

Update on Capacity Building Activities at DLR's Earth Observation Center EOC

WGCapD-3 Annual Meeting, Dehradun, India

Dieter Hausamann

24 April 2014



Wissen für Morgen

Contributions from DLR-EOC:

Land Surface:

A. Müller

C. Künzer

U. Geßner

Applied Spectroscopy:

C. Fischer

Georisk & Civil Security

M. Mück

F. Hummel

(future) UN-SPIDER GER

J. Post

RCMRD

Dr. Tesfaye Kormé,
Direktor RS Department
& Deputy Director



Agenda of the meeting between Regional Centre for Mapping and Resources for Development (RCMRD) and German Aerospace Center (DLR)

Date: 24 March 2014, 13:30 – 16:45

Place: EOC building 122, room 0126 Newton


Monday, 24 March 2014

- 13:30 – 13:40 Arrival and Welcome
- 13:40 – 13:50 Introduction of DLR Earth Observation Center (EOC) and German Remote Sensing Data Center (DFD) - (D. Klein, DFD Directorate)
- 13:50 – 14:10 Introduction of RCMRD
(Farah / Korme, RCMRD)
- 14:10 – 14:15 Remote Sensing of the Land Surface at DFD
(A. Müller, Head of Department of Land Surface)
- 14:15 – 14:30 EO Applications in the Context of Land Surface Dynamics
(C. Künzer & U. Gessner, Dep. of Land Surface, Team Land Surface Dynamics)
- 14:30 – 14:40 EO Applications in South Africa
(C. Fischer, Dep. of Land Surface, Team Applied Spectroscopy)
- 14:40 – 14:50 Risk Assessment in Southern and West Africa
(M. Mück / F. Hummel, Dep. of Georisk and Civil Security)
- 14:50-15:00 - *Short coffee break* -
- 15:00-15:30 Wrap-up and discussion on possibilities for cooperation
in the field of land surface EO-applications
- 15:30 – 15:45 CEOS Working Group on Capacity Building and Data Democracy (WGCapD)
and discussion on possibilities for cooperation in the field of capacity building
(D. Hausmann, DLR_School_Lab)
- 15:45 – 16:45 Visit to facilities/labs of German Remote Sensing Data Center (DFD)

EO Applications in the Context of Land Surface Dynamics

Team Land Surface Dynamics
Department Land Surface
DLR-DFD

U. Gessner, K. Knauer, C. Kuenzer, A. Müller



Knowledge for Tomorrow



SPONSORED BY THE



Federal Ministry
of Education
and Research

Risk Assessment in Southern and West Africa (SASSCAL & WASCAL project)

Matthias Mück, Franz Hummel



WASCAL

West African Science Service Center on Climate Change and Adapted Land Use

FUNDED BY:
 Bundesministerium
für Bildung
und Forschung

Competence Center

- data reception, maintenance & access
- research & provision of science-based advice to stakeholders

Core Research Program

- joint West African – German research
- interdisciplinary research on climate change and adapted land use

Graduate Research Program

- 10 Graduate Schools at West African universities in collaboration with German universities, training of PhD students





WASCAL partner countries

- Bénin
- Burkina Faso
- Côte d'Ivoire
- Gambia
- Ghana
- Mali
- Niger
- Nigeria
- Sénégal
- Togo

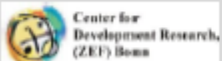


WASCAL - Activities at DLR-LAX

Satellite Receiving Infrastructure Competence Center, Ouagadougou



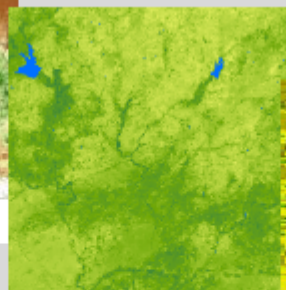
main partner:



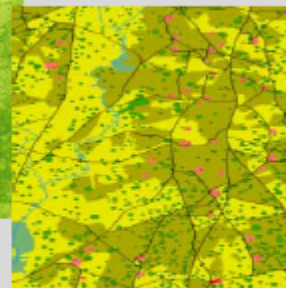
Income from Carbon Markets



NPP/biomass



tree cover

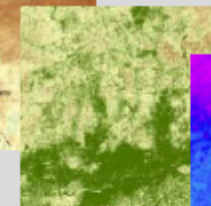


pot. reforestation

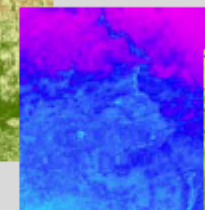
Interactions Land Surface - Climate Terrestrial Essential Climate Variables



