science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

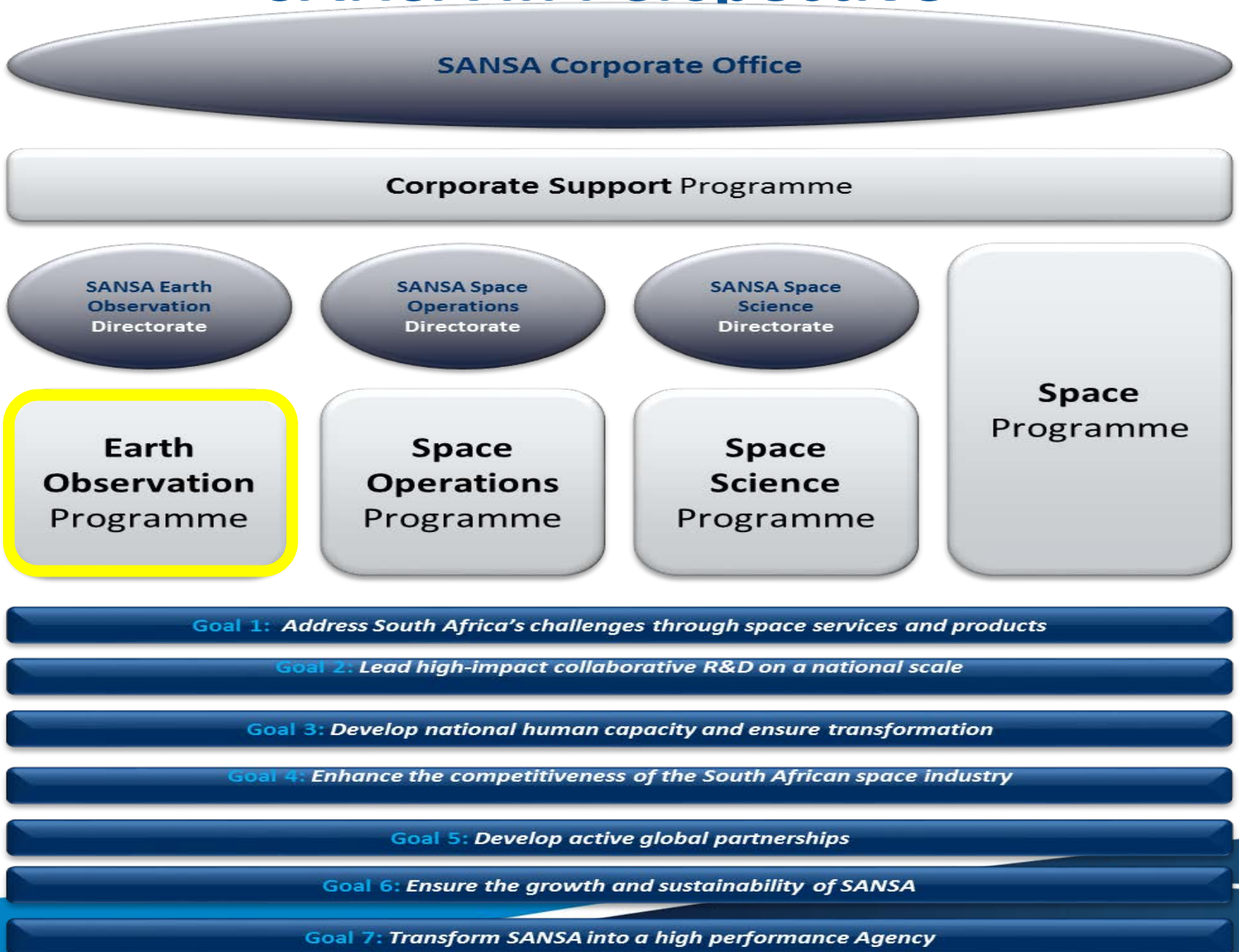
sansa
SOUTH AFRICAN NATIONAL SPACE AGENCY

Earth Observation Data & Services in support of the WEF Nexus

Workshop – Hilton, 21-23 Nov. 2016

Dr Clement Adjorlolo

SANSA in Perspective



SANSA Earth Observation Programme

Earth Observation

- ✓ Image acquisition
- ✓ Image distribution
- ✓ Value-added services

Data Base Processing & Distribution

Data Acquisition

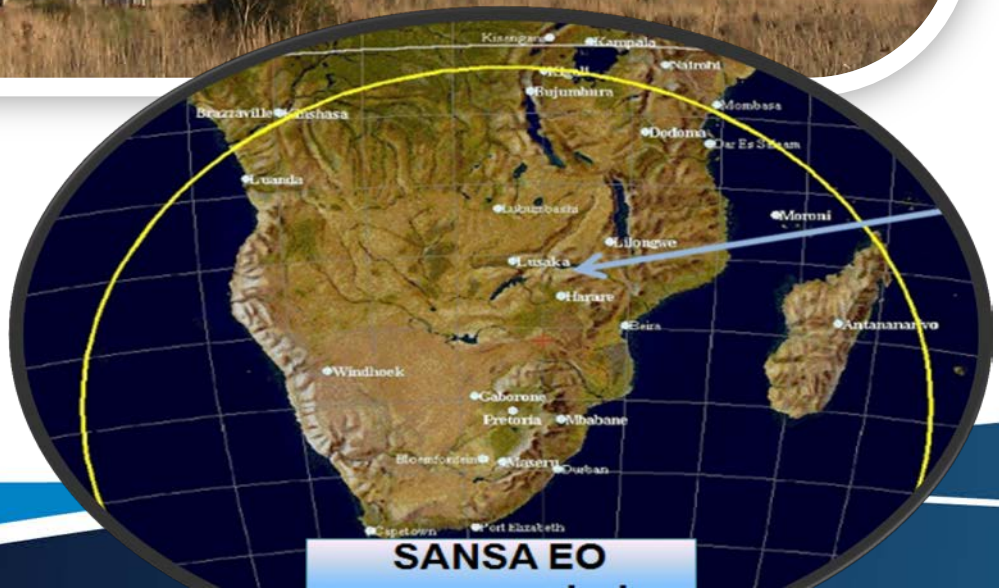
Decision Support Tools

Direct reception sensors

Data received by SANSA Space Operations demodulators ….

