Earth Observation for Agriculture

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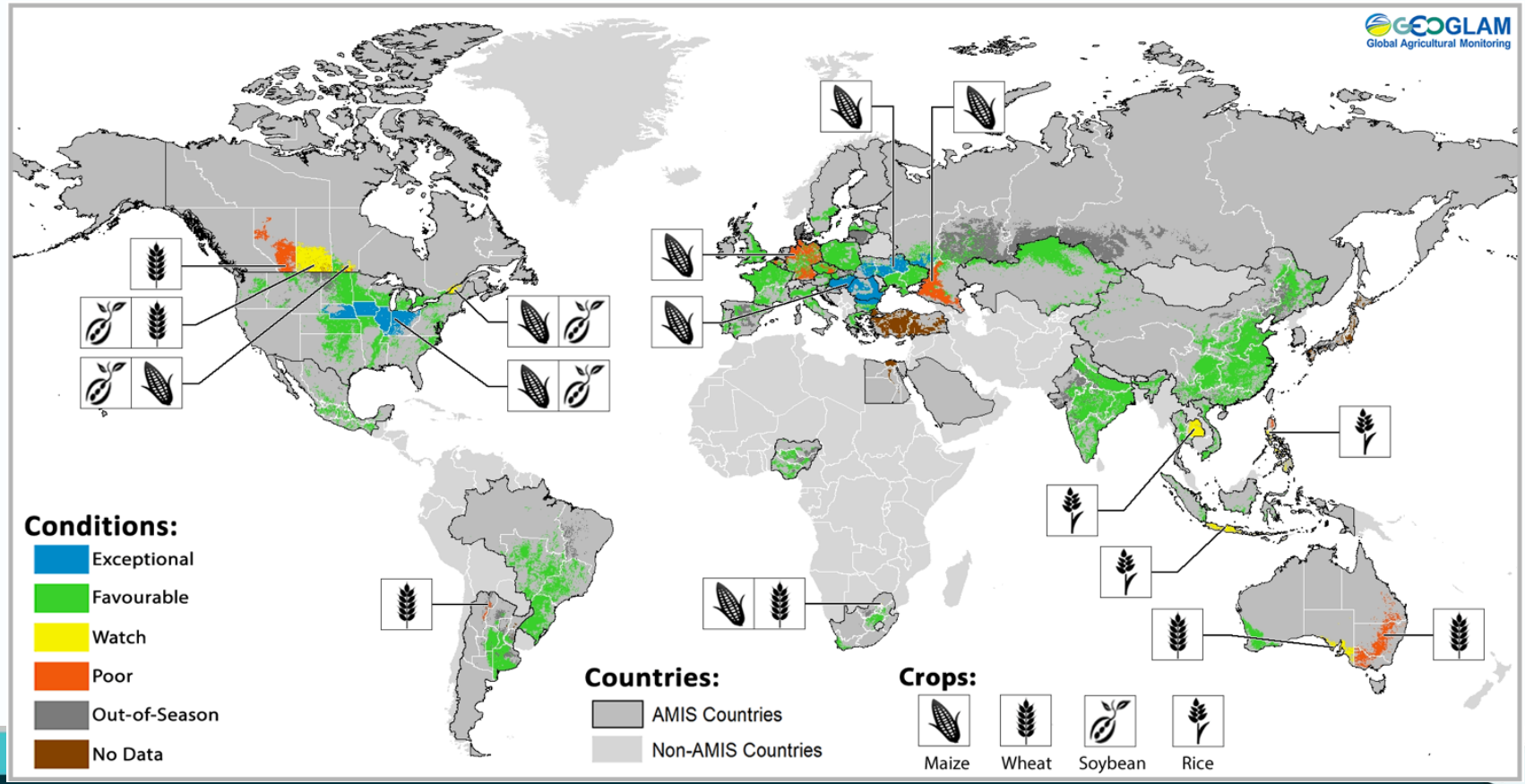
Outline

From Research to Operations

- Best Practice Applications - Operational Crop Mapping Programs
- Examples of latest technologies and applications
- Trends and Opportunities