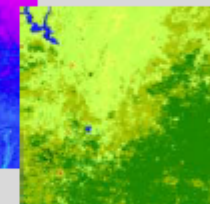
LAI



fCover



albedo



land cover

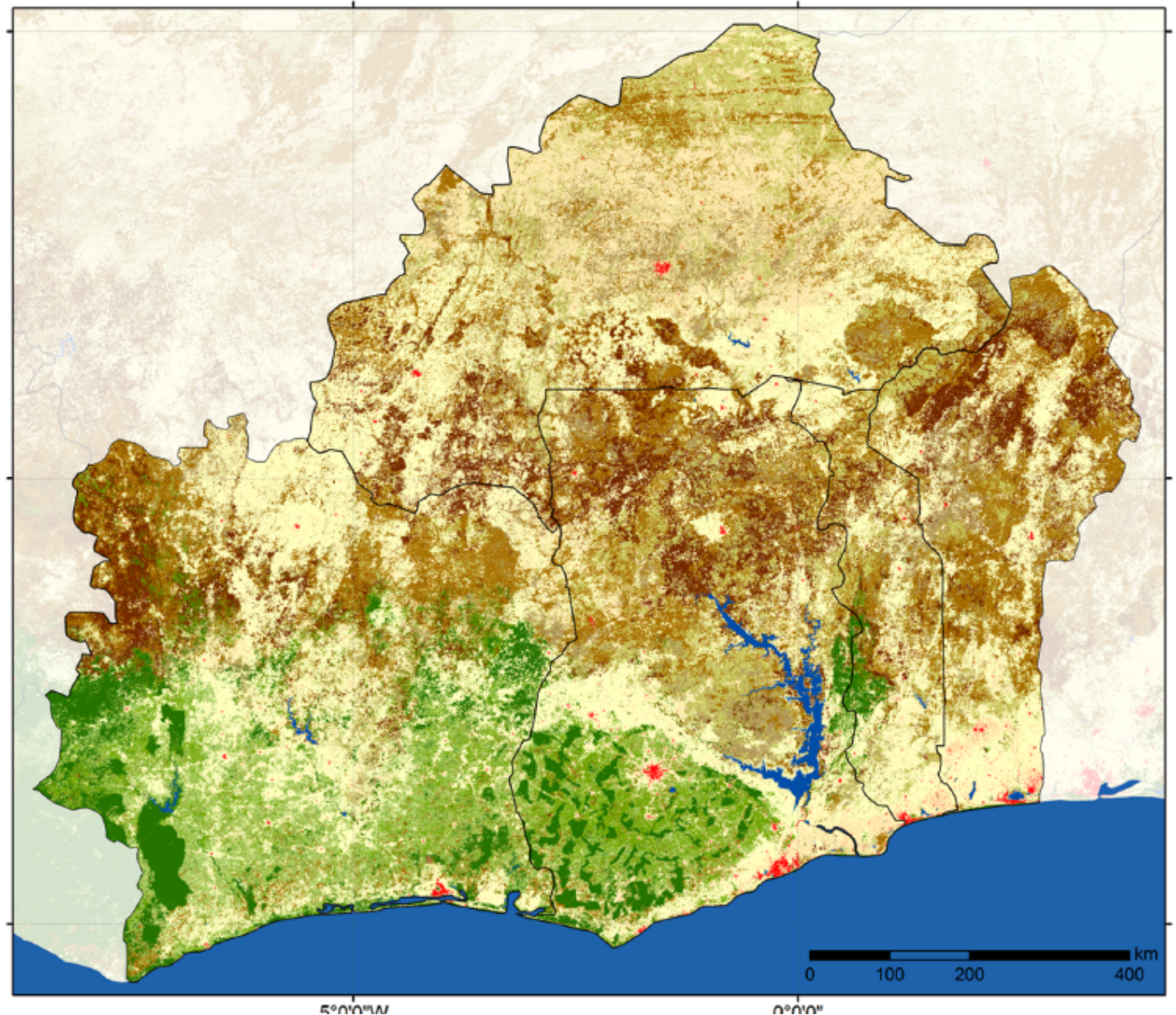
waterbodies

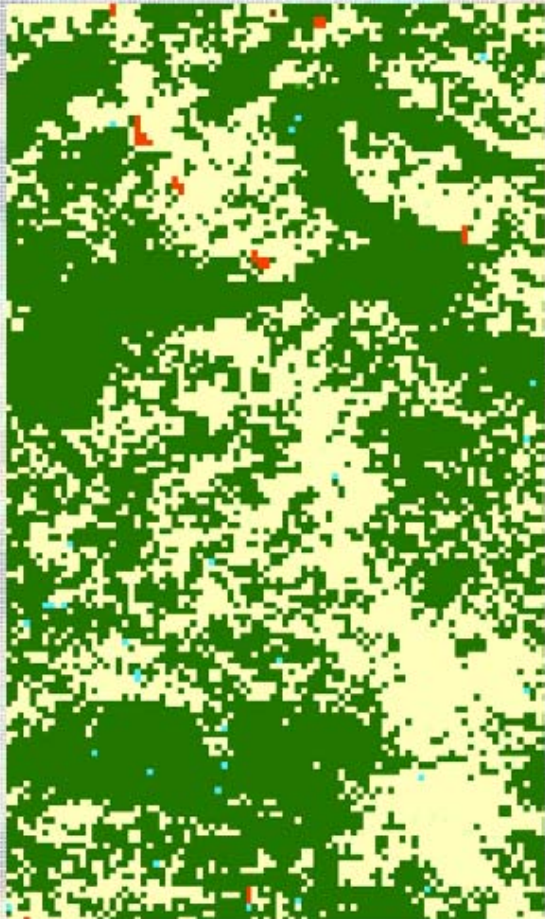
main



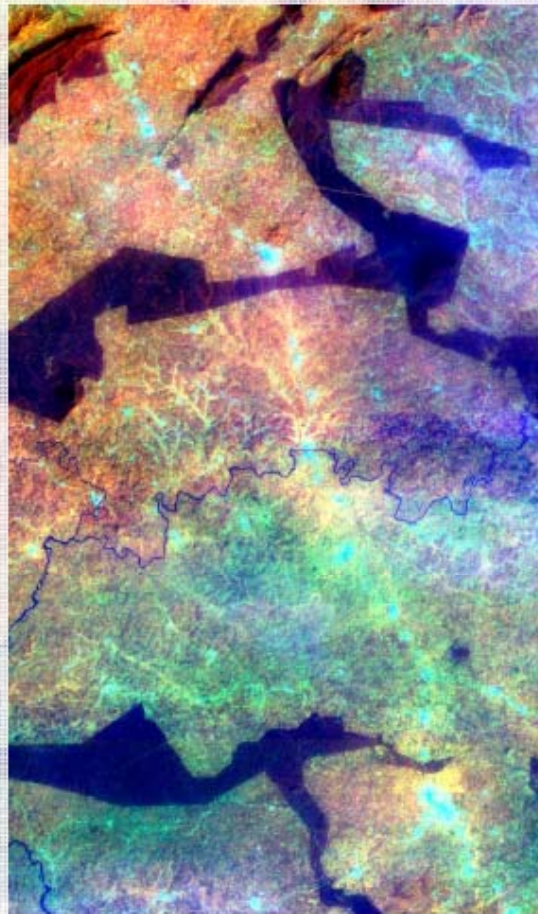
DLR Land Cover Product

-  evergreen forest
-  closed woodland, evergr. agricultural use
-  open woodland, evergr. agricultural use
-  closed woodland
-  open woodland
-  shrubland
-  grassland
-  sparse vegetation
-  agriculture





Global Standard
(MODIS)



Landsat



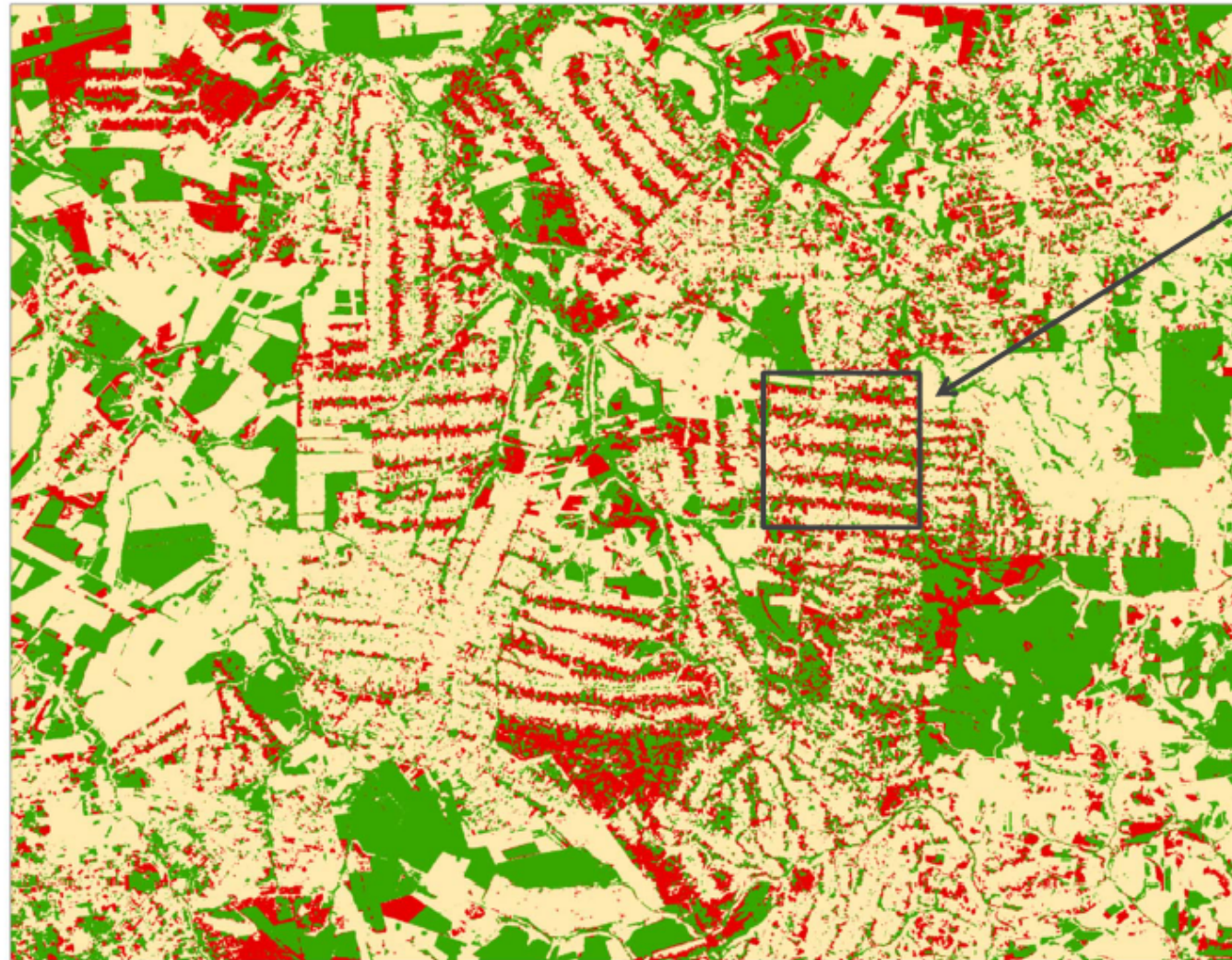
WASCAL-DLR-Product
(MODIS, ASAR, TanDEM-X)