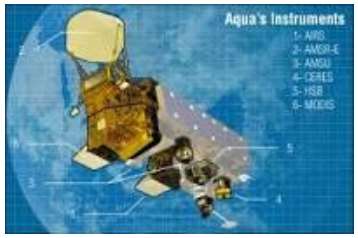
Ingested, archived and catalogued by SANSA Earth Observation ground segments

- SPOT 6 & 7.
- SPOT 5.
- Landsat 8
- Land sat 7
- MODIS (Aqua and Terra)
- NOAA AVHRR
- NOAA AVHRR
- CBERS 4

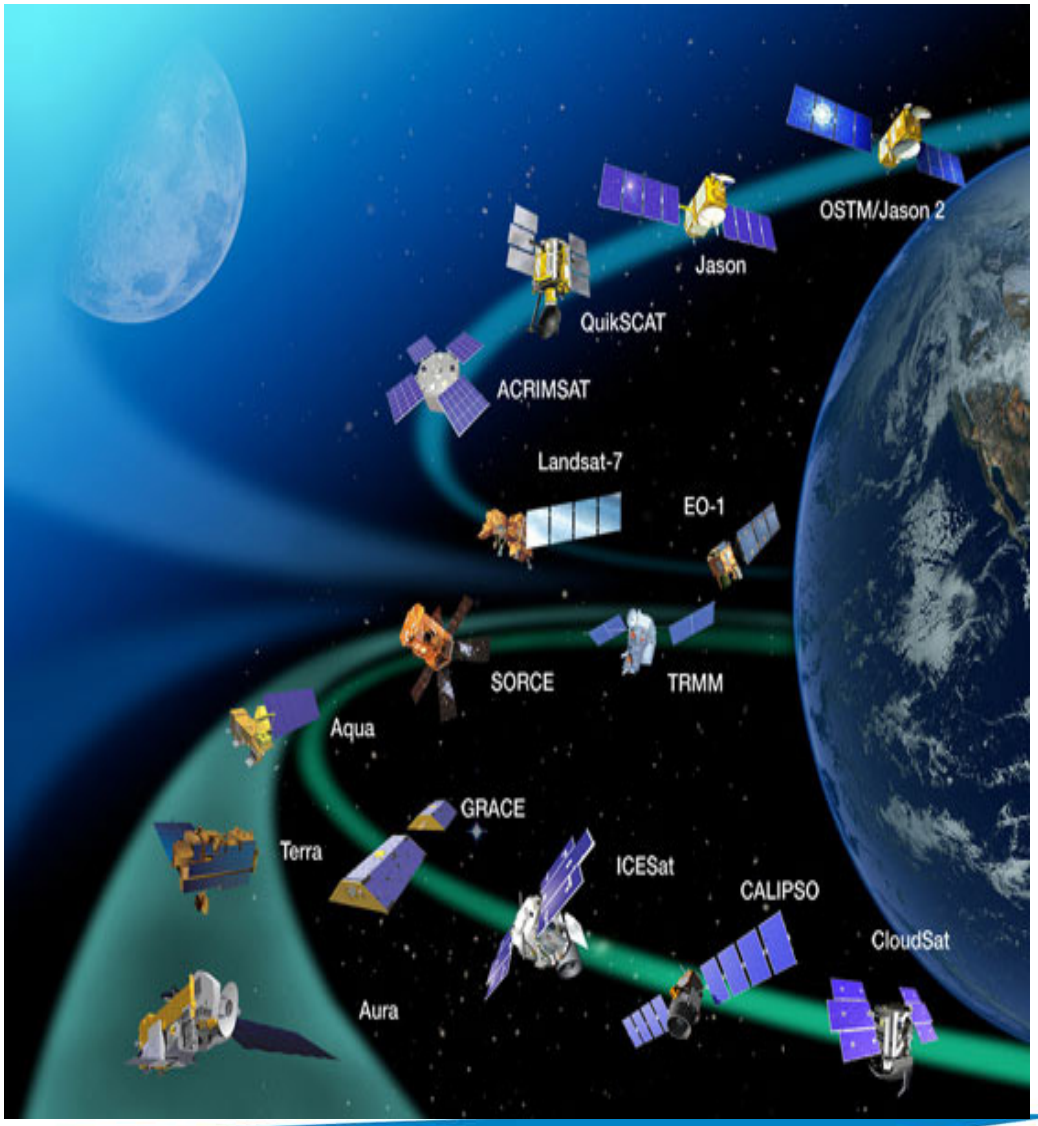


Distributor of other commercial data

- RADARSAT-1
- GeoEye
- Ikonos
- QuickBird
- World View (1,2,3..)
- PLEIADES
- TerraSAR- X
- RAPIDEYE
- ALOS-2



Transforming Terabytes of EO-Data into Information



The Big Picture

Problem:
Status Quo
Uncertainty in monitoring and risk assessment using traditional technologies and methods

Satellite data converted into actionable information can assist optimise production management operations

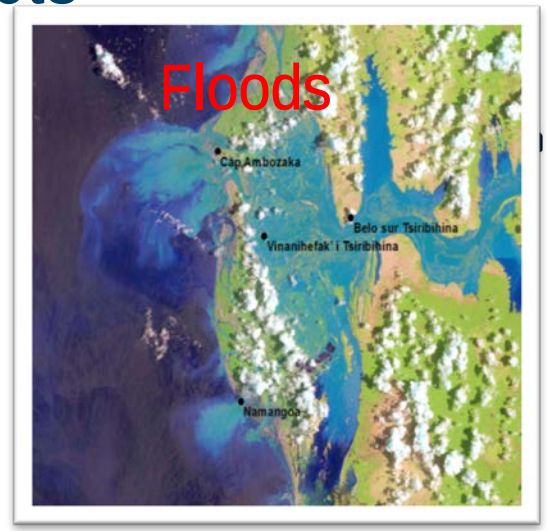
Solution:
Enhancing existing methods & techniques