Global use of EO for Crop Monitoring Growing Rapidly



National-Level use of Earth Observation for Agriculture - China

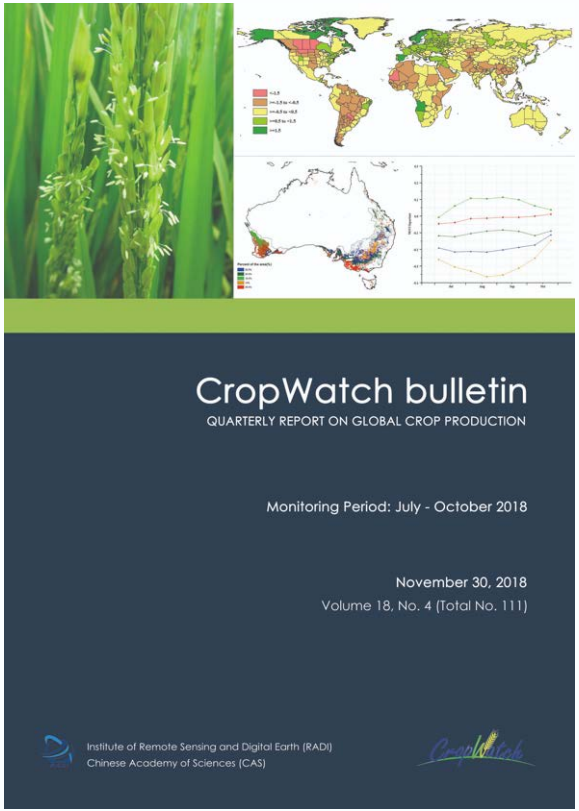
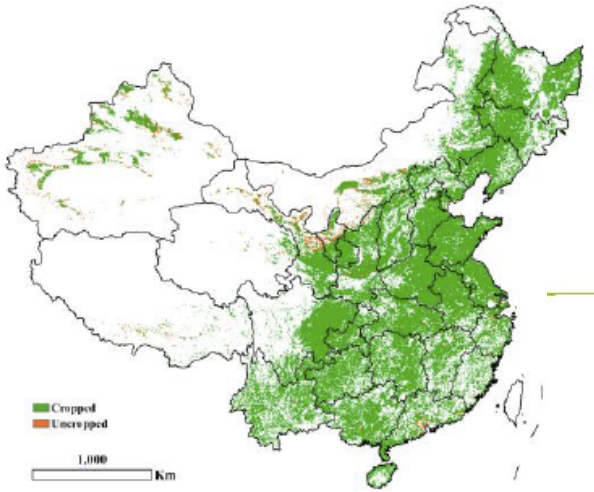
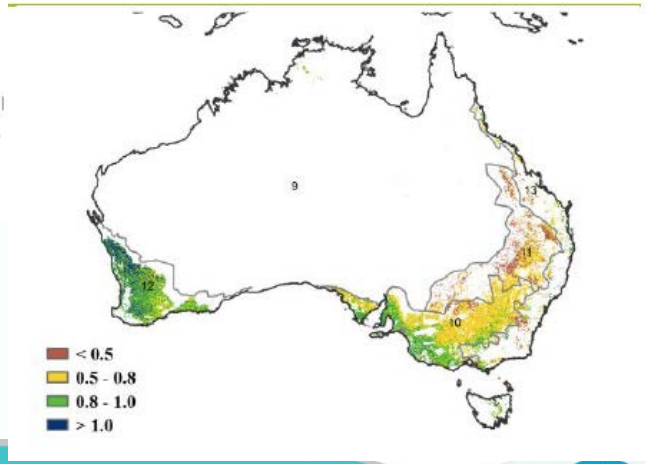
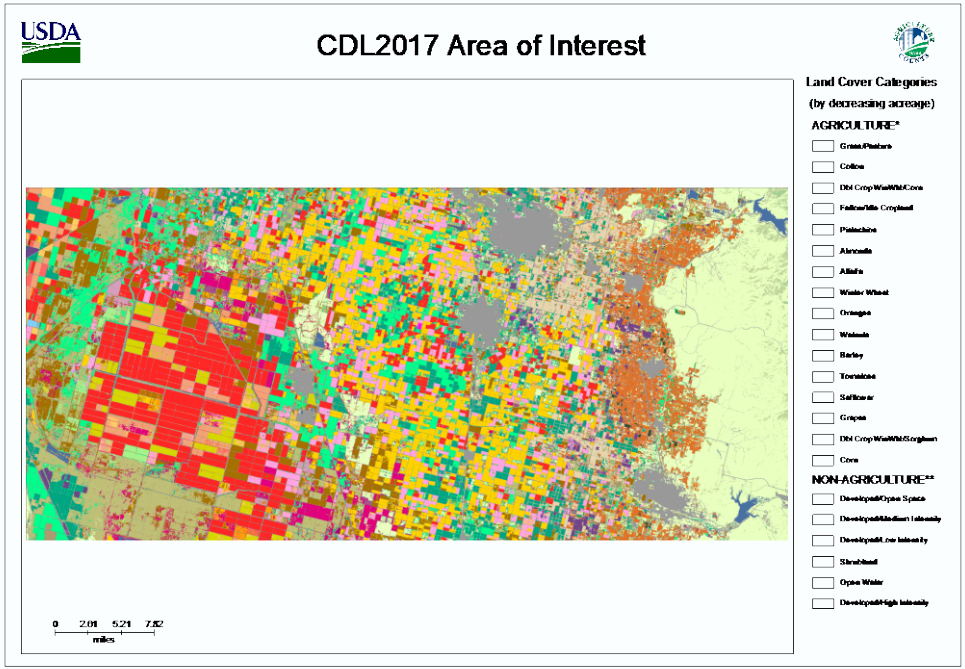


