Recent developments in the use of EO-derived parameters and indicators for environmental and vegetation monitoring applications in Africa in the “GMES and Africa” perspective

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EUROPEAN COMMISSION

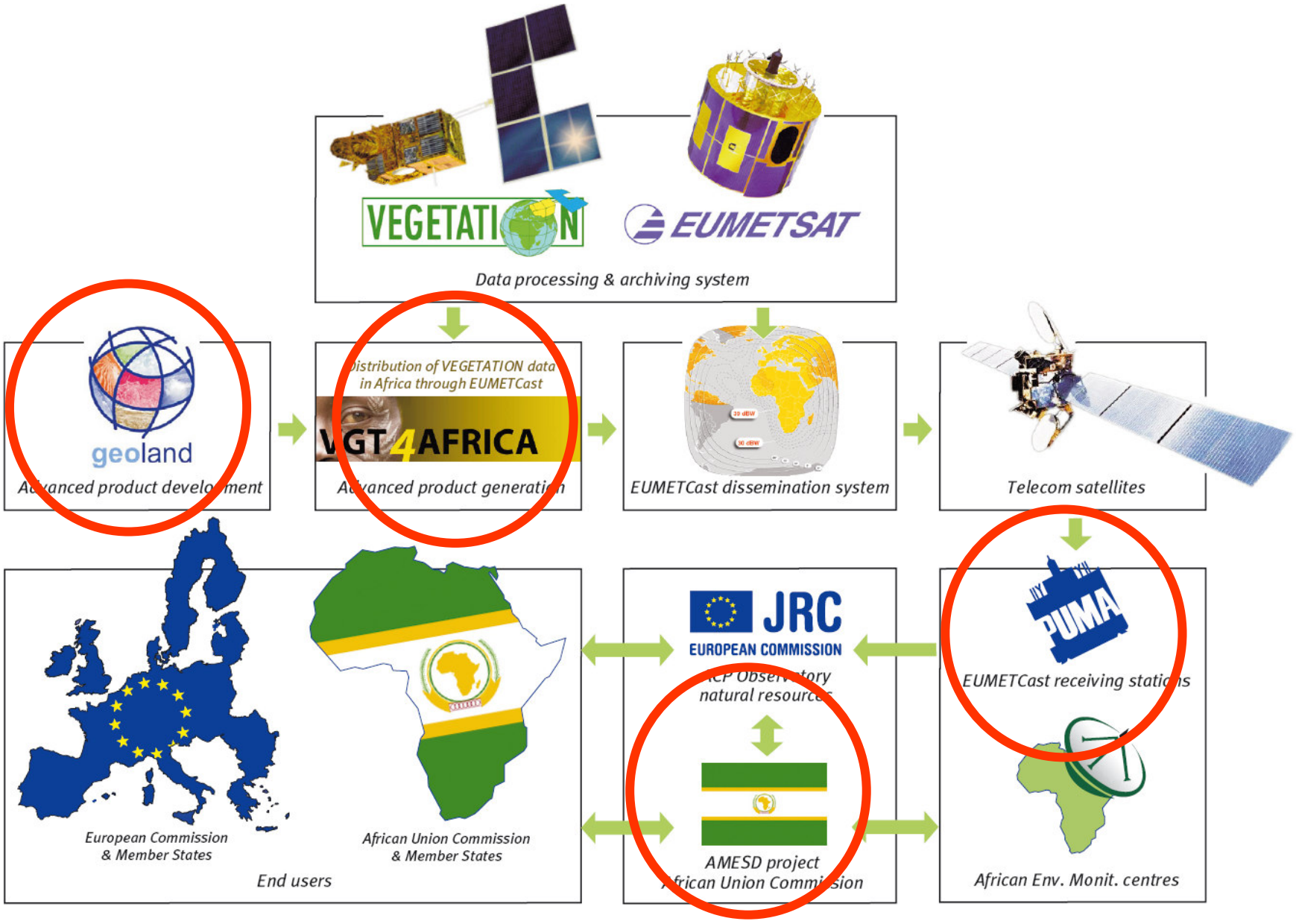
content

Focus of the presentation: EO-derived products for Africa

- Articulation between GMES projects, PUMA & AMESD projects and ACP observatory
- GMES – Africa: the Lisbon process
- the use of EO products in Africa: lessons learnt