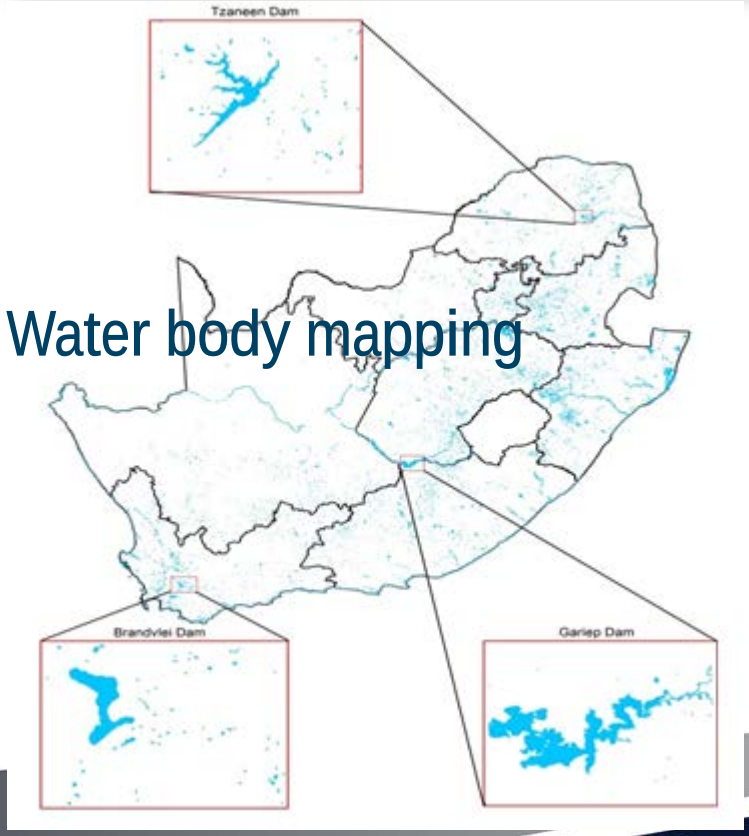
State of the Art Monitoring Services

Outcomes:
move projections beyond current capacity

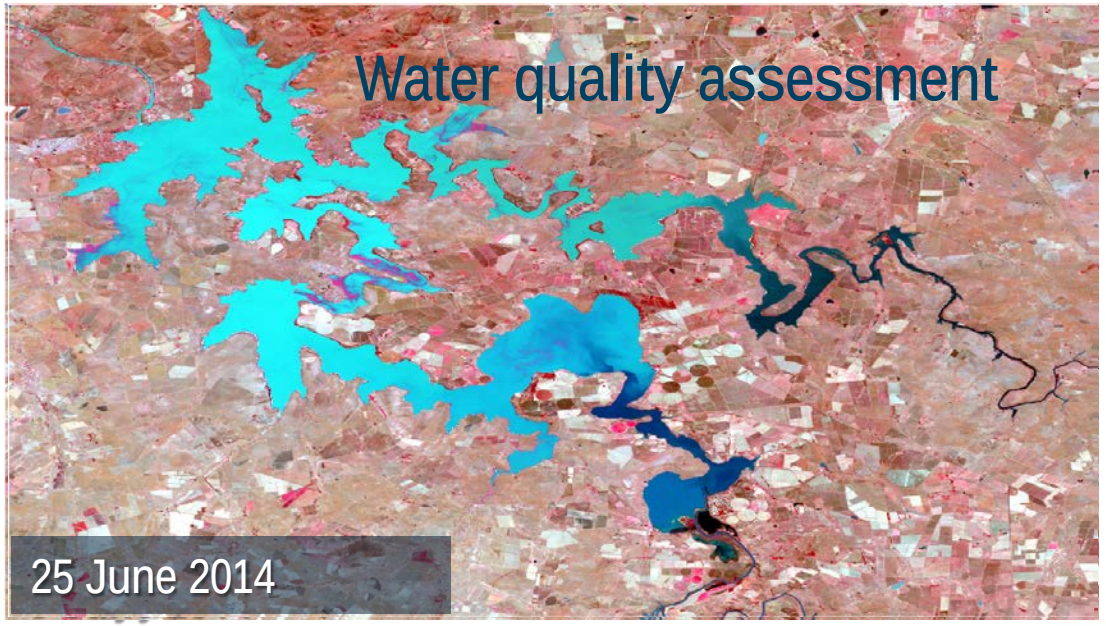
- WEF Production Monitoring & Prediction
- **Risk Assessment & Reporting**
- **Partnerships & Collaborations**