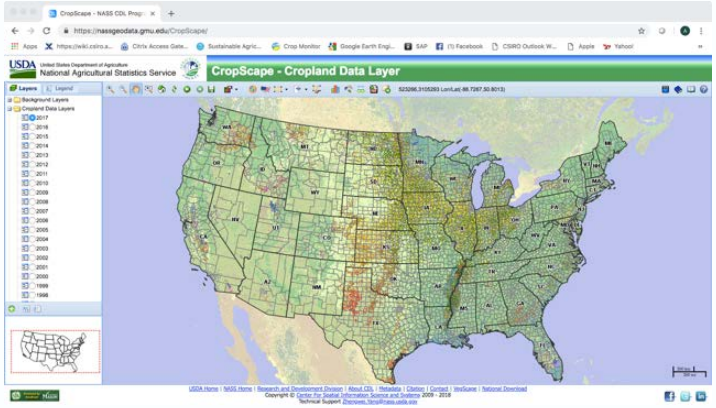
Figure 4.3. China cropped and uncropped arable land, by pixel, July - October 2018

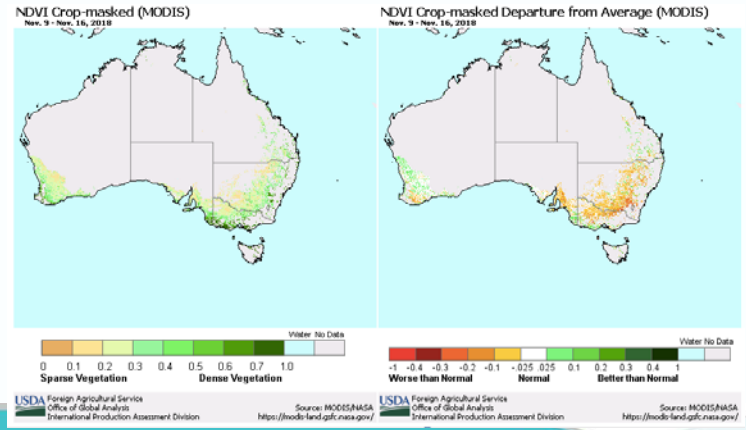




National-Level use of Earth Observation for Agriculture - USA

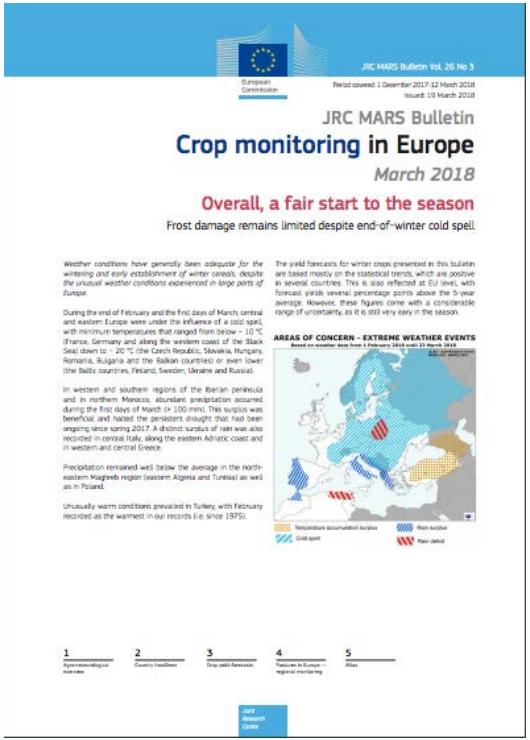


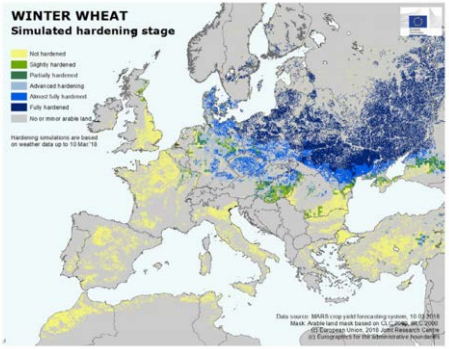




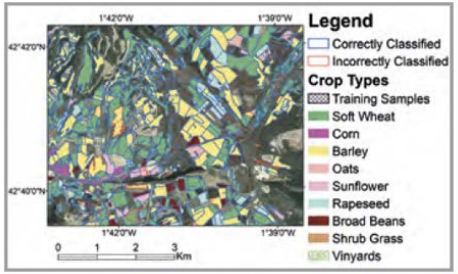
Combined satellite observation data and ground-based assessments

National-Level use of Earth Observation for Agriculture - Europe

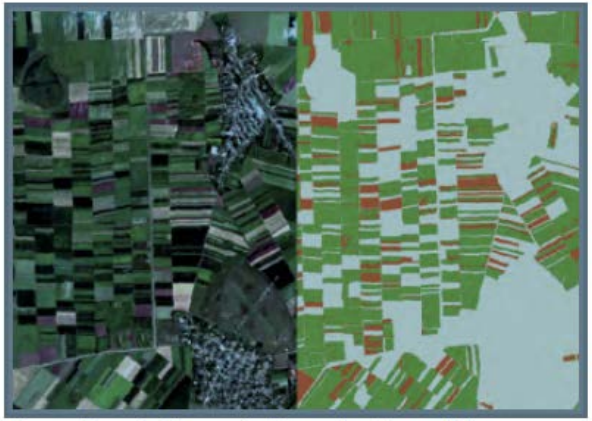




EO Data integrated with crop production models



Crop type classification using time-series of Sentinel-2 imagery, Navarra, Spain 2017