The Detail in one of our typical Landcover / Landuse Maps



- managed tree cover
- agricultural area - temporarily flooded
- agricultural area - bare
- agricultural area - type 1
- agricultural area - type 2
- seminatural tree cover - plantation of melaleuca
- seminatural herbaceous vegetation
- artificial surface - dense urban area
- artificial surface - open urban and rural area
- artificial surface - mosaic of houses with garden
- artificial surface - single houses and large buildings
- water body - river
- water body - channels
- water body - aquacultural ponds

Deforestation patterns in Paraguay's subtropical Atlantic Forest 2003-2013



~ 10,000 ha

→ Large scale clearing

e.g. „Fishbone“ pattern



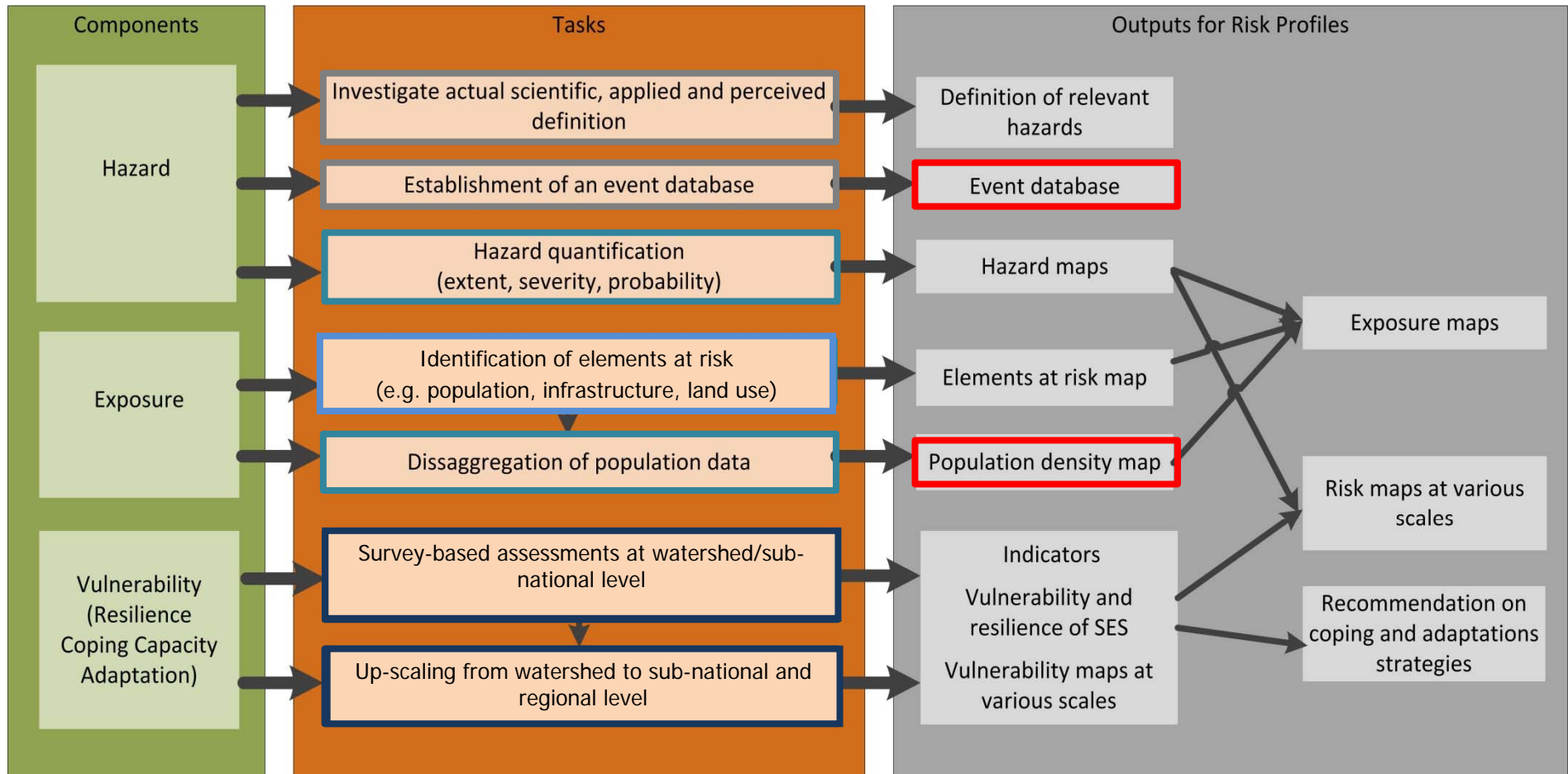
Forest cover loss 2003-2013

- Remaining forest
- Forest Loss
- Non Forest

0 5 10 20 km



Risk Assessment within WASCAL



Organisation mainly responsible for task:

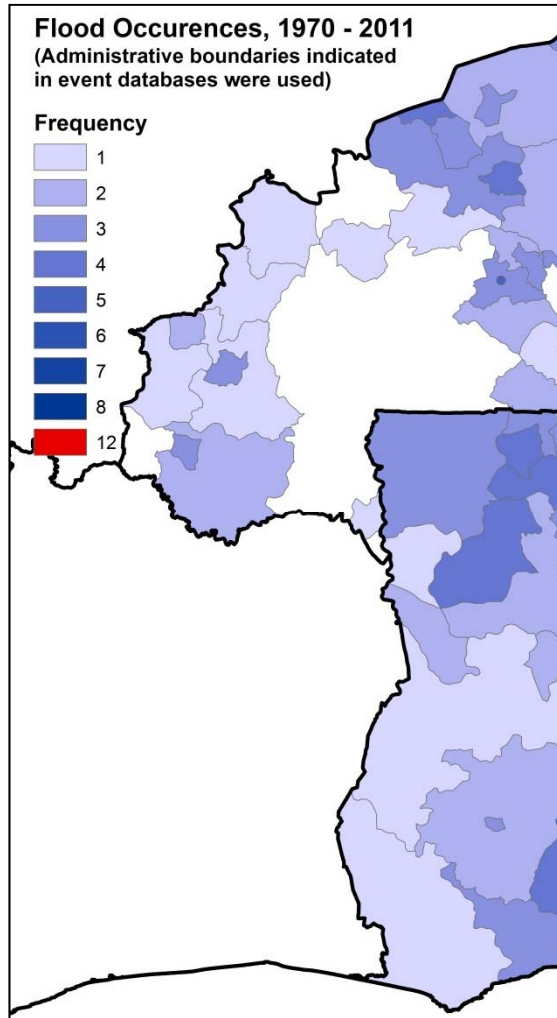
UNU / DLR

DLR

UNU



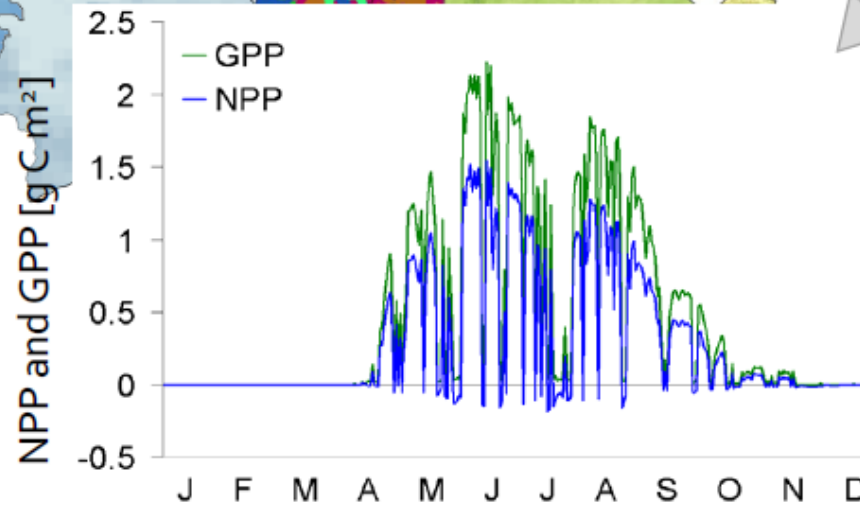
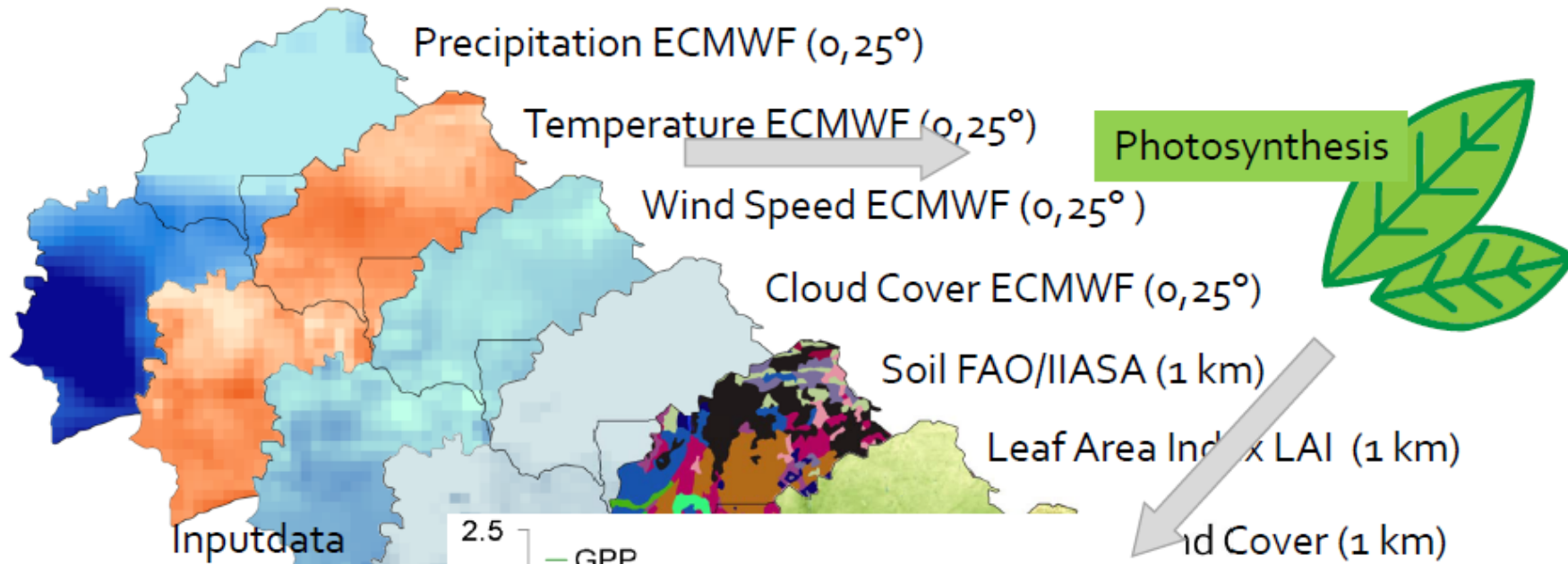
Event Database



Event Database Table			
ID:	<input type="text" value="1"/>	Frequency:	<input type="text"/>
Event No:	<input type="text"/>	Affected Area (km ²):	<input type="text"/>
Event Year:	<input type="text"/>	Communities:	<input type="text"/>
Date begin:	<input type="text"/>	Households:	<input type="text"/>
Date end:	<input type="text"/>	Number of deaths:	<input type="text"/>
Country:	<input type="text"/>	No_male:	<input type="text"/>
Region:	<input type="text"/>	No_female:	<input type="text"/>
District:	<input type="text"/>	No_children:	<input type="text"/>
Dist_ID:	<input type="text"/>	Number of people affected:	<input type="text"/>
Commune_BF:	<input type="text"/>	No_male affected:	<input type="text"/>
DisMain_type:	<input type="text" value="Hydro-meteorological"/>	No_female affected:	<input type="text"/>
DisSub_Type:	<input type="text"/>	No_children affected:	<input type="text"/>
DisSub-sub Type:	<input type="text" value="general flood"/>	Number of livestock killed:	<input type="text"/>
DisNo (EM-DAT):	<input type="text"/>	Cropland destroyed (Ha):	<input type="text"/>
GLIDENumber:	<input type="text"/>	Crop type:	<input type="text"/>
Dartmouth Register_annual DFO:	<input type="text"/>	Forest land (Ha):	<input type="text"/>
Sources:	<input type="text"/>	Value_crops (USD):	<input type="text"/>
Disaster Main Type:	<input type="text"/>	Value_livestock (USD):	<input type="text"/>
Main Cause:	<input type="text"/>	Value_housing (USD):	<input type="text"/>
		Value_pers effects (USD):	<input type="text"/>
		Value_public infras (USD):	<input type="text"/>
		Intangible damage:	<input type="text"/>
		Spatial extent:	<input type="text"/>