National Value Added Products



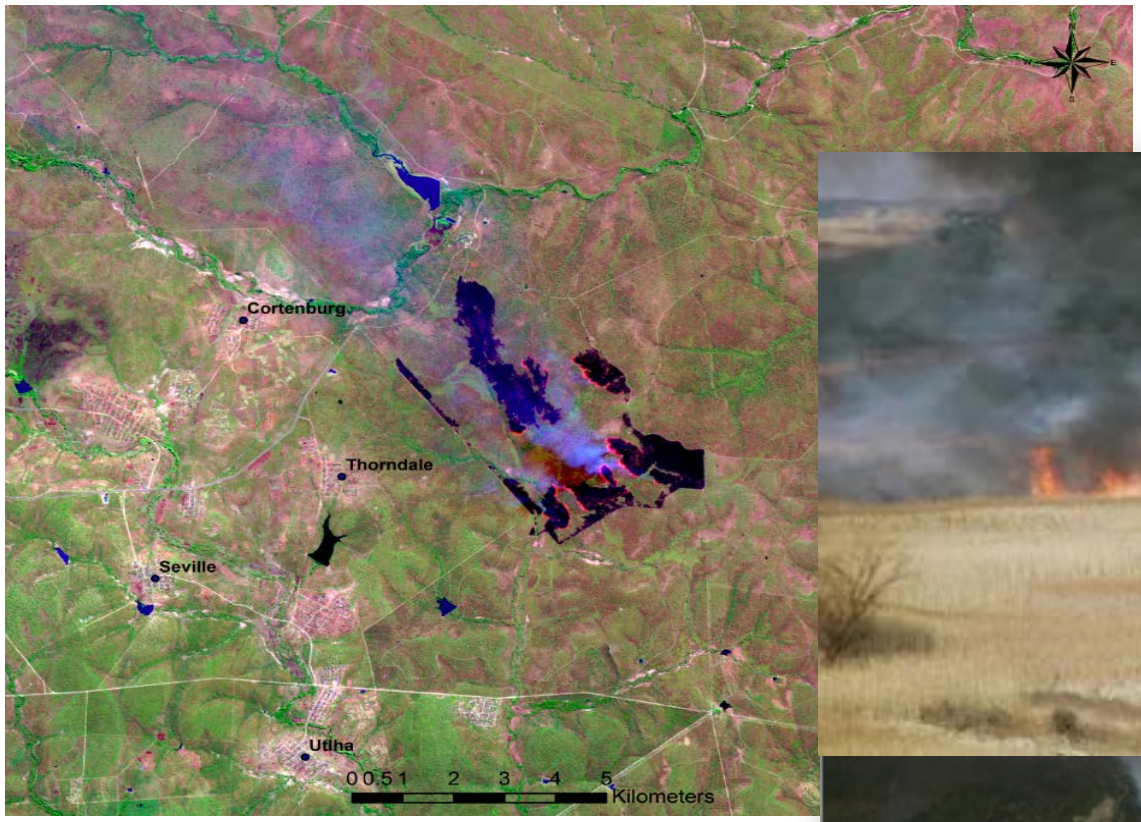


Water body mapping



Mining applications

Fire Disaster Management Applications

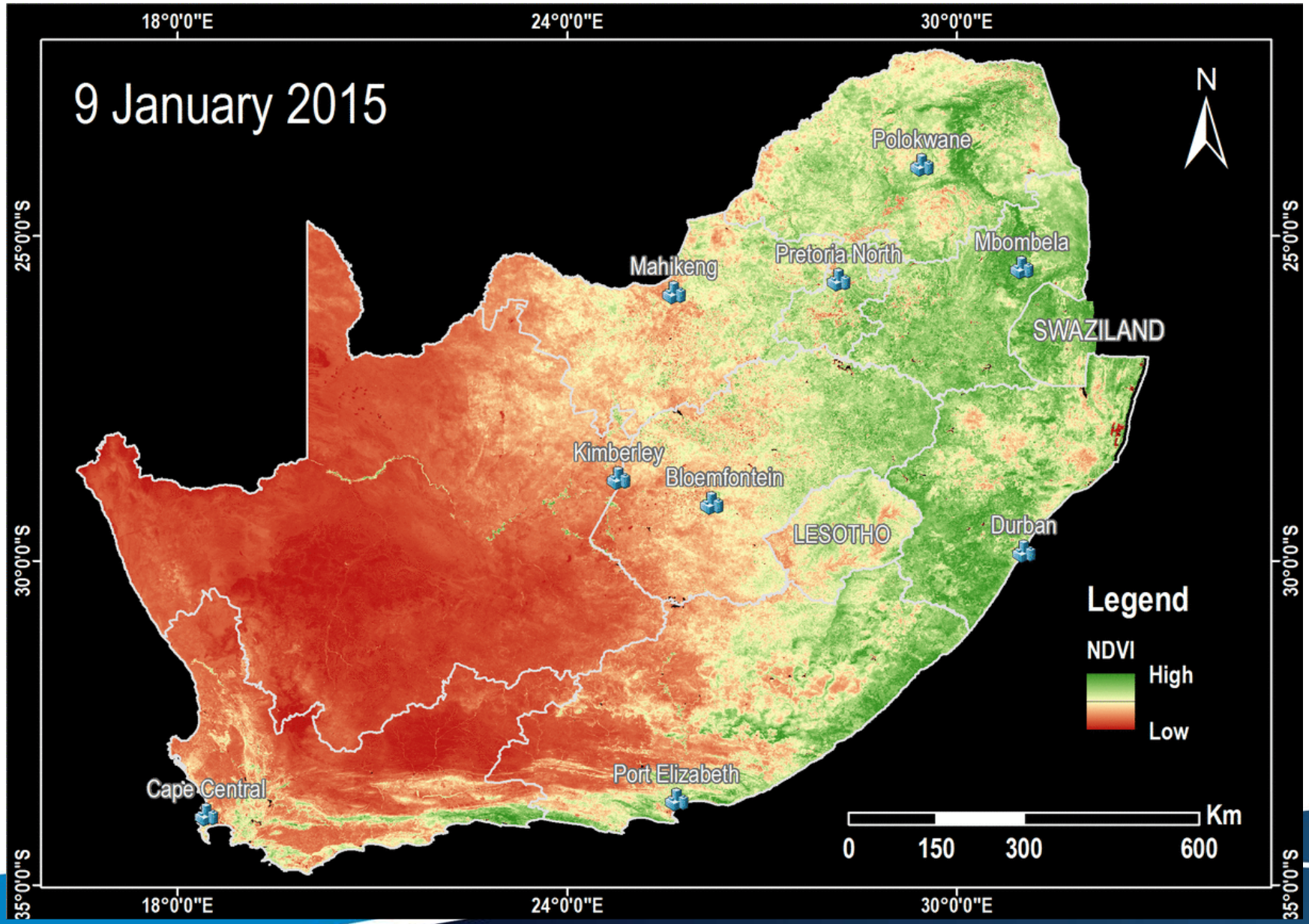


- Fire detection
- Fire risk mapping
- Post fire assessment

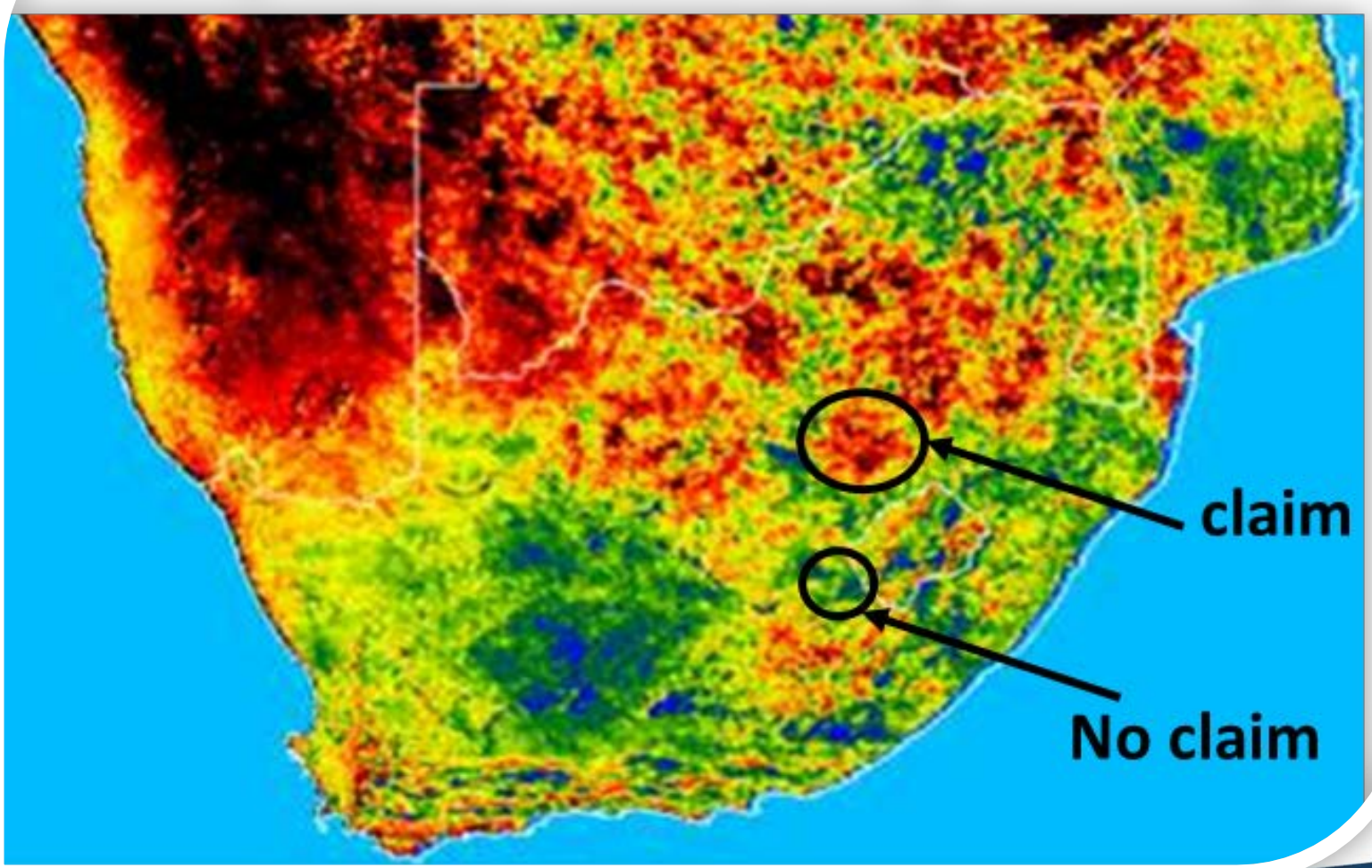
Advance Fire Mapping System (AFIS) – Fire detection http://www.afis.co.za/