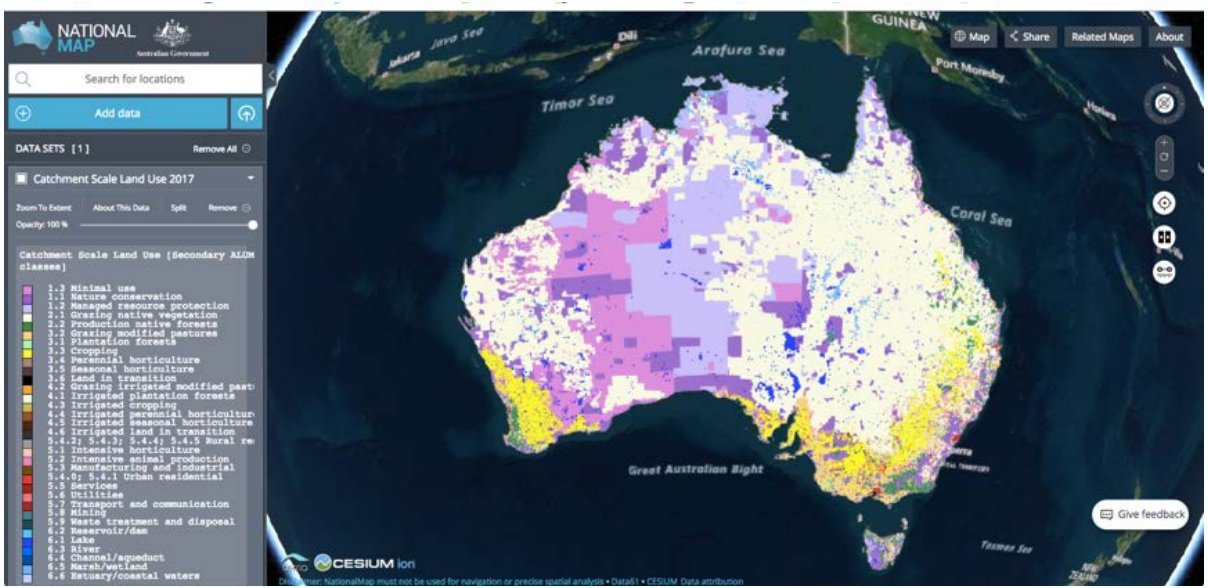


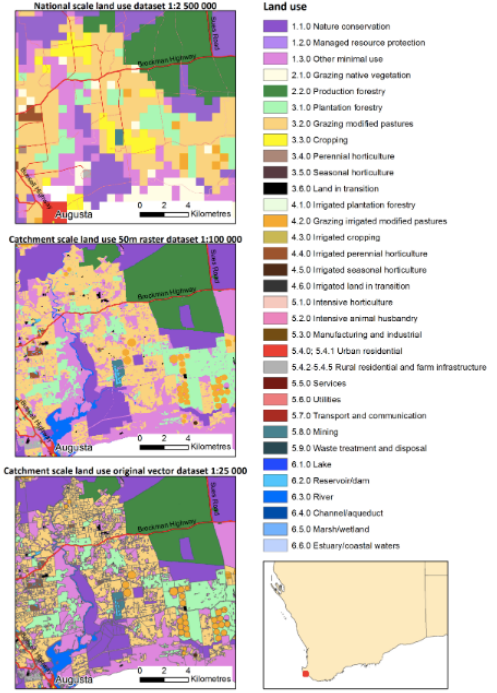
Buzau County, Romania. Example of possible mismatches (right image, in orange) between the declared and observed crop.

Credit :Contains Copernicus Sentinel data [2017]/ESA

Verifying compliance with Common Agriculture Policy/Subsidies

National-Level use of Earth Observation for Agriculture - Australia

