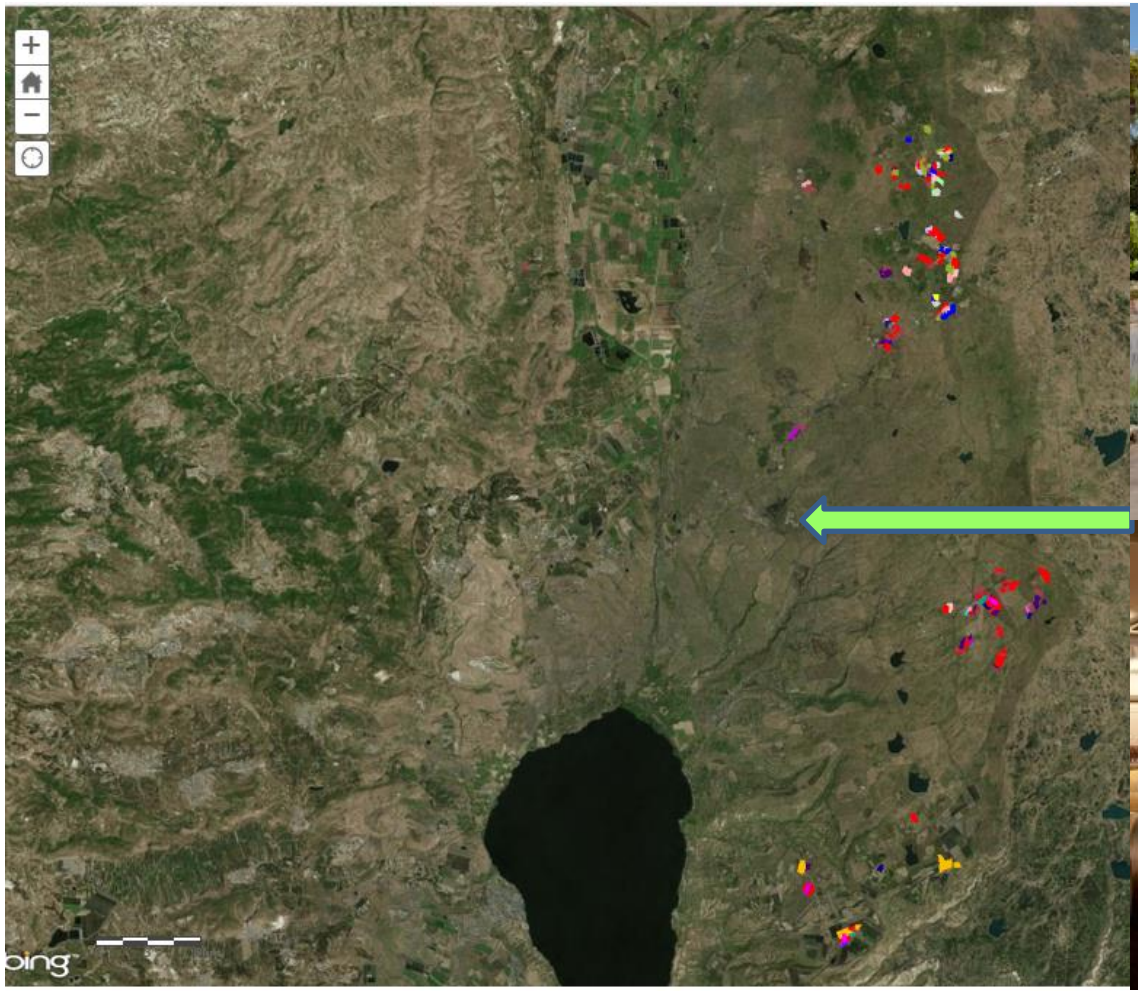
Where Are We?

GOLAN HEIGHTS WINERY

Where Are We?