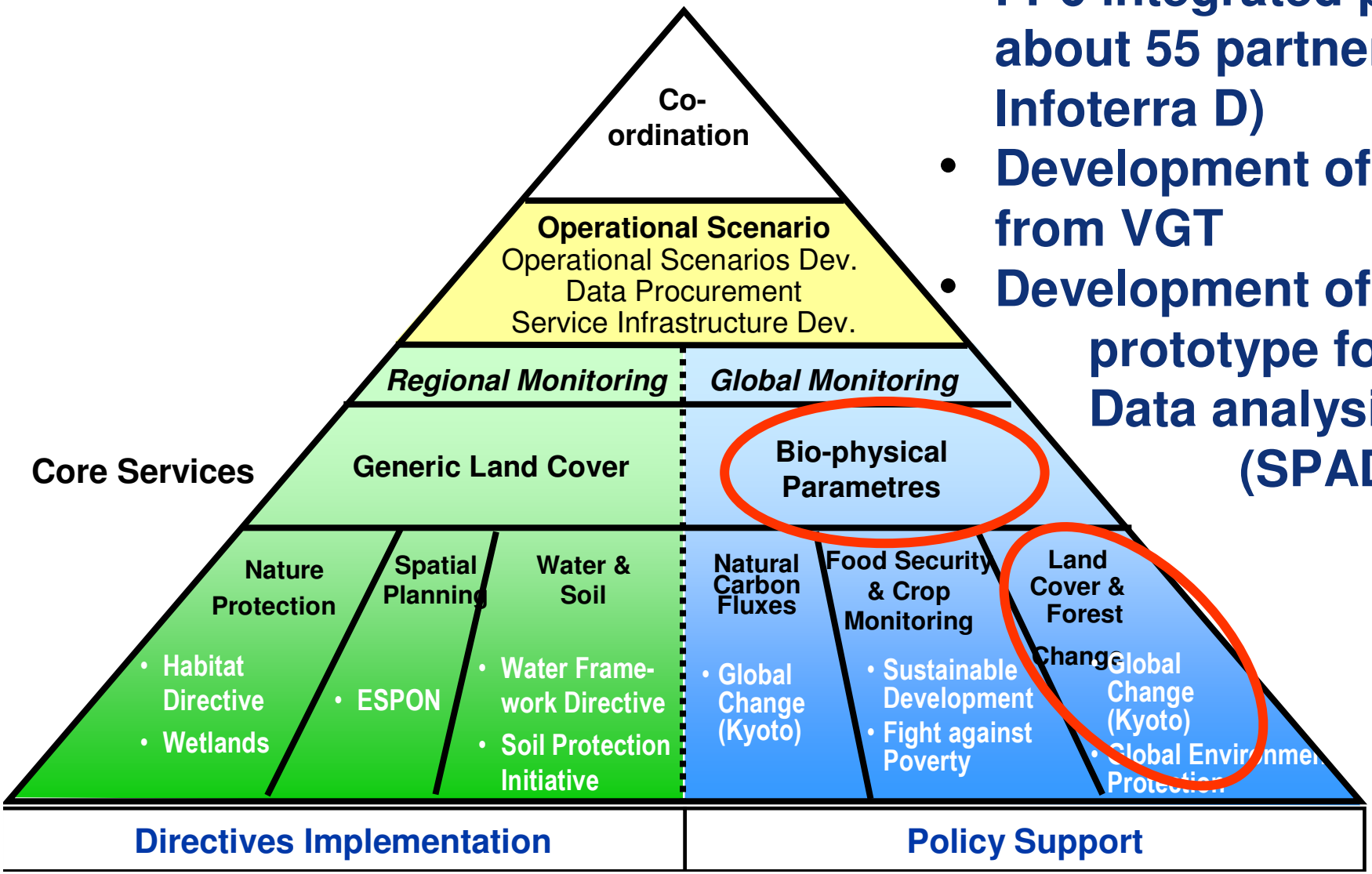
Project articulation:
there is some order behind apparent chaos…