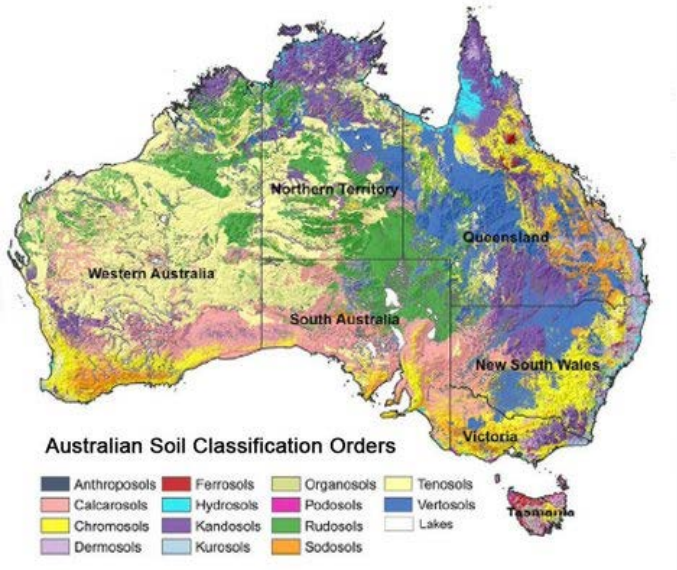




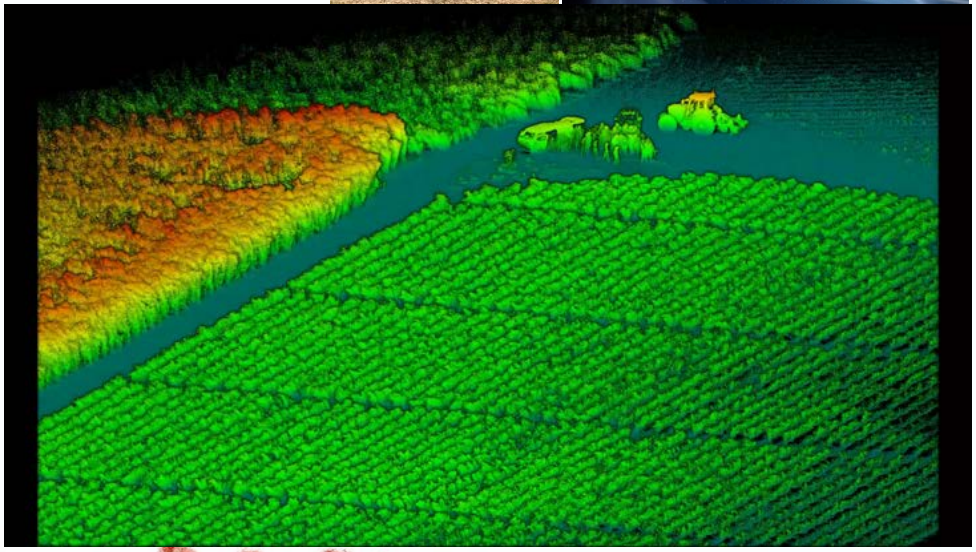
Top. A sample of national scale mapping near Augusta based on data captured at approximately 1:2,500,000 scale provides insufficient detail for use in catchment scale applications. Source: Land Use of Australia 2010-11, Version 5, ABARES 2016.