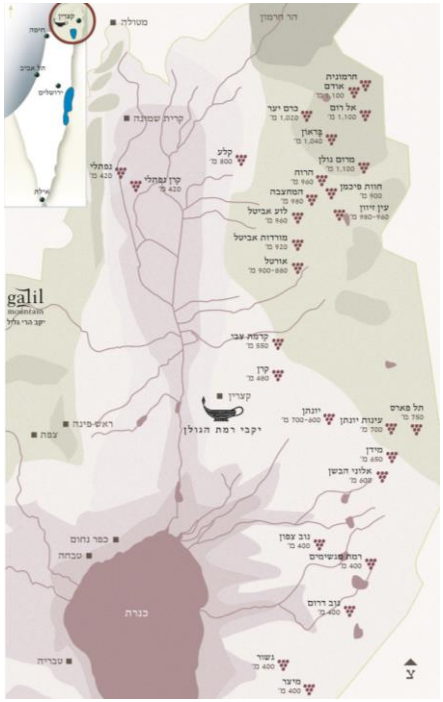
GOLAN HEIGHTS WINERY

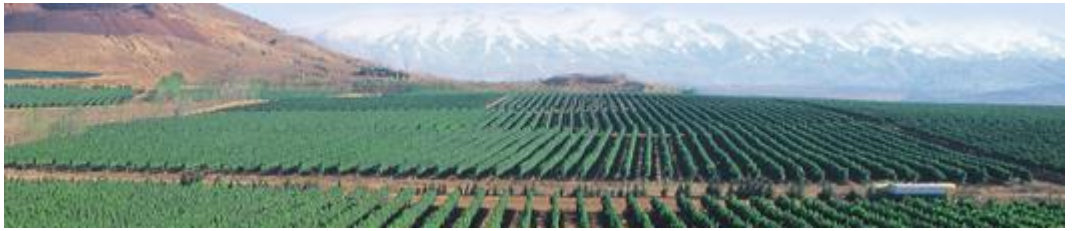


Who Are We?

GOLAN HEIGHTS WINERY

- Established 1983, also first vintage.
- Vineyards first planted 1976.
- Approximately 25 vineyards through out the Golan Heights.
- ~650 hectares (1600 acres).
- Divided and cultivated to approx. 430 blocks (averaged block,1.5 ha).





What is precision viticulture?

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- Precision viticulture is precision farming applied to optimize vineyard performance, meaning maximizing yield and quality while minimizing environmental impacts.

- This is accomplished by measuring local variation different factors like: soil, topography, microclimate, vine health, vegetation etc. and then applying appropriate viticulture management practices.

- High in-field variability will need more detailed and precise management.

- Precision viticulture depends on new and emerging technologies such as environmental sensors, satellite and airborne remote sensing, and geographic information systems (GIS) to assess and respond to variability.

So, when WineGrowing, uniformity is the “magic” word

Difference in vegetation → Difference in ripening

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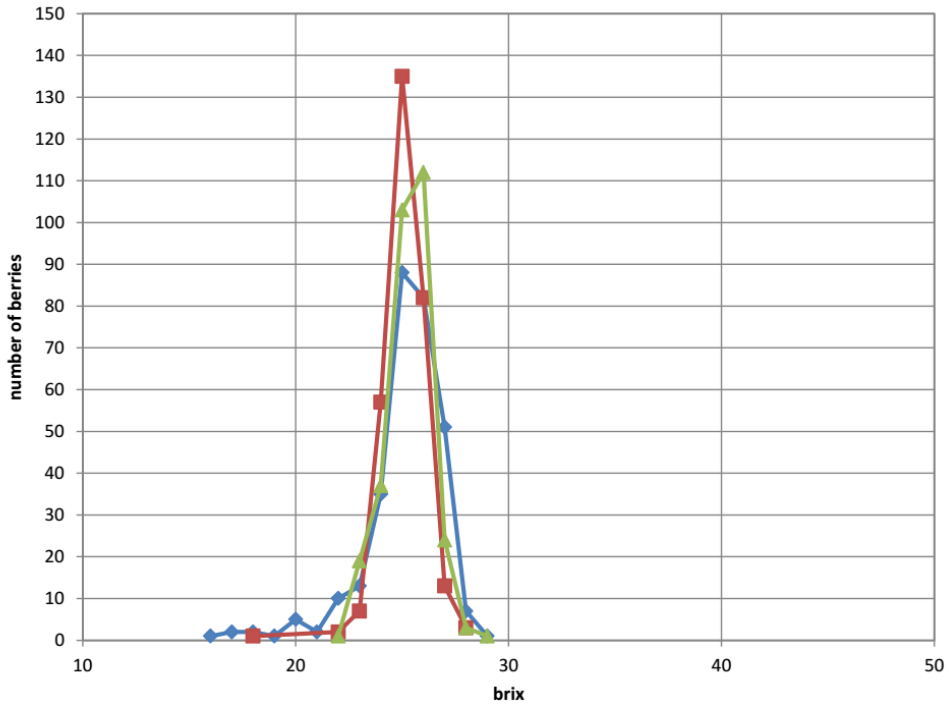

The use of NDVI in vineyards:

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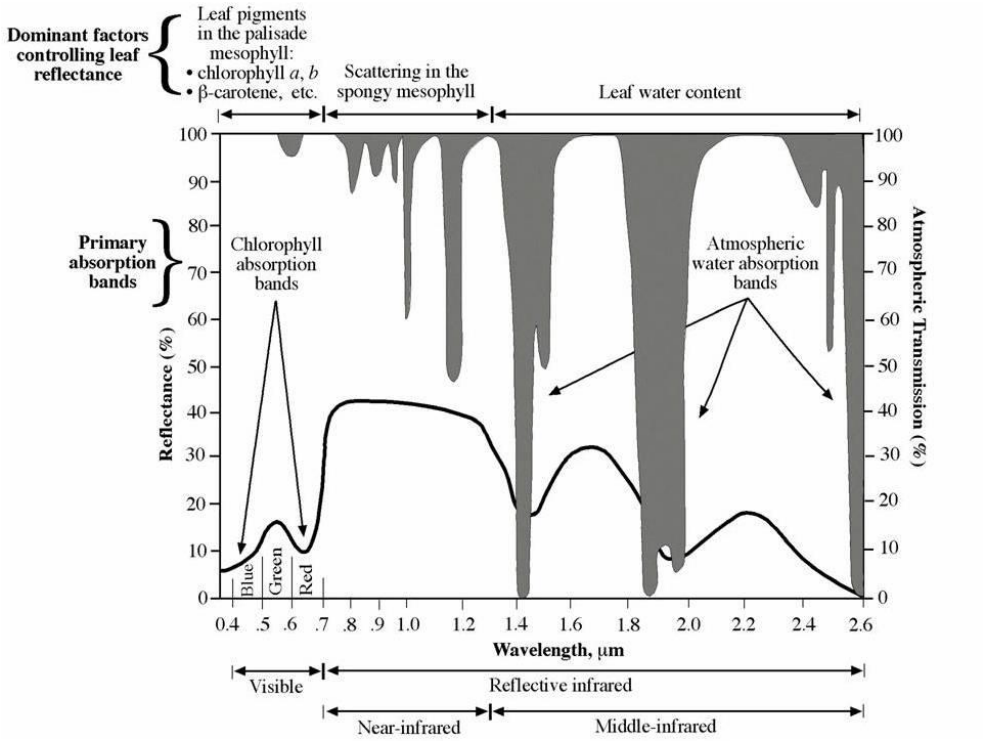
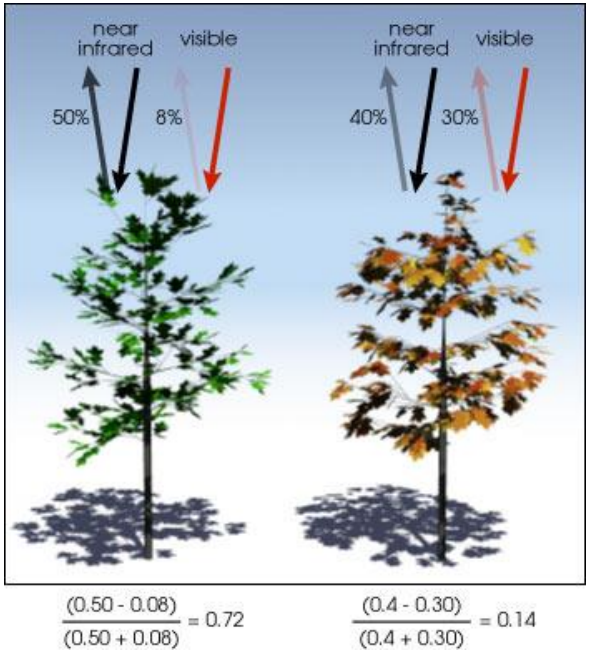
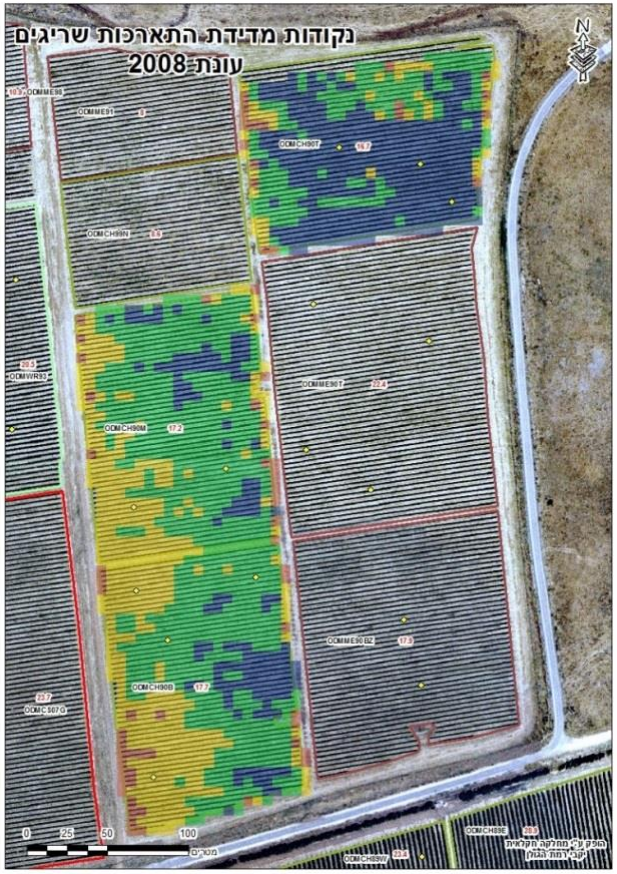
Normalized Difference Vegetation Index = NDVI