Developing and delivering advanced products to Africa



Geoland 1

- **FP6 integrated project, about 55 partners (leader: Infoterra D)**
- **Development of products from VGT**
- **Development of a prototype for env. Data analysis (SPADA)**



PUMA

- **The first EDF-funded pan-African project**
- **Main purpose: ensure access to MSG data by all African met services**
- **Key results by end of project (09/2006)**
  - A new receiving station installed in each of the 53 African countries (incl. N. Africa and South Africa thanks to additional funding via WMO) + regional centres. Based on 3 PCs, includes weather forecast sw.
  - 275 professionals trained to operate and maintain the stations and to use data for weather forecast
  - 6 non-meteorological pilot projects implemented

vgt4Africa

- **3-years Specific Support Action (VITO, MEDIAS, JRC)**
- **From prototype to operational processing chains**
  - About 10 products
- **Operation data distribution to Africa via EUMETCast**
  - All countries receive, 25% use some of the data
- **Involvement of users**
  - choice of products,
  - 4 training sessions

vgt4Africa

product name	*processing chain development*	*heritage*
S10 NDVI	**VITO**	**standard VEGETATION product**
Albedo	**MEDIAS-F**	**geoland, cyclops (MEDIAS & al)**
Burnt Area	**JRC/GEM-MONDE**	**gba2000, L3JRC (JRC/GEM & al)**
Dry Matter Productivity	**VITO**	**Montheith, MARS (JRC)**
Fractional cover	**MEDIAS-F**	**desert locust monitoring (UCL-JRC/GEM) glc2000 (JRC/GEM & al)**
Leaf Area Index	**MEDIAS-F**	**geoland, cyclopes (MEDIAS & al)**
Normalized Difference Water Index	**VITO**	**Gao, 1996**
Phenology	**JRC/GEM-MONDE**	**geoland (JRC/GEM)**
Small Water Bodies	**JRC/GEM-MONDE**	**JRC/GEM**
Vegetation Productivity Index	**VITO**	**Sannier & al 1996, MARS (JRC)**

www.vgt4africa.org

AMESD

- **EDF-funded project, 21 M€, 4yr, started 11/2008**
- **Objectives**

To help African governments in:

Designing, implementing, monitoring and evaluating their regional and continental environmental policies towards sustainable development;

Improving the socio-economical conditions and well-being of African population;

Meeting their obligations towards international environmental treaties;

Participating to the international efforts of global environment surveillance.

AMESD expected results

1. Improved access to existing sources of basic Earth Observations, field and ancillary data (incl. “thematic receivers”)

2. Operational information services improving decision-making processes in the fields of environmental management and other policies;

3. Policy frameworks strengthened for active and sustainable participation of African governments in global environmental surveillance initiatives (i. a. GMES)

4. Adequate technical level of AMESD African users ensured (i. a. training)

AMESD result 2

Development of five Regional Thematic Actions

CEMAC: Management of water resources **focusing on** environmental aspects **of watersheds** ***[RIC: CICOS]***

ECOWAS: Water management for cropland and rangeland **management** ***[RIC: AGRHYMET]***

IGAD: Land degradation**, mitigation and natural habitat** ***[RIC: ICPAC]***

IOC: Coastal and marine management ***[RIC: tbc]***

SADC: Agricultural and environmental resource management**, *[RIC: BOTS Met Service, partners: SA Weather Bureau, SADC RRSU, SADC DMC]***

ACP Observatory

28 years of environmental monitoring in Africa

- Tropical deforestation monitoring
- Land-cover mapping and monitoring
- Fire detection
- Crop monitoring

JRC Framework Program (2007-2013)

- Europe as a Global Partner as a theme
- Two sub-themes
  - Global Security
  - Development Co-operation
- ACP Observatory for Sustainable Development
  - 5 units involved
  - 40-50 staff
  - Close link with DG DEV and AIDCO