Source: ABARES – Department of Agriculture and Water Resources

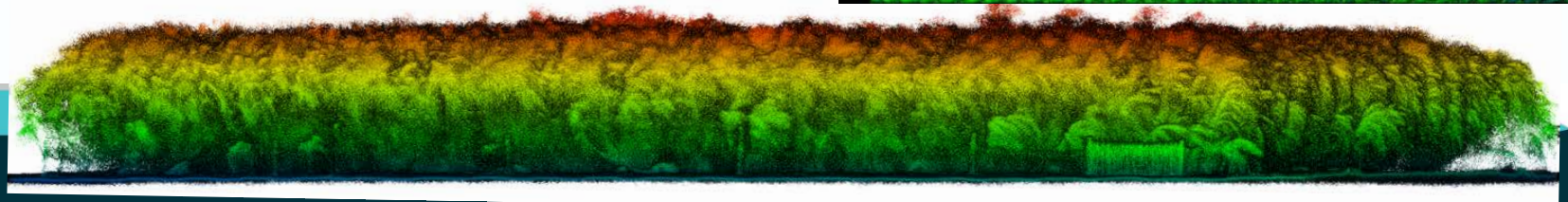
Samples of latest Research and Applications - from Drone to Satellite



Data via Soil and Landscape Grid of Australia



3D Lidar Maps of Sugarcane

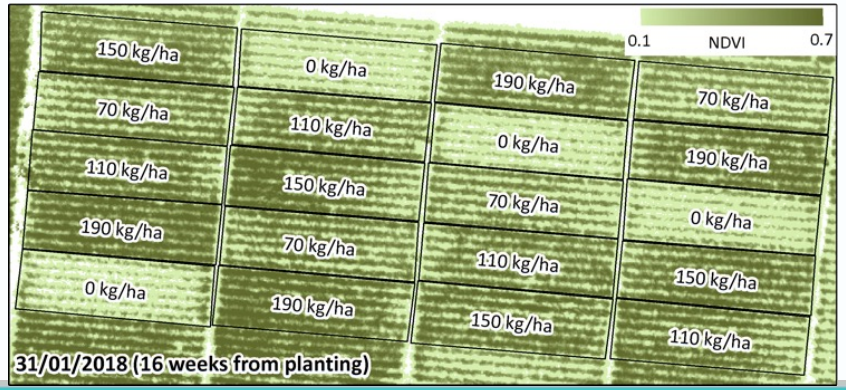


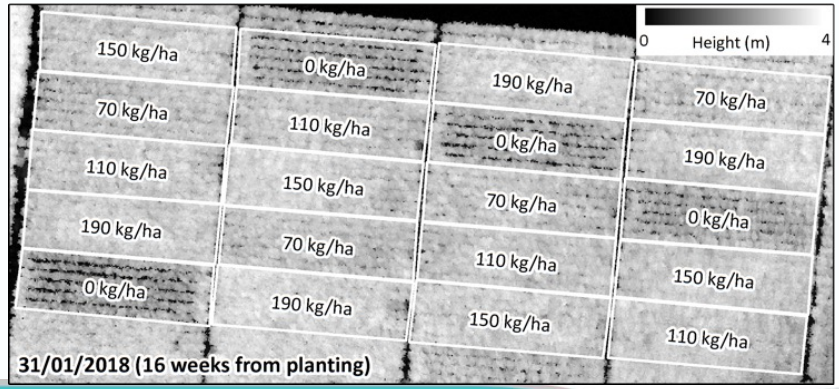
Crop Nitrogen trials w. Lidar

UAS survey every 6 weeks:

- LiDAR scans
- Multispectral imagery
- Leaf N content
- Stalk/leaf biomass (at harvest)