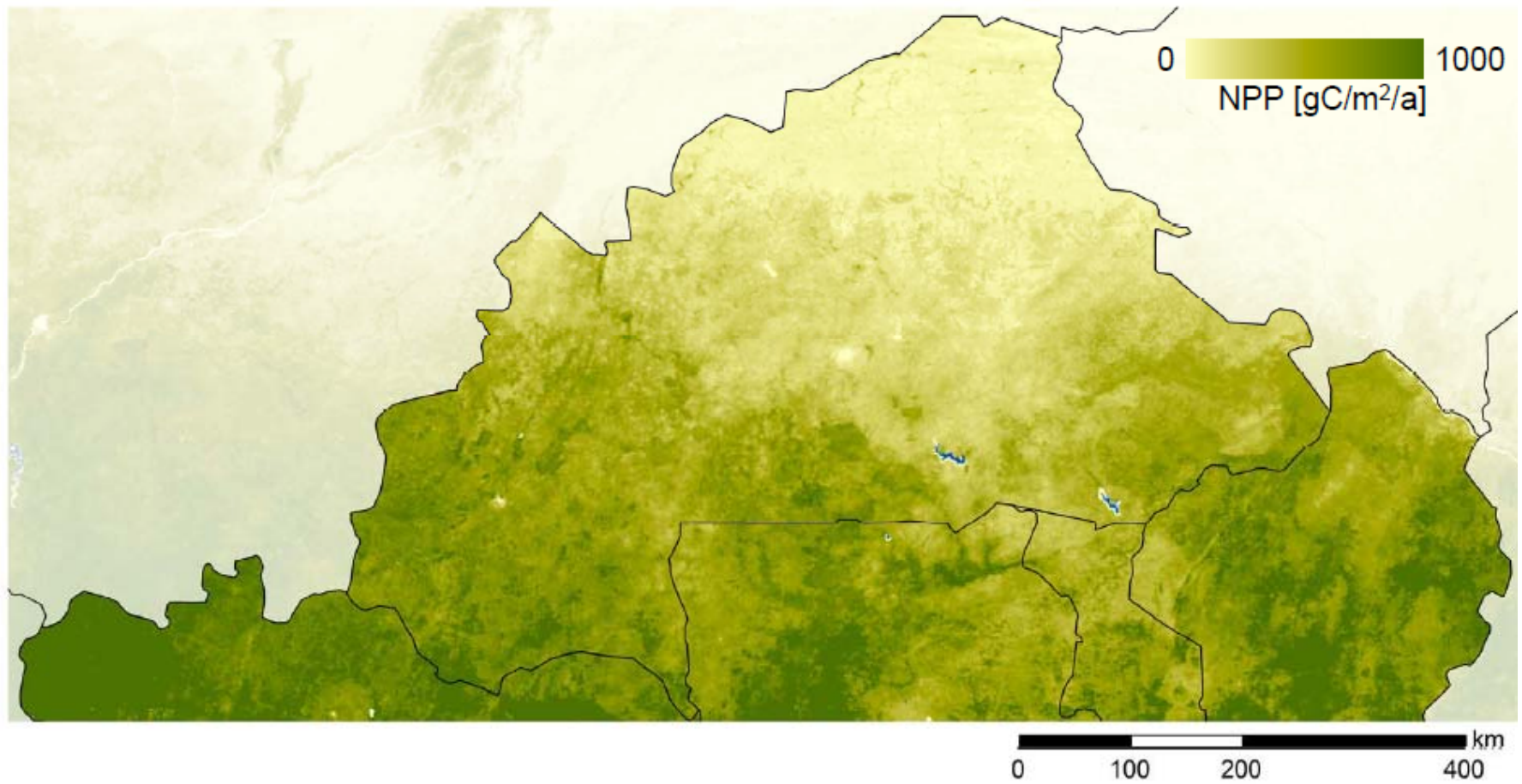
Vegetation Modell BETHY/DLR



Wißkirchen, K.; Tum, M.; Günther, K.P.;
Niklaus, M.; Eisfelder, C. und Knorr, W. (2013)



Net Primary Productivity 2011



SASSCAL

(Southern Africa Science Service Centre for Climate Change
and Adaptive Land Management)

VISION:

SASSCAL is the REGIONAL driver for innovation and knowledge exchange to **enhance adaptive land use and sustainable economic development** in Southern Africa under global change conditions

MISSION:

- To **establish a network of science service centres** in the southern African region, thereby strengthening the regional scientific capacity and existing initiatives,
- to **support adaptation** by the participating countries **to cope with climate change and land use change** and the resulting impact on ecosystem functions and services, and
- to **generate and provide** scientifically sound, relevant and timely **information for policy and development planning processes** that will promote the improved livelihoods of the broader society.



SASSCAL - <http://www.sasscal.org/>



Southern African Science Service Centre for Climate Change and Adaptive Land Management

Home ▾ National communities ▾ Institutions ▾ Tasks ▾ Data ▾ Involved people ▾ Events ▾ News ▾ Vacancies ▾

You are here: [Home](#)

Important links

- Governing Board

More on this topic

- Home
- Aim and Scope
- Function, Structure and Mode of Operations
- The RSSC Implementation Process
- Mission

Vacancy announcements

There are currently no vacancies.

Thematic workshops

- Climate: 7 - 10 April 2014 (Heja Lodge, Windhoek)
- Agriculture: 23-27 Sept 2013 (Livingstone)
- Biodiversity: 30 Sept - 4 Oct 2013 (Livingstone)
- Water: 7-11 Oct 2013 (Livingstone)
- Forestry: 7-11 Oct 2013 (Livingstone)

Service

- Send weblink to a colleague

Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) - a Regional Science Service Centre (RSSC) in Southern Africa

SASSCAL is a joint initiative of Angola, Botswana, Namibia, South Africa, Zambia, and Germany, responding to the challenges of global change. The establishment of a **Southern African Science Service Centre for Climate Change and Adaptive Land Management** could create added value for the whole southern African region. It should be conceptualised and operationalised to complement the excellent existing research and capacity development infrastructures and research initiatives in the region. It should be embedded in the regional and national research. Its mission is to conduct problem-oriented research in the area of adaptation to climate and change and sustainable land management and provide evidence-based advice for all decision-makers and stakeholders to improve the livelihoods of people in the region and to contribute to the creation of an African knowledge-based society.

Latest news




April 2014
08
Tuesday

The 'Thematic Workshop Climate' has started on Monday, 7 April at the Heja Lodge near Windhoek, Namibia. (Group photo of all participants) [more](#)

(Copyright: SASSCAL - Clärin Bohn)

News

March 2014
19
Wednesday



Signing of the **'Memorandum of Understanding'** by Dr. Sedogo (r) and Dr. Mwima (l), Executive Directors [more](#)

March 2014
19
Wednesday



Prof. Norbert Jürgens represents **SASSCAL at the Africa Days**, which were hosted by the BMBF in Berlin on 16-18 March 2014 [more](#)

March 2014
17
Monday



In Botswana ten new automatic weather stations (AWS) are online now. [more](#)

March 2014
10
Monday



On Tuesday, 11h February Zambia has now officially launched the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) initiative. The launch begun with official handover of the ten Automatic Weather Stations (AWS), which were installed in Zambia in 2013. [more](#)

SASSCAL WeatherNet

A large number of automatic weather stations has been implemented in the frame of the BIOTA AFRICA project by the Namibian National Botanical Research Institute (NBRI) and the Group "Biodiversity, Evolution and Ecology (BEE) of the University of Namibia. The website offers hourly