ACP Observatory

Land degradation and desertification

Illegal mining and logging

Food security

Natural Risks Reduction

Climate Change

Vulnerability Assessment

Marine resources & Fisheries

Renewable Energies

Biodiversity protection

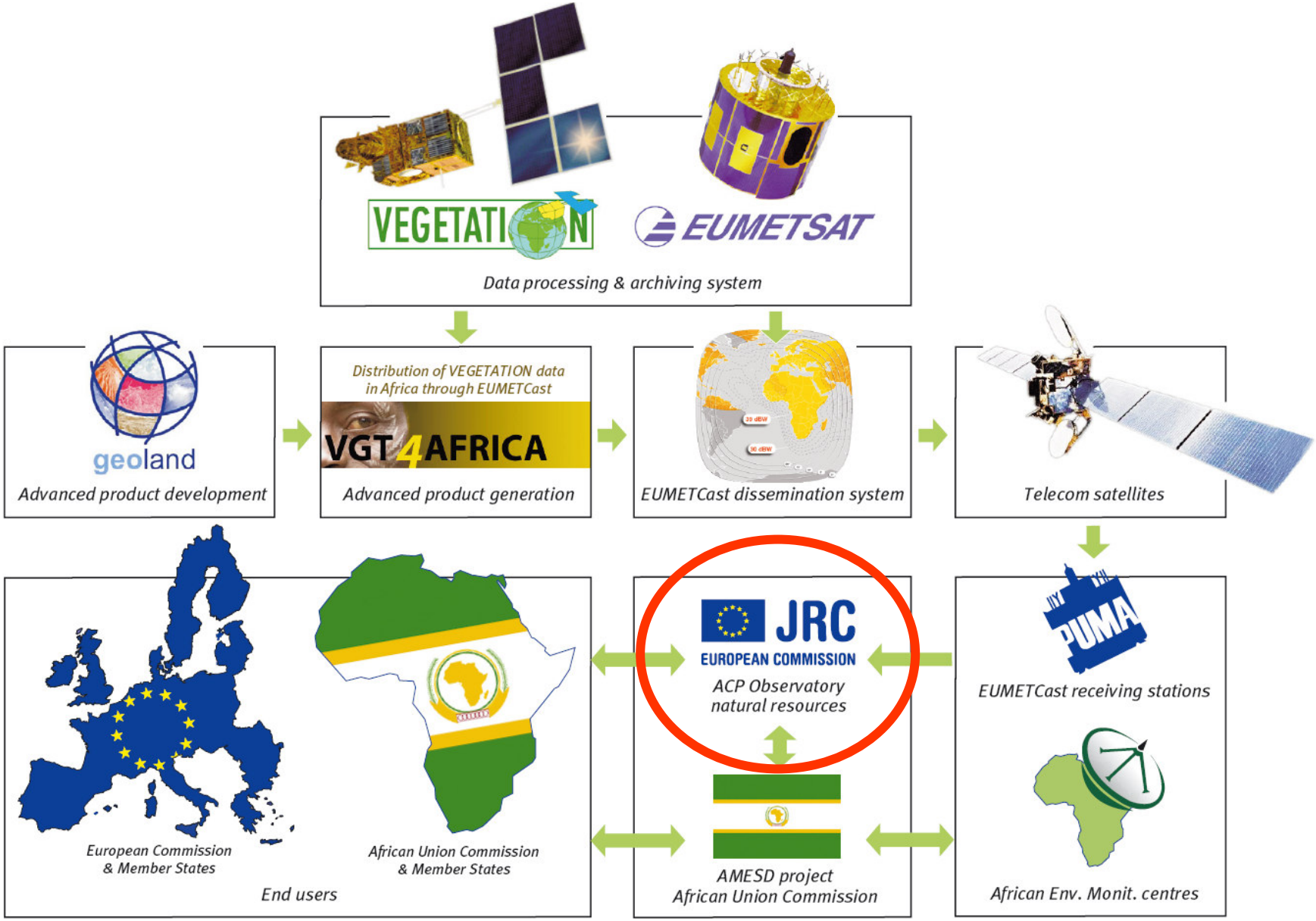
Crisis response & Humanitarian Aid

ACP Observatory

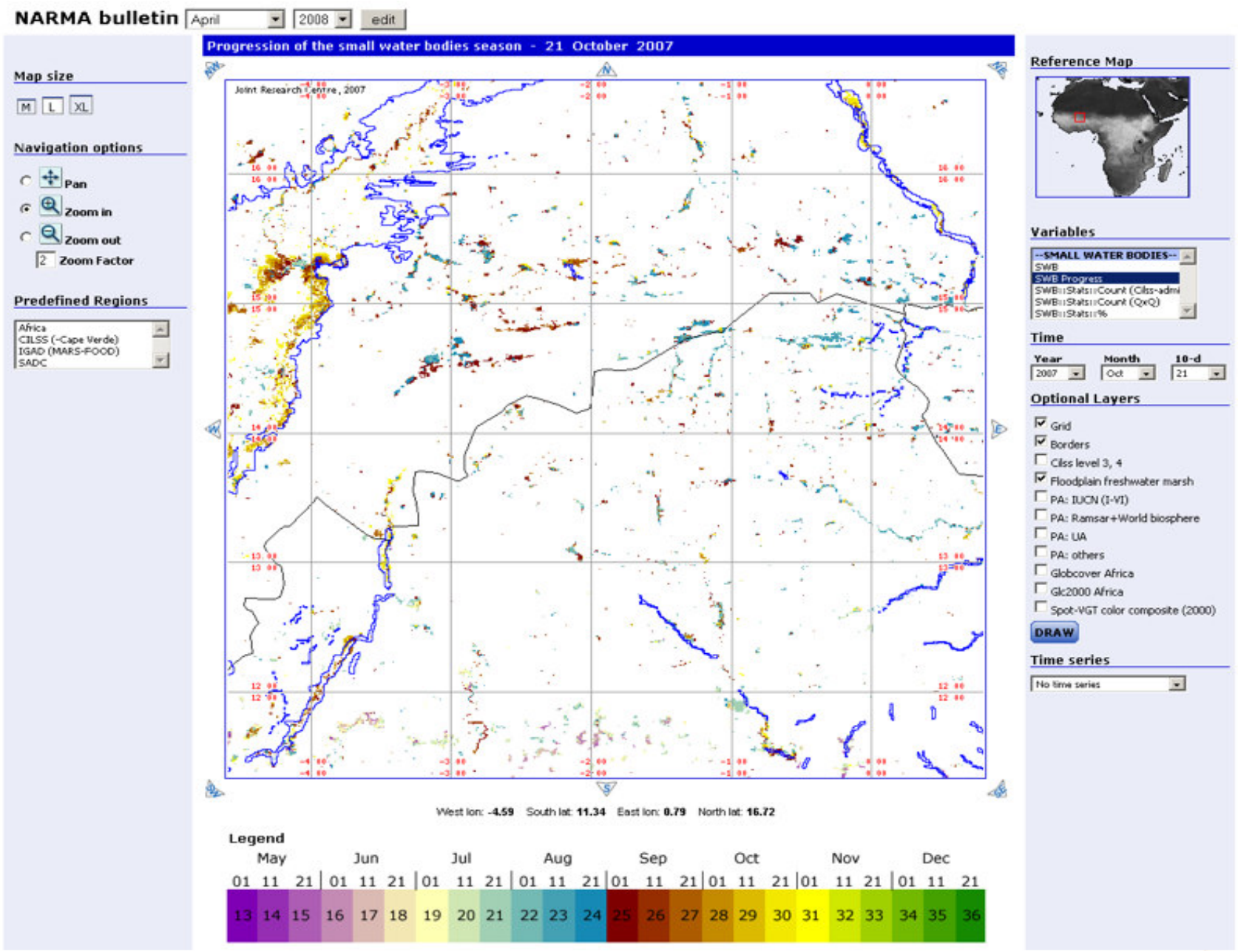
Purpose of the observatory:

- Provide scientific and technical advice to colleagues in "policy DGs"
- Assist in policy formulation (EC level)
- Provide factual information for decision making (EC level, beneficiary countries)
- Contribute to technology transfer to assist evolution in development aid strategy (from project to budgetary support →aid to decision is needed by partners)

ACP Observatory