Validation for e.g. NASA's GEDI Lidar Instrument





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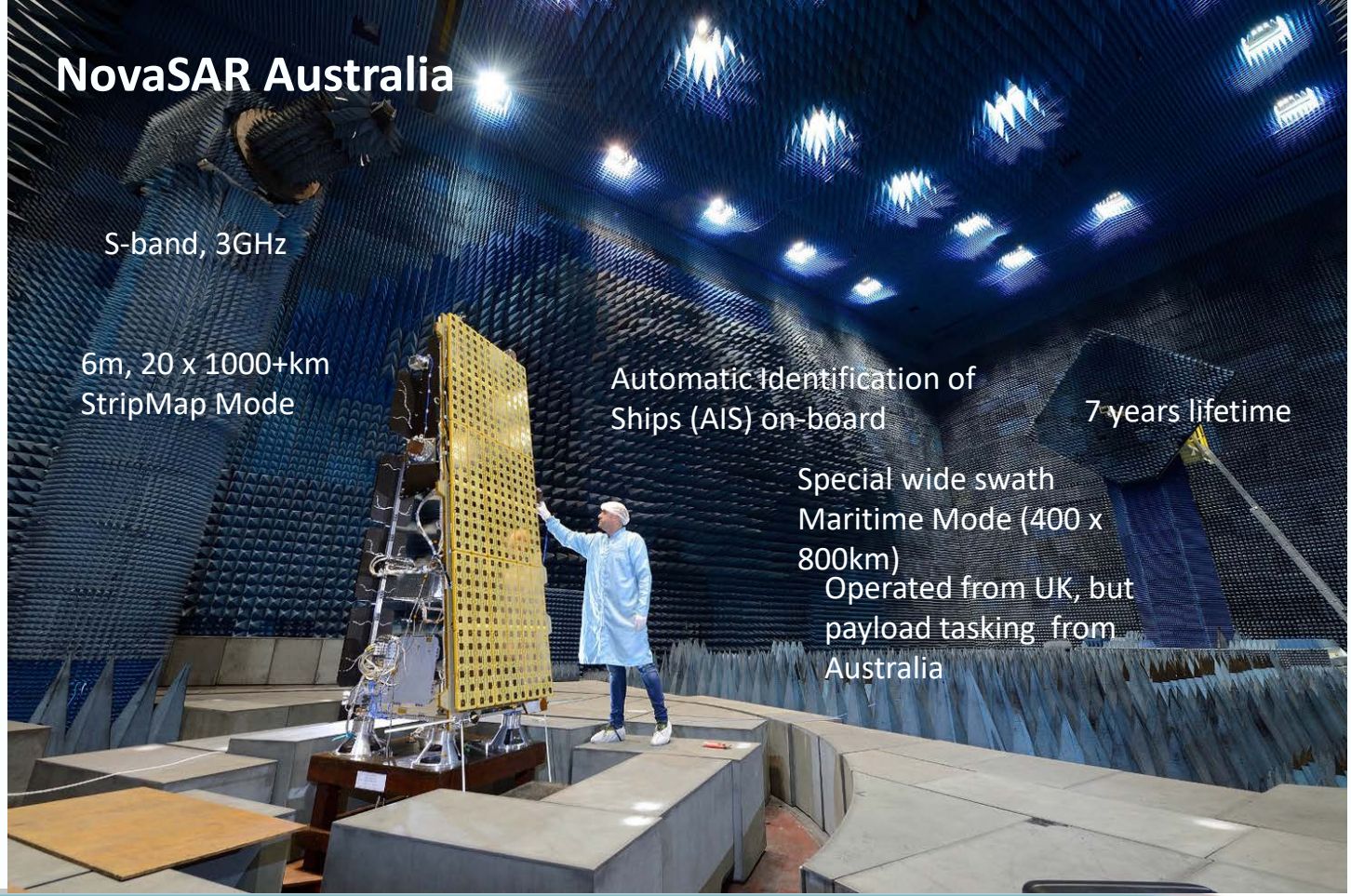
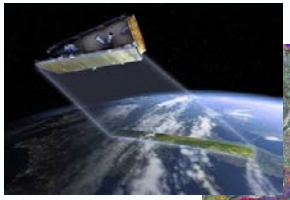
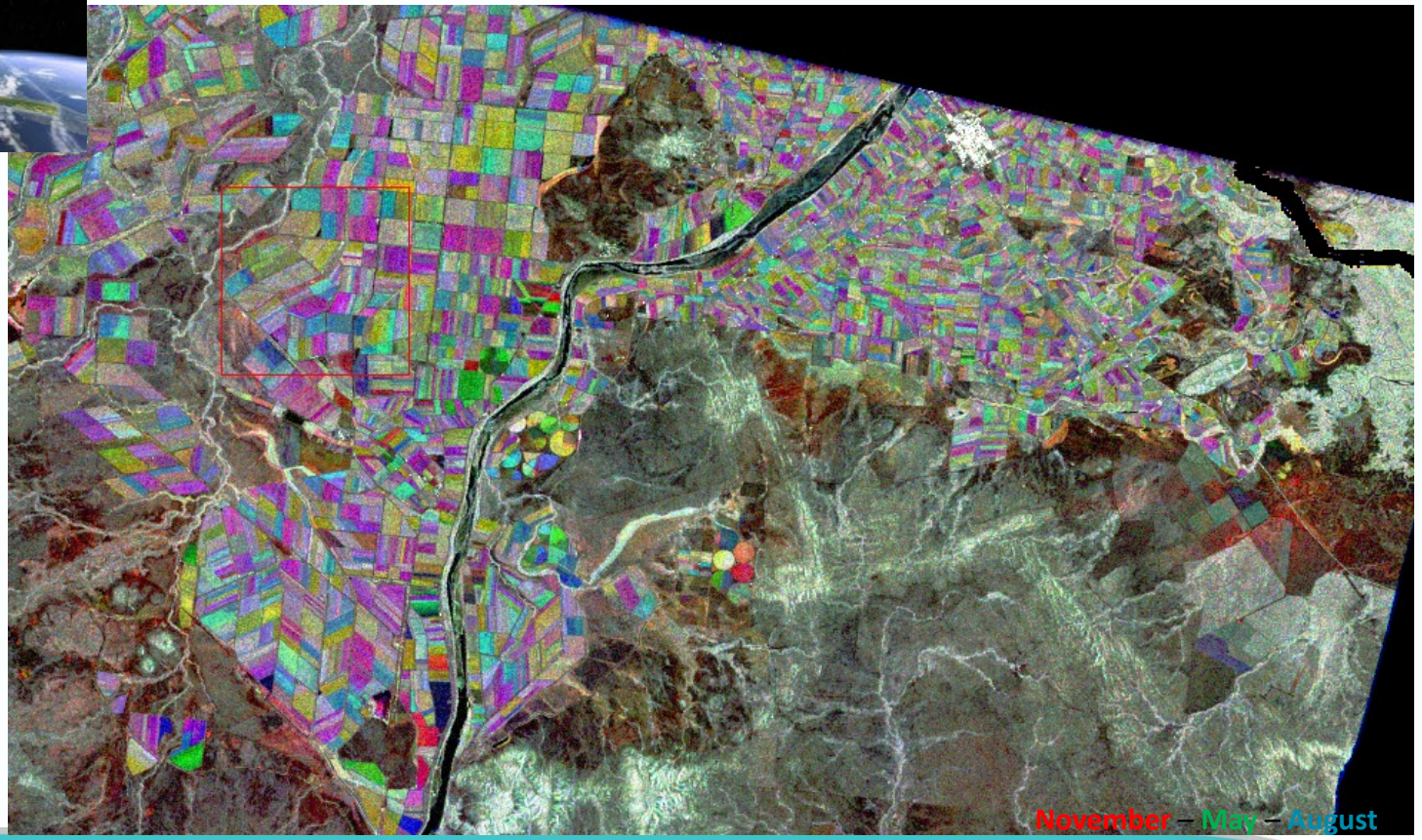
NovaSAR Australia



https://research.csiro.au/cceo/novasar/novasar-introduction/

Use of satellite radar (e.g. NovaSAR) to map crop productivity in cloudy regions…





Sugarcane fields QLD- Multi-temporal Sentinel-1 image of VH backscatter

Trends and Opportunities

- We now have free access to petabytes of well curated, public satellite data, world wide, on various platforms (e.g. Digital Earth Australia, Amazon, Google, Copernicus Regional Hub, etc.)
  - *Companies will be able to access and bring their own analytics tools to do their own data analytics on these platforms on a 'pay-per-use' model.*
- New, customized sensors being developed to address specific crop/soil/water measurement needs - from drones or satellites.
- Several new "CubeSats" under development.
- It is now easier to provide fast turnaround (less than 6 hrs) between satellite data acquisition and delivery of tailored information to users (or their equipment !).