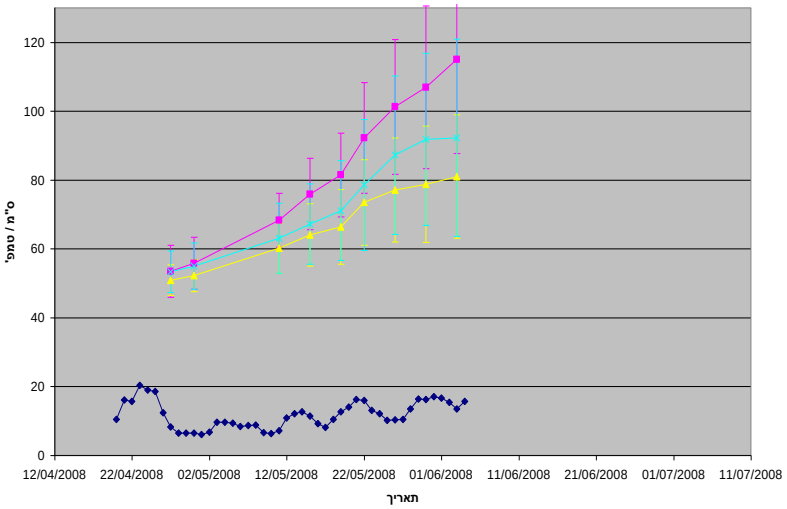


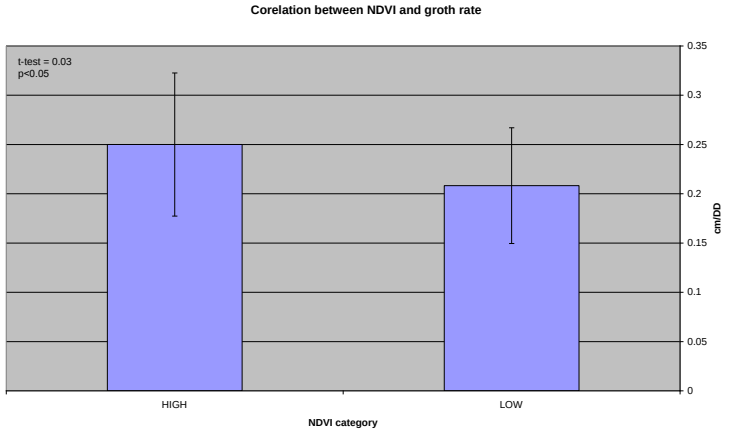


$$NDVI = \frac{(NIR - \mathrm{Re}\,d)}{(NIR + \mathrm{Re}\,d)}$$

Correlation between NDVI and shoot growth:

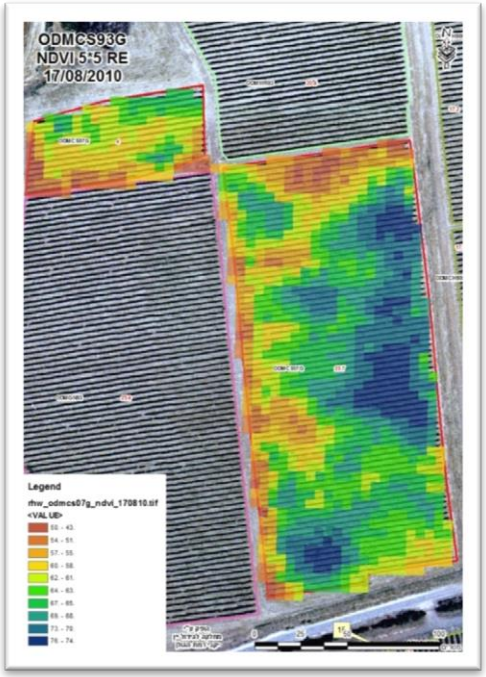


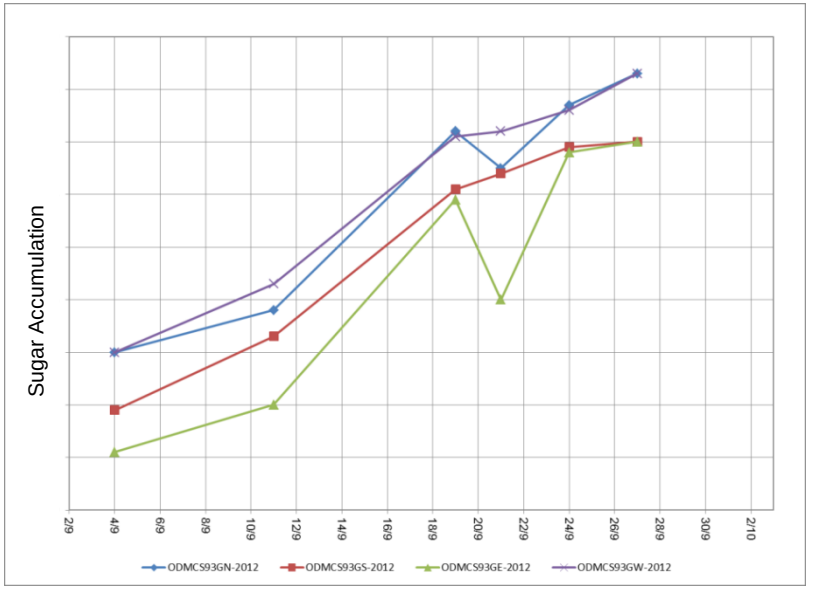




Difference in vegetation → Difference in ripening

Shoot length (cm)	Sugar concentration (°B)	Acid concentration (g/l)	pH	Skin colour (520 nm)
± 60	23,4	5,2	3,8	1,203
± 120	24,5	7,4	3,3	2,761
> 200	21,9	8,9	3,2	1,078





NDVI- Different methods and resolutions

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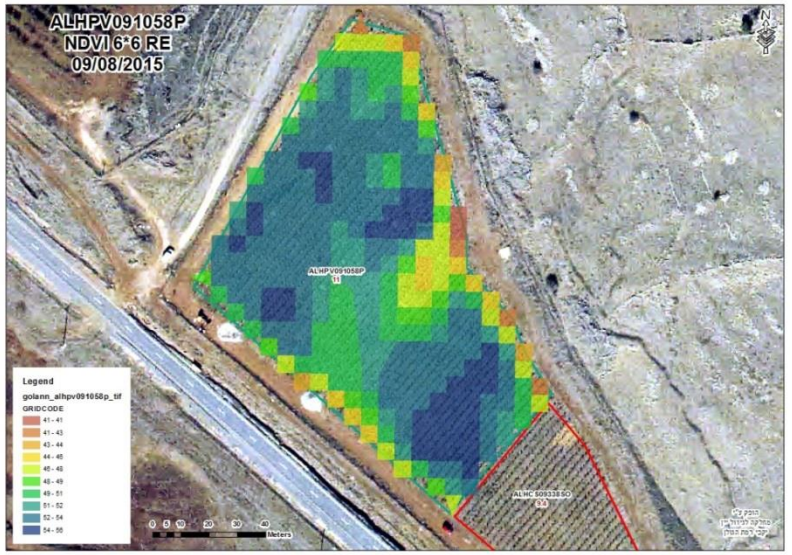

Designing a vineyard for uniformity:

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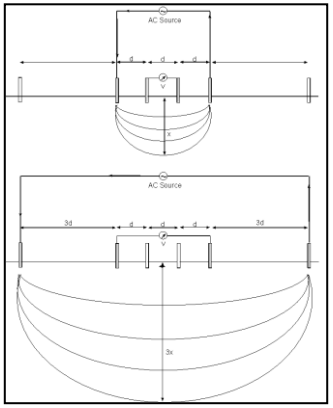
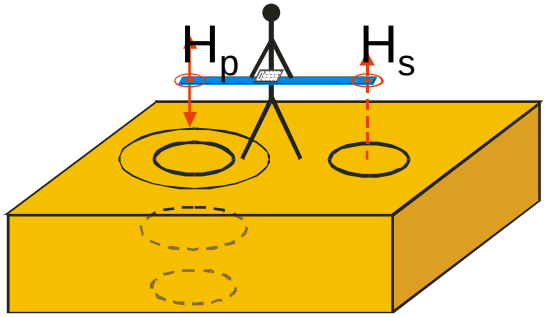
Mapping the soil, based on electric conductivity (EC):



VERIS



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Designing a vineyard for uniformity:

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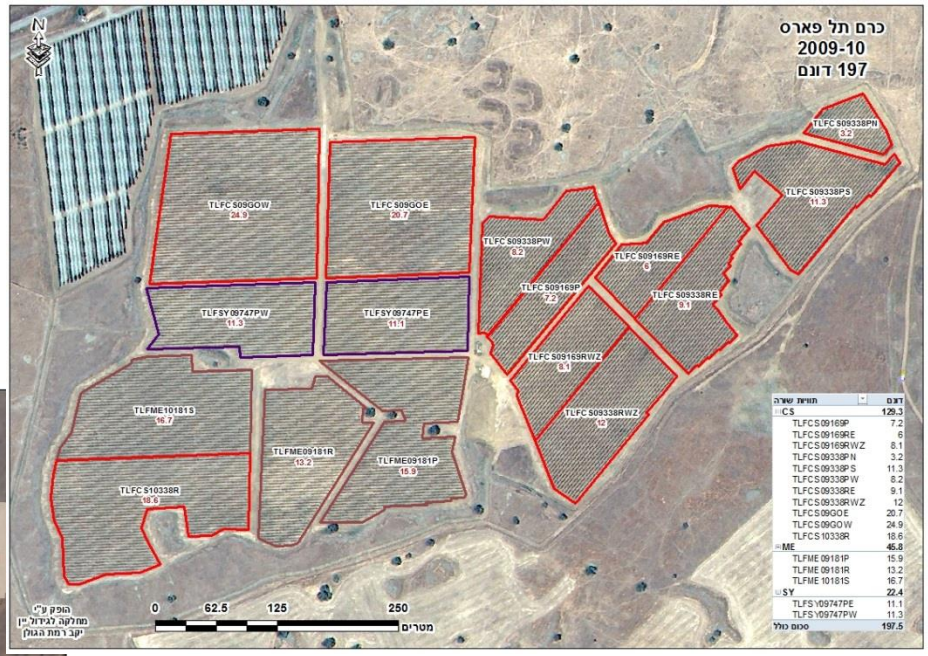
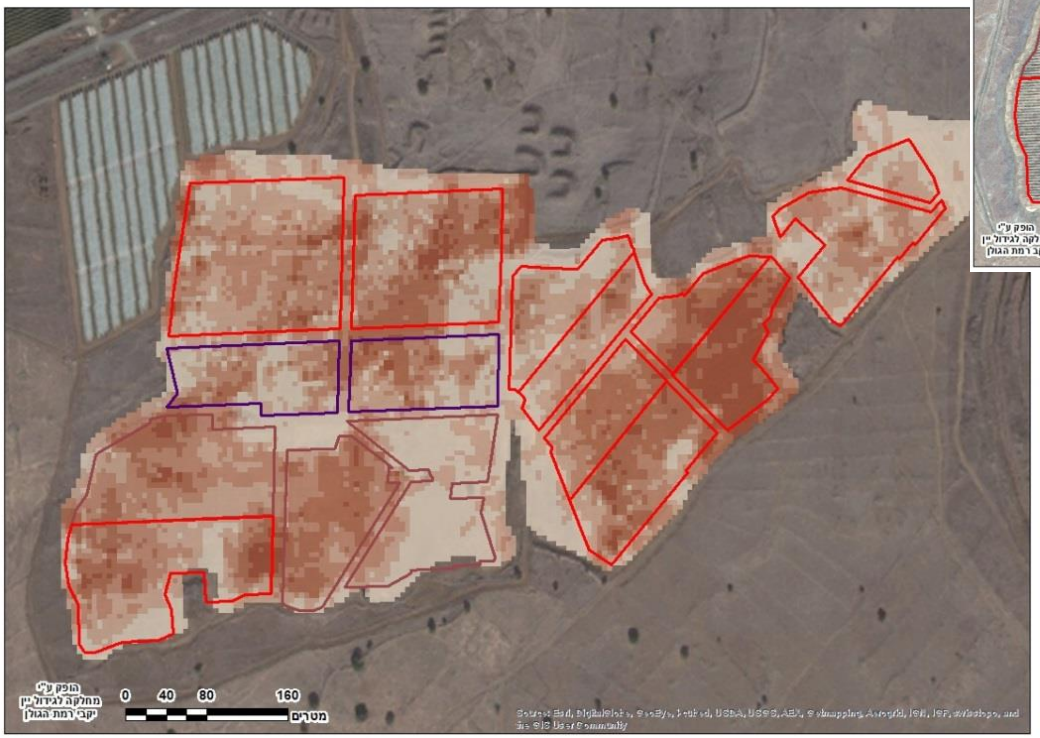
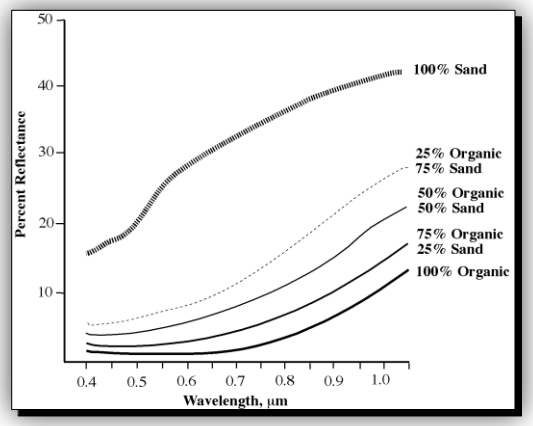
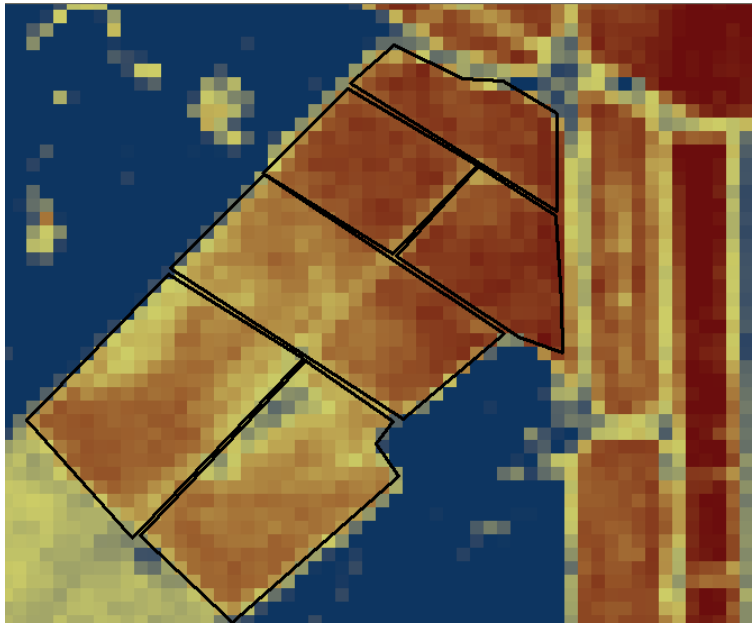
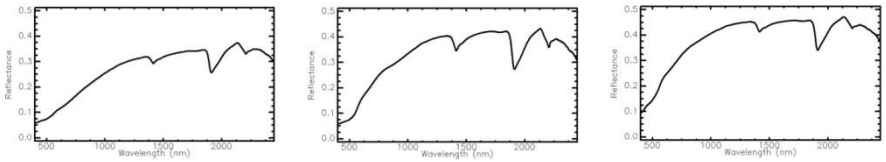