Application examples

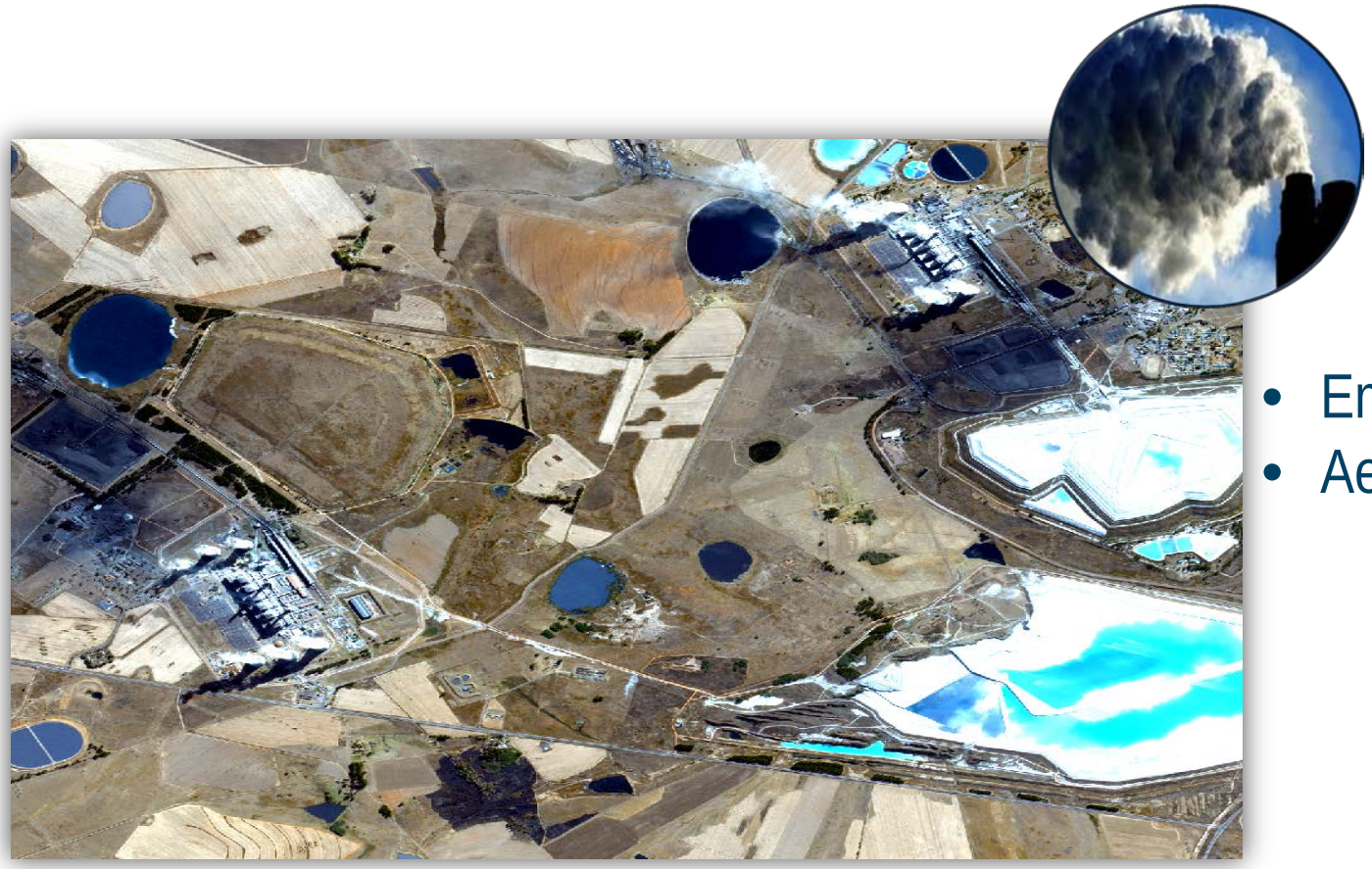
Long-term time Series of Satellite-derived Vegetation Indices



Application examples



Air quality applications

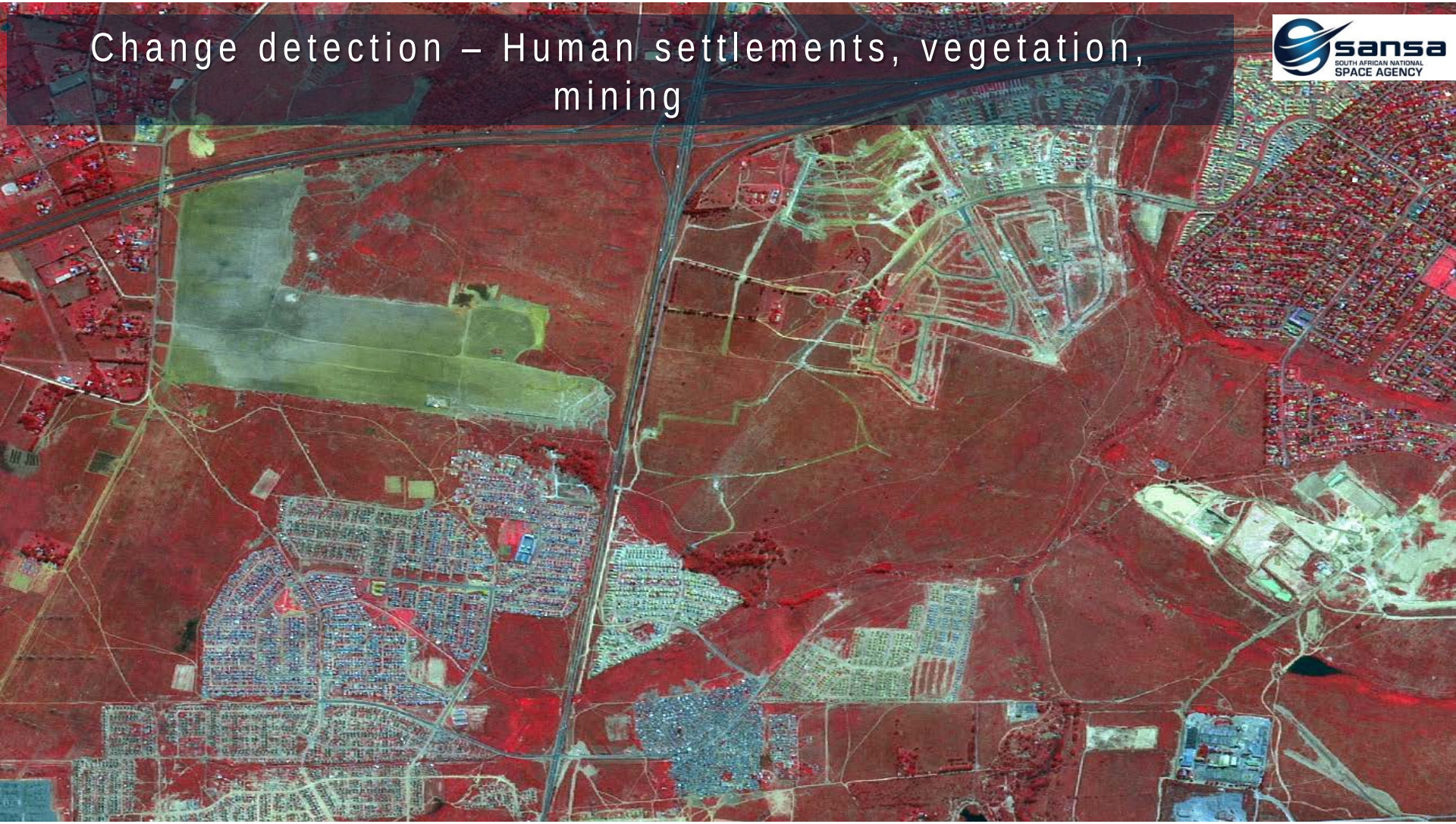


- Emission inventory
- Aerosol concentration

Spatial planning applications

- Community development
- Infrastructure planning
- Service delivery
- Monitoring
- Policy formulation and implementation
- Urbanisation