 **Ganab**
21 Apr 2014 13:00
30.2 °C / 0 mm
Wind: 4.9 m/s - WNW (298°)

► Go to the weather station

 **Gellap Ost**
21 Apr 2014 13:00
28.4 °C / 0 mm
Wind: 3.2 m/s - N (353°)

► SASSCAL WeatherNet website
► Refresh weather ticker

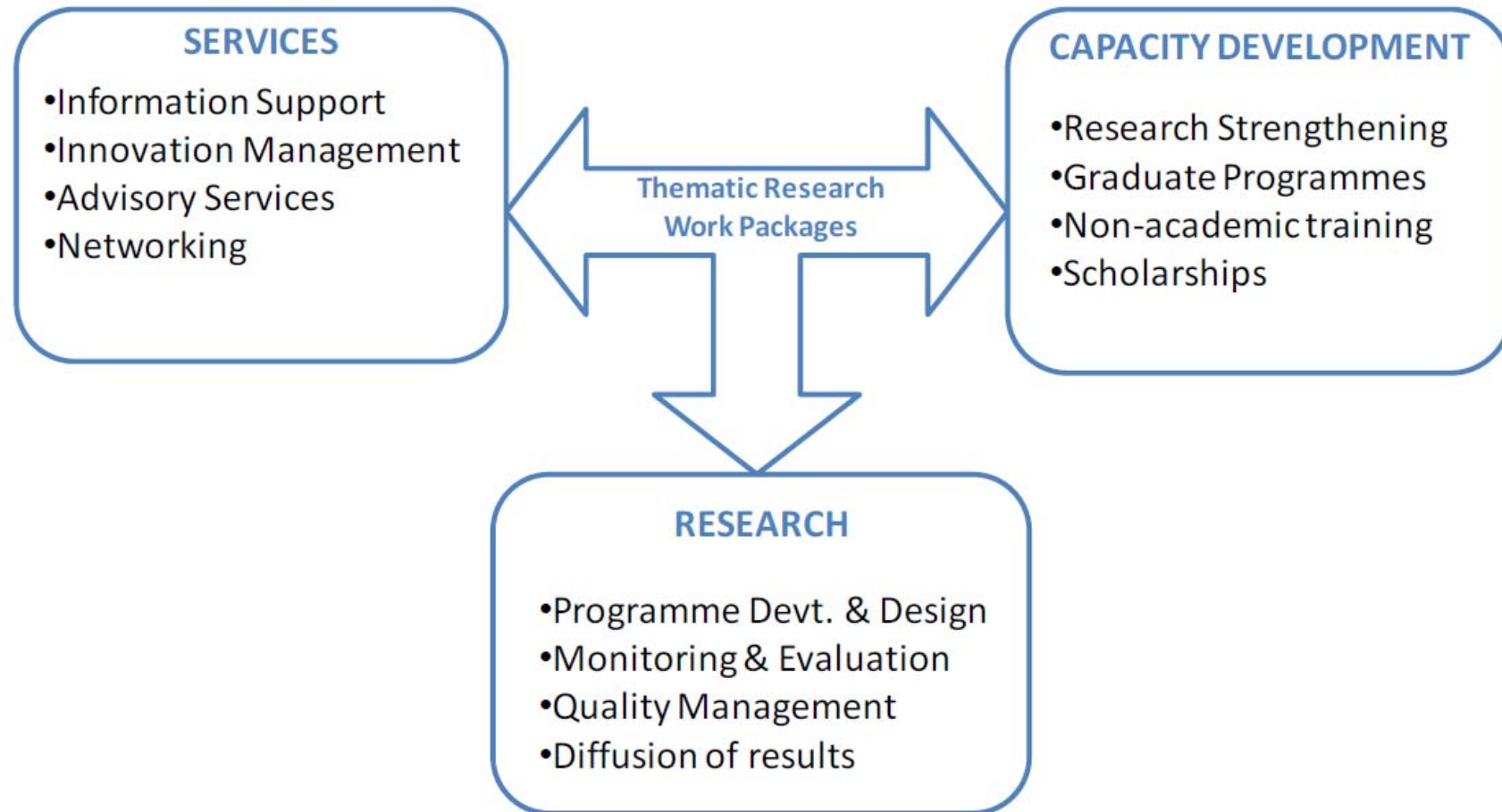
Photo Guide



100%



SASSCAL – Product portfolio overview



DLR task (11/2012 – 10/2016)

“Remote Sensing applications for flood risk management”

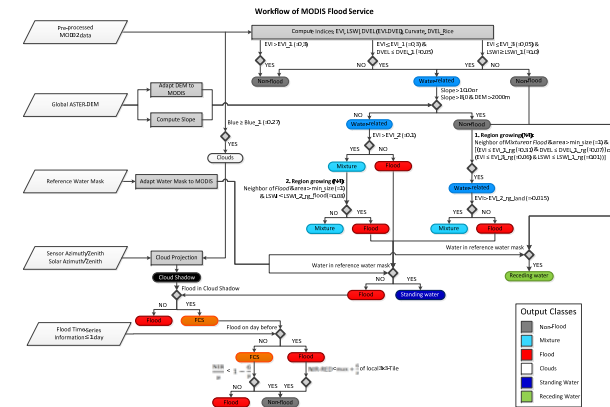
Main objectives:

- Development of applicable and transferable **methods for flood detection and monitoring** and **regular low-resolution flood mapping**, in order to implement an exemplarily **flood mapping service for a specific test area**
- Implementation of a **risk assessment concept** in one test area in order to support flood management
- Gained **mapping products** serve as crucial input parameter for local and regional flood risk management, flood forecasting and early warning



Flood service: MODIS (upcoming Sentinel-3)

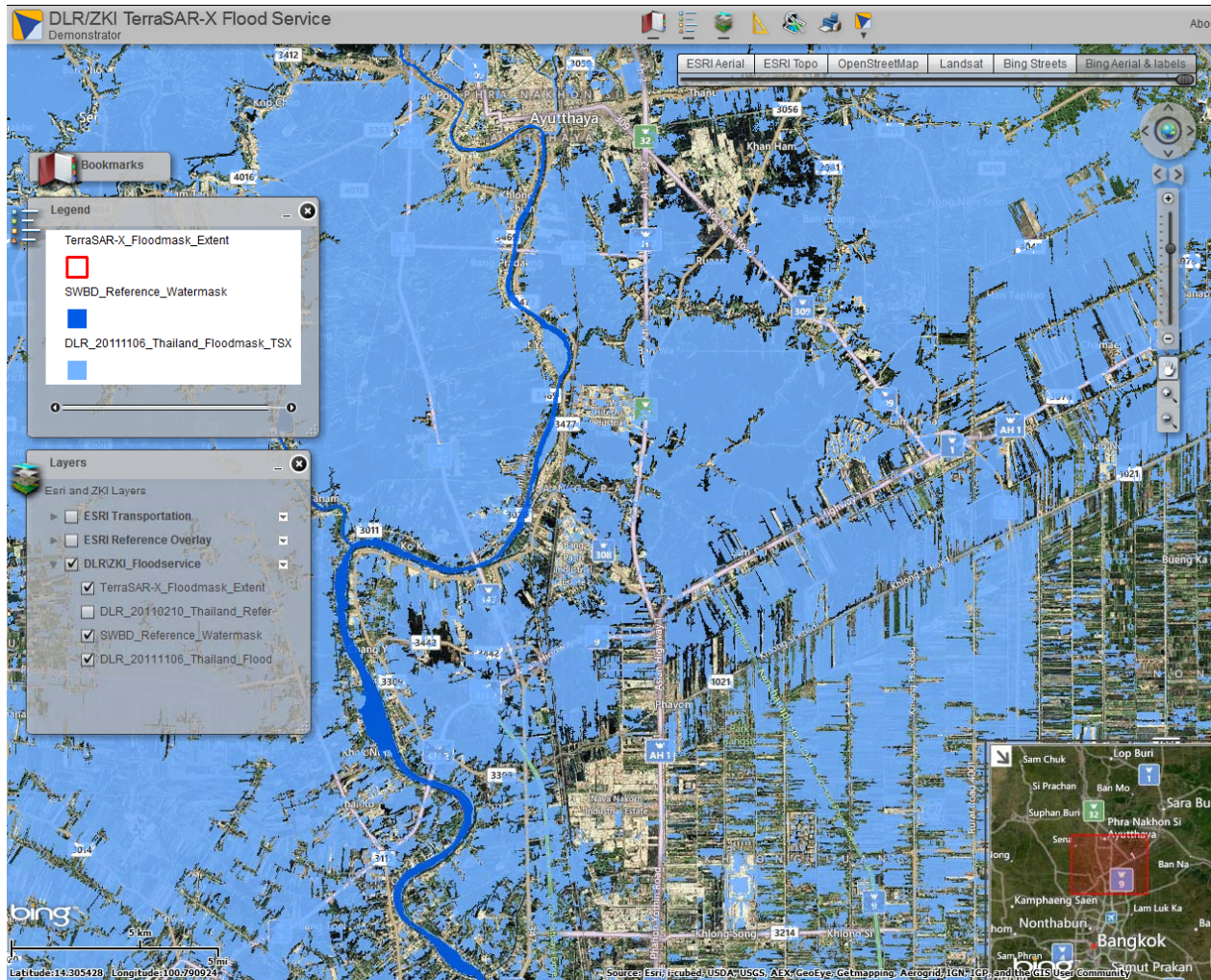
MODIS flood mapping service, 21.03.2013



- fully automatic service (Europe)
- Scale: Land/Continent (resolution 250m)
- Repetition rate: daily
- Interactive demand of the flood masks via WebGIS



Flood service: TerraSAR-X (upcoming Sentinel-1)



- Fully automatic
- Flood detection on local/regional Scale
- **Activation on-demand**
- Interactive demand of the flood masks via WebGIS



Rapid Loss Estimation (RaLE)

Main objective of RaLE:

- Provision of relevant and reliable **crisis information (rapid mapping)** to support the planning and implementation of **emergency and reconstruction efforts**
- Users are primarily government and aid organizations