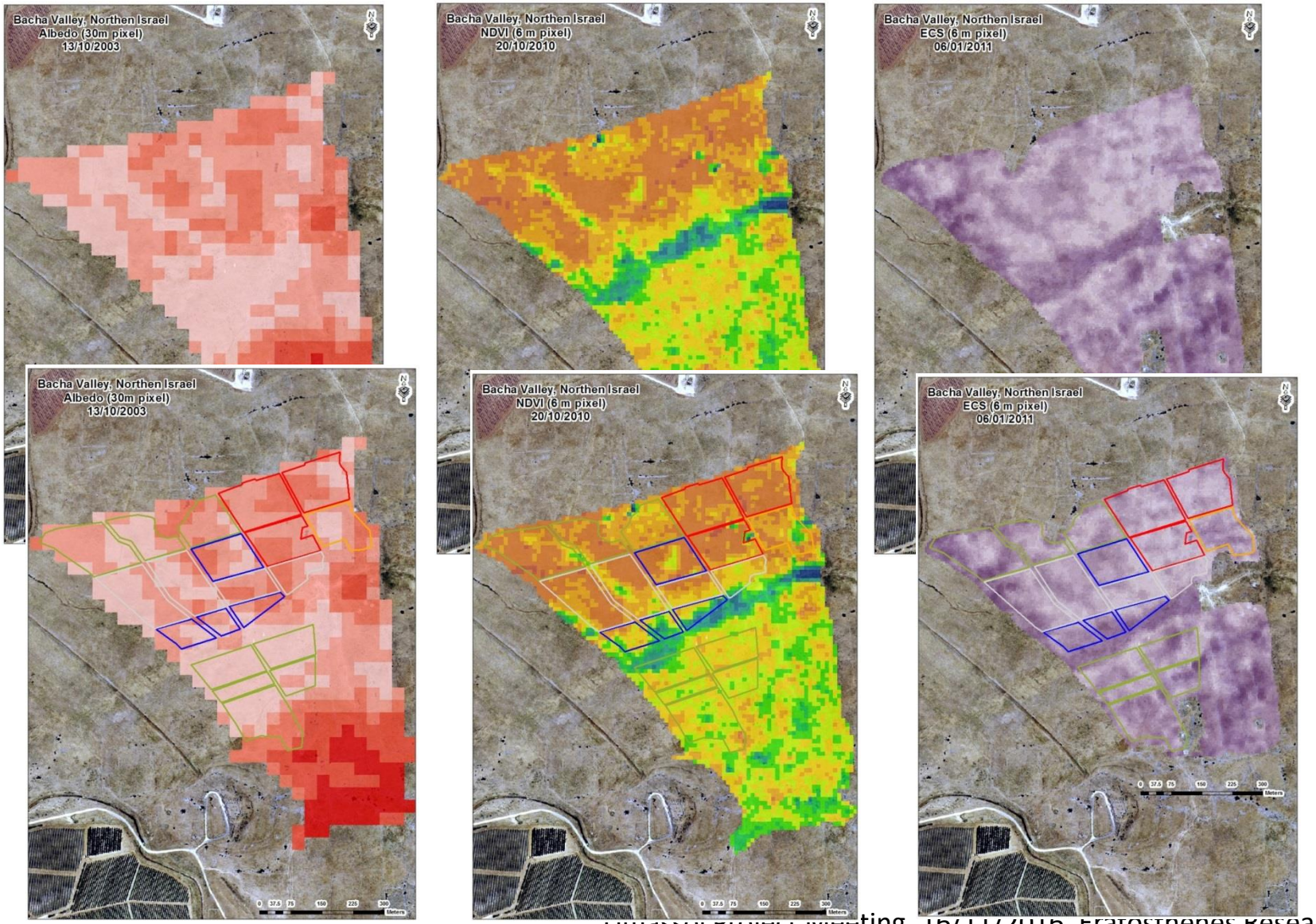
Variance of exposed soil:



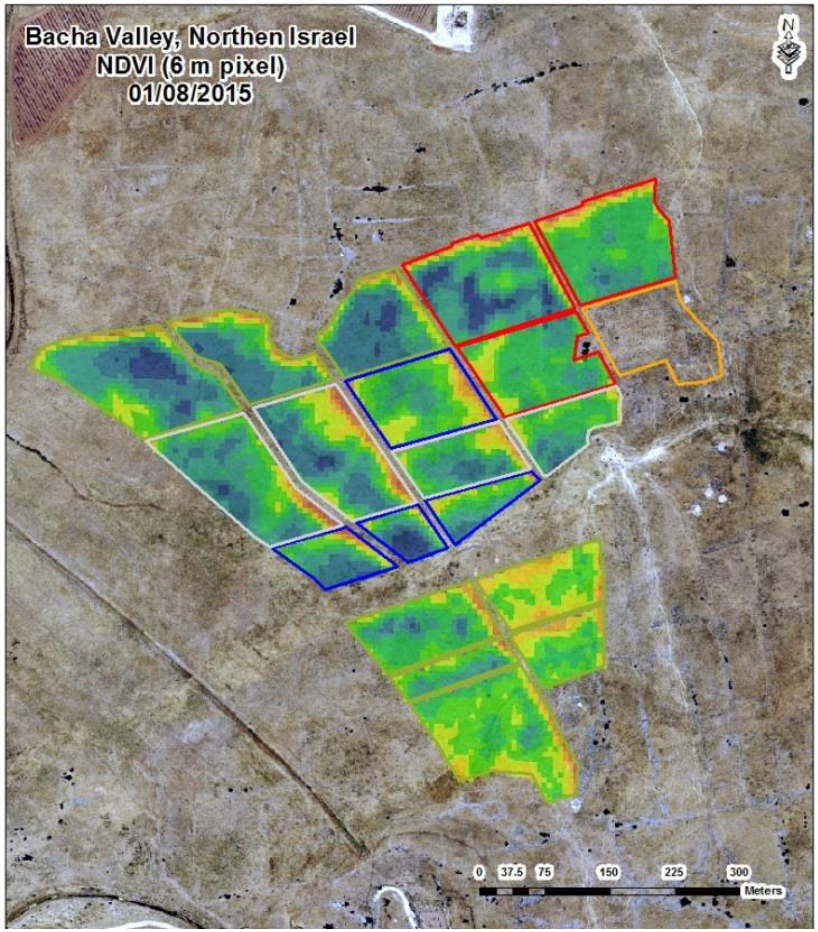




Correlation



NDVI from Satellite, vineyard's second vintage:



Is it Uniform?

Summarize:

- Invest in designing the vineyard ahead using all tools available:
  - Ground soil mapping
  - Satellite images: soil reflectance, NDVI

- After establishment use remote sensing tools to define your variability and monitor improvement.

- Drink lots of good wine!

Open Discussion

Thank you for listening!

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