Change detection – Human settlements, vegetation, mining

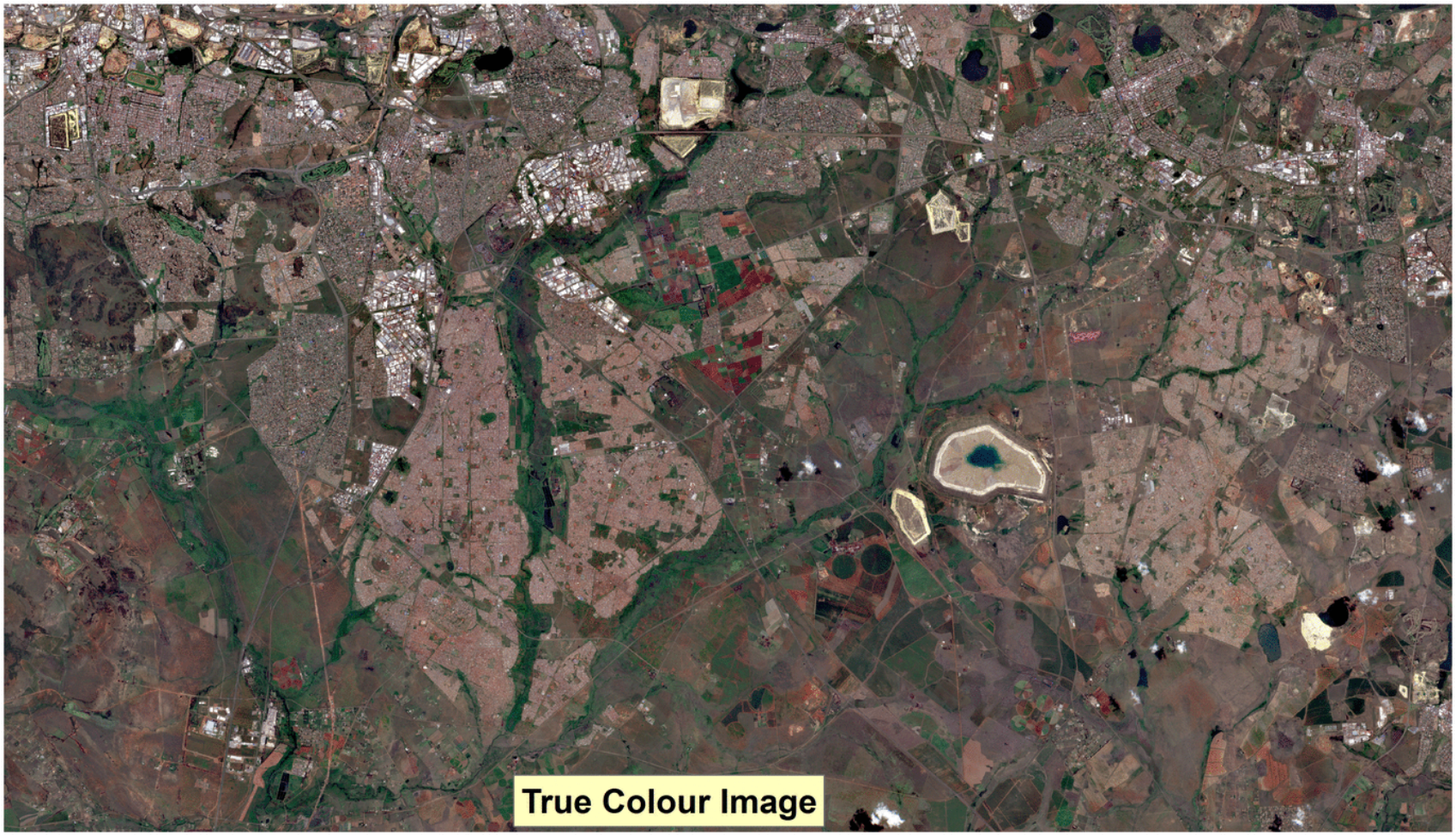


Agriculture/vegetation applications

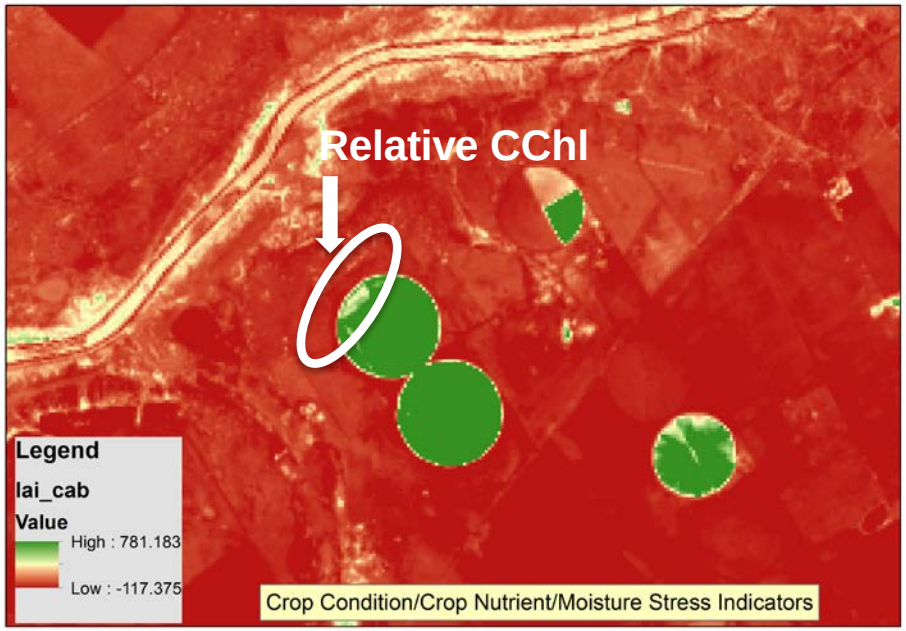
- Vegetation condition
- Land capability
- Yield estimation
- Deforestation
- Vegetation management

Monitoring using satellite-derived parameters

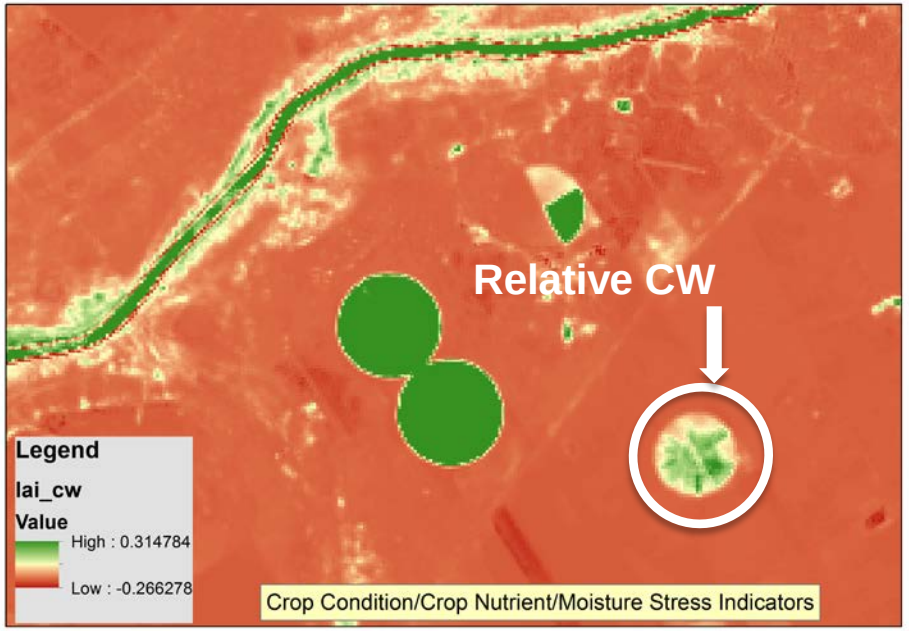
FAPAR; Fraction of Vegetation Cover; Fraction of Soil; Leaf Area Index (LAI); Leaf Chlorophyll Content (CHL); Leaf Water Content



Relative Canopy Leaf Chlorophyll stress

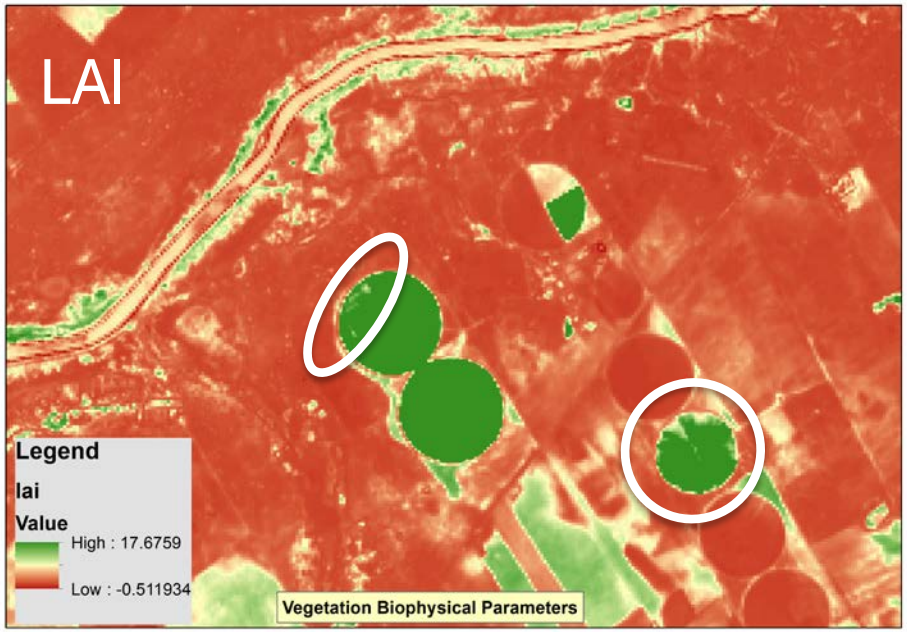


Relative Canopy Leaf Water Stress



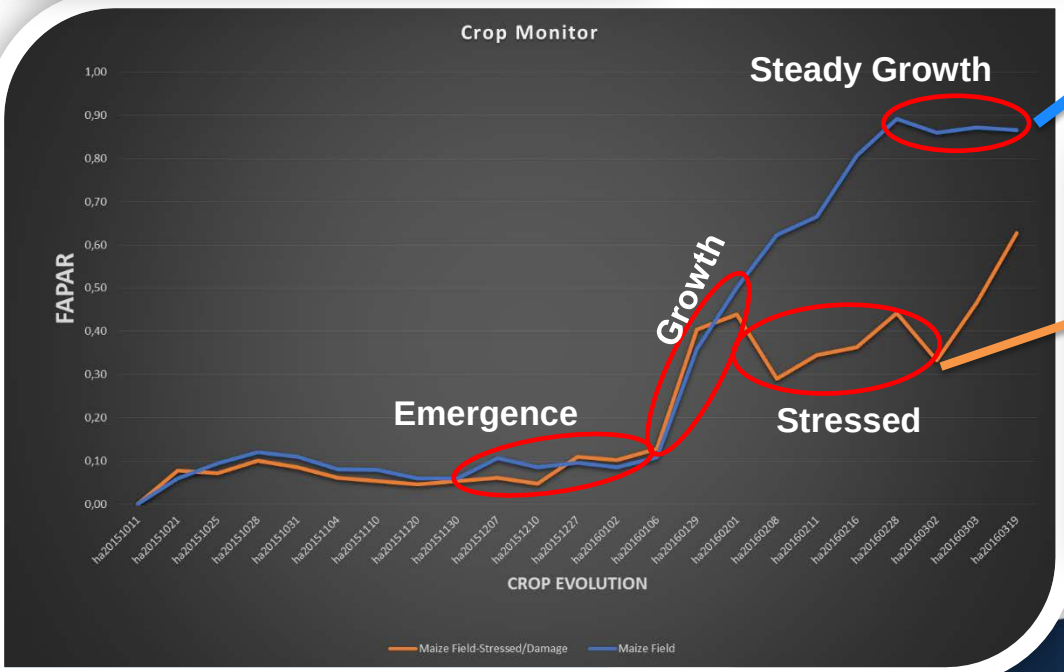
Summary

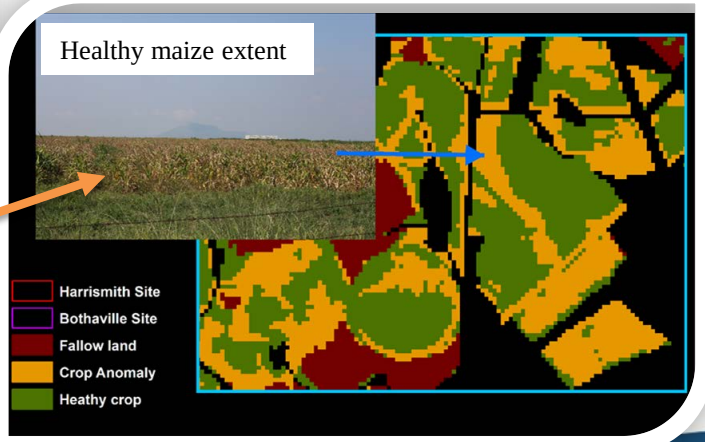
The two crop fields assessed above displayed symptoms of vegetation stress due to low relative canopy **leaf chlorophyll (CChl)** and relative canopy **leaf water (CW)** values. These two fields were analyzed using retrieved biophysical parameters from sentinel 2 image. The CChl and CW were modelled with the Leaf Area Index (LAI) values to assess whether the low values were, in fact, a cause of stress or a result of a sparse vegetation cover/density.

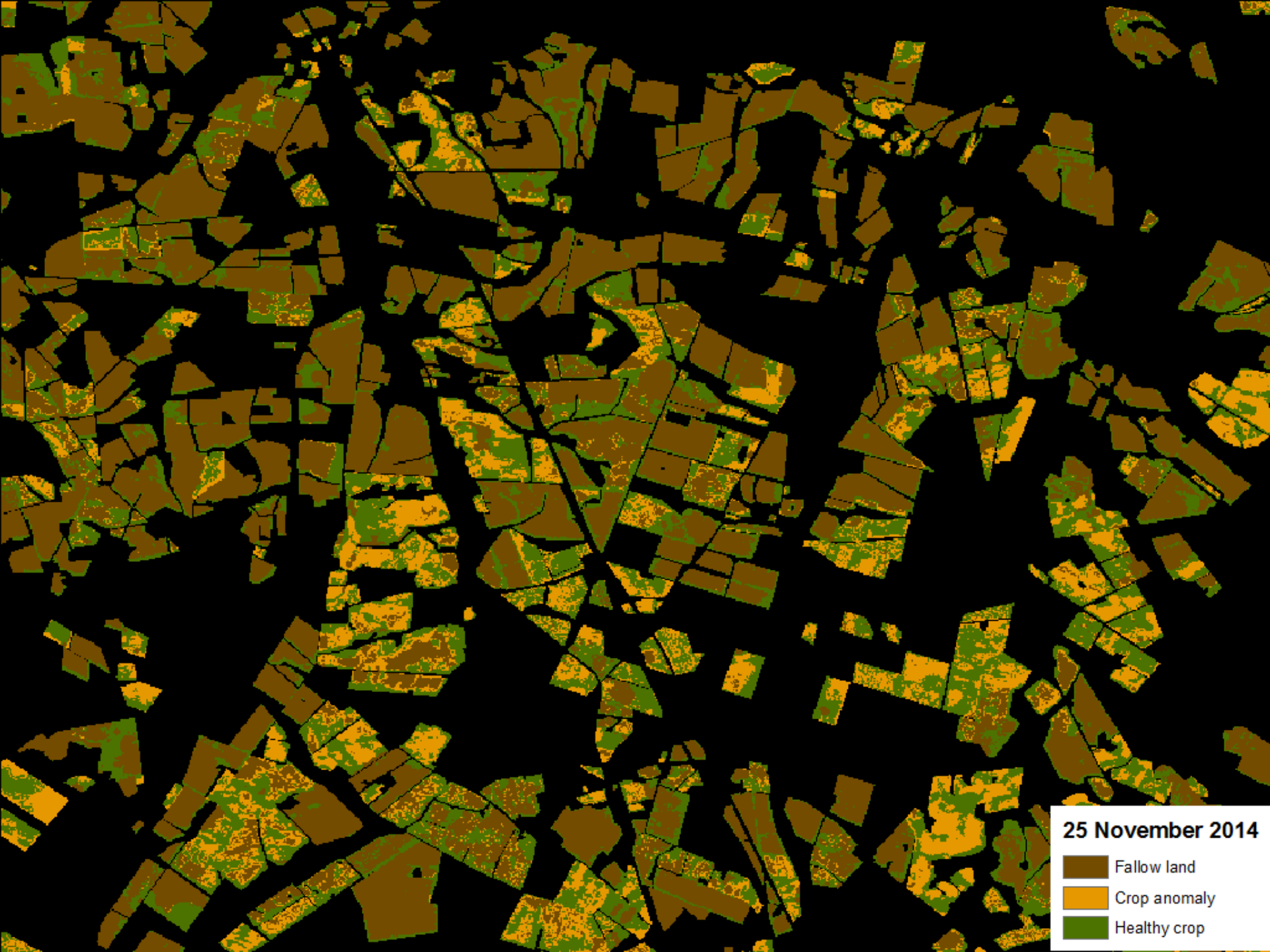


Application examples

Field verification & Validation

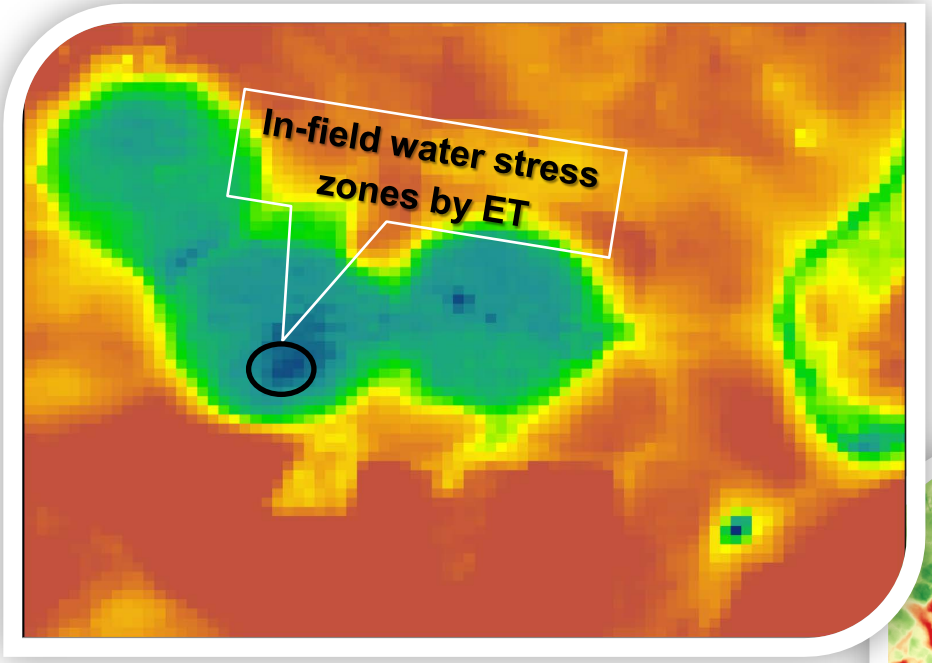




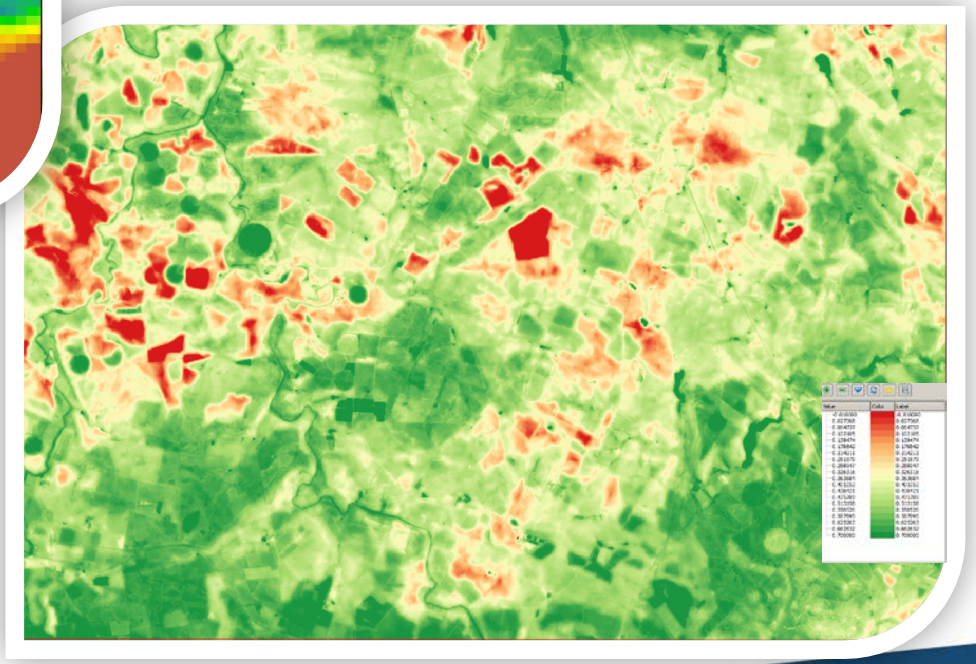

25 November 2014
Fallow land
Crop anomaly
Healthy crop

Application examples

In-field crop anomaly detection by ET and LAI



Actual ET calculated from Landsat-8 data acquired over center-pivots irrigated corn field near Harrismith. Image date: 25-09-2015



Users & Partnership: National and Regional Stakeholders

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REPUBLIC OF SOUTH AFRICA

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Department: Defence
REPUBLIC OF SOUTH AFRICA

agriculture, forestry & fisheries
Department: Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

the dpsa
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REPUBLIC OF SOUTH AFRICA

human settlements
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Department: Environmental Affairs
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water & sanitation
Department: Water and Sanitation
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Earth Observation Users

International Partnerships

USGS
science for a changing world

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DLR

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AMESD

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AIRBUS

RCMRD

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JOINT RESEARCH CENTRE
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Thank You