Output:

- Number of potentially affected people
- Number of potential casualties (dead, injured)
- Number and type of affected critical infrastructure
- Direct economic losses



The EO-Miners Project – Overview of the South African Test Site

<http://www.eo-miners.eu>

Christian Fischer (c.fischer@dlr.de)

German Aerospace Center (DLR)

German Remote Sensing Data Center (DFD-LAX)

RCMRD visit at DLR-DFD

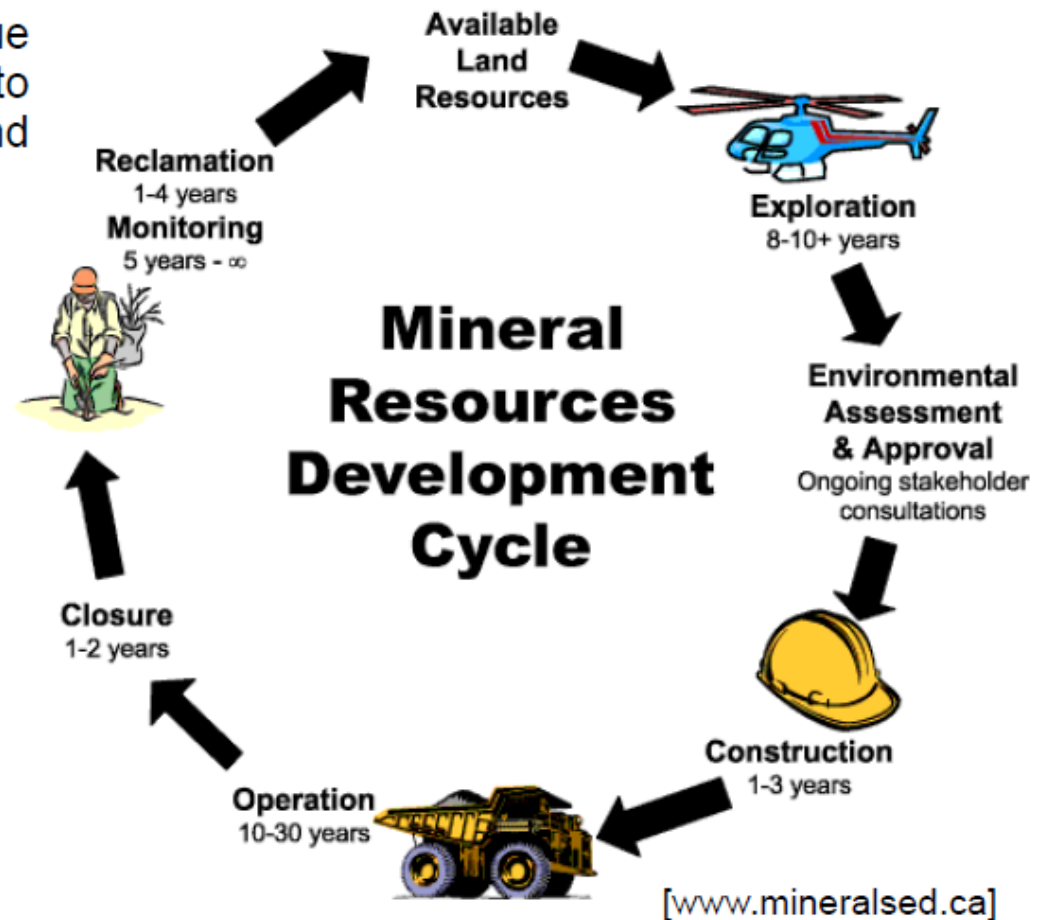
24 March 2014



Mineral Resources Development Cycle

Earth Observation (EO) offers a unique opportunity and varieties of methods to collect spatial information to monitor and assess each phase of the mining cycle:

- Spaceborne and airborne imagery
- Ground and airborne geophysics
- Geochemistry
- In-situ measurements
- Monitoring networks
- 3D modelling
- etc.



Mapping Collapsing Structures using WV-II-DEM and LIDAR



**GEOTECHNICAL HAZARDS
AND GROUND STABILITY**
eMalaheni, South Africa



Legend

- Town
- eMalaheni municipality
- National route
- Interchange
- Main road
- Secondary road
- Other roads
- Railway
- River
- ▲ Location and look-direction at 3D view

Slope angle

Interpretation

This product shows the how the amount of land used by mining (i.e. the footprint) has changed between 1989 and 2010 in eMalaheni and the neighbouring Sluise-Tweede municipalities. Although the shape of the mining footprint differed between 1989 and 2010, the total area removed by mining remained largely unchanged. However, between 2002 and 2010, the total area occupied by mining more than doubled from 16,000 Hectares to 40,000 Hectares.

The land occupied by mining was mapped using satellite imagery (i.e. SPOT).

The product relates to indicator A1 'Total land used' by mining.

Cartographic Information

Coordinate System: Projected	Geographic:
Projection: UTM Zone 35S	Geographic (GMS): WGS84
Datum: WGS84	

0 0.25 0.5 1 km

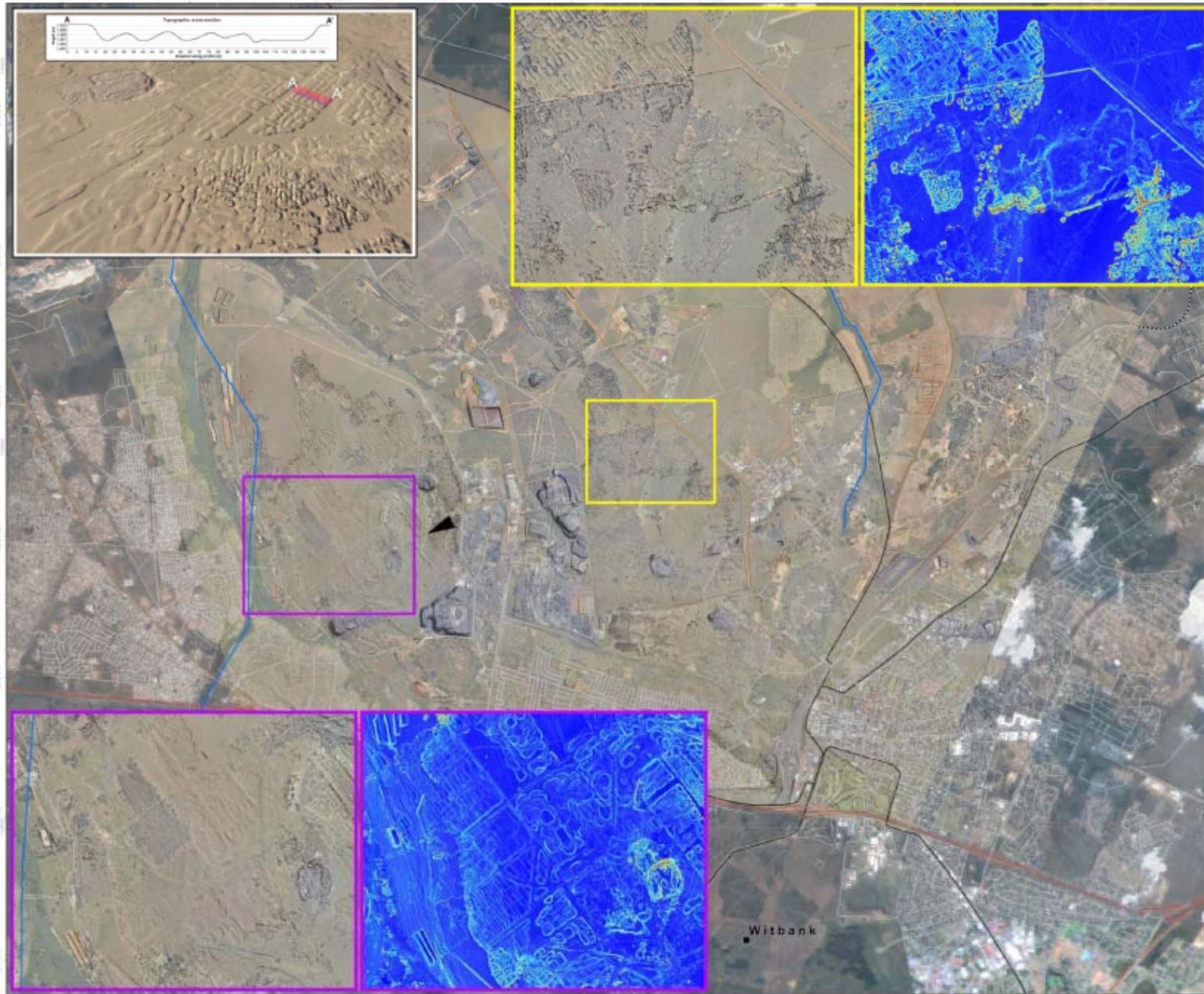
Framework

The EO-IndiGEO project (Earth Observation for Monitoring and Observing Environmental and Geotechnical Impacts of Mining Processes: Exploration and Assessment), is running with financial support from the European Commission under the Seventh Framework Programme, FP7-EVW-2206-1, Grant Agreement No. 246424.

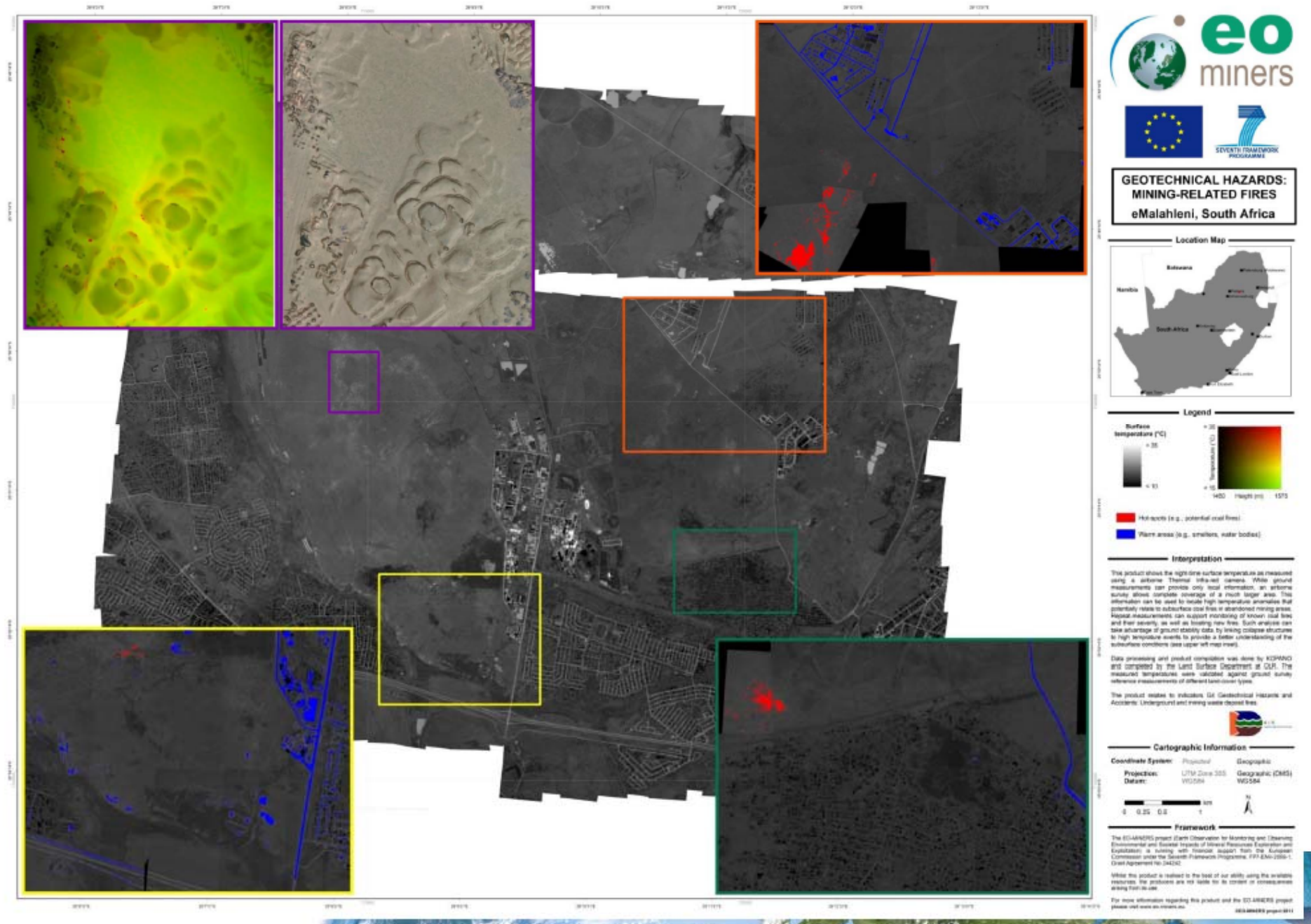
While this product is released in the best of our ability using the available resources, the producers are not liable for its content or consequences arising from its use.

For more information regarding this product and the EO-IndiGEO project, please visit www.eoindigeo.eu.

EO-IndiGEO project 0211



Mapping Coal Fires using airborne LIDAR and FLIR data



**GEOTECHNICAL HAZARDS:
MINING-RELATED FIRES**
eMalaheni, South Africa



Legend

Surface temperature (°C): 15, 20, 25, 30, 35

Temperature (°C) vs. Height (m): 1575, 1450

High spots (e.g., potential coal fires)

Water areas (e.g., streams, water bodies)

Interpretation

The product shows the night time surface temperature as measured using a airborne Thermal infrared camera. While ground measurements can provide only local information, an airborne survey allows complete coverage of a much larger area. This information can be used to locate high temperature anomalies that potentially relate to subsurface coal fires in abandoned mining areas. Repeat measurements can support monitoring of known coal fires and their severity, as well as locating new fires. Such analyses can take advantage of ground stability data by linking collapse structures to high temperature events to provide a better understanding of the subsurface conditions (see upper left map inset).

Data processing and product compilation was done by KPMRNO and completed by the Land Surface Department at GRI. The measured temperatures were calculated against ground survey reference measurements of affected land cover types.

The product enables to indicators like Geotechnical Hazards and Accidents, Underground and mining waste disposal fires.

Cartographic Information

Coordinate System: Projected Geographic

Projection: UTM Zone 35S Geographic (CRS): WGS84

Date: WGS84 WGS84

Scale: 0 0.25 0.5 1 km

North arrow

Framework

The eGEMAP2015 project (Earth Observation for Monitoring and Characterising Environmental and Ecological Impacts of Mineral Resource Exploration and Exploitation) is funded with financial support from the European Commission under the Seventh Framework Programme, FP7 (2007-2013), Grant Agreement No. 234232.

While this product is released in the best of our ability using the available resources, the producers are not liable for its content or consequences arising from its use.

For more information regarding this product and the eGEMAP2015 project, please visit www.eo-miners.eu **EO-MINERS project 011**

Conclusion & Outlook

- Remote Sensing (RS) data is among the panel of techniques that can significantly contribute to the Mineral Resources Development Cycle.
- EO imagery complements and optimizes conventional information and mapping techniques, without substituting for them and can be used to improve existing and often only selective approaches to a recording of environmental status and changes.

Important aspects:

- data harmonization & linking existing geological information with RS data
- definition of data products, including meta-information, and improvement of processing work-flows within COPERNICUS & HORIZON 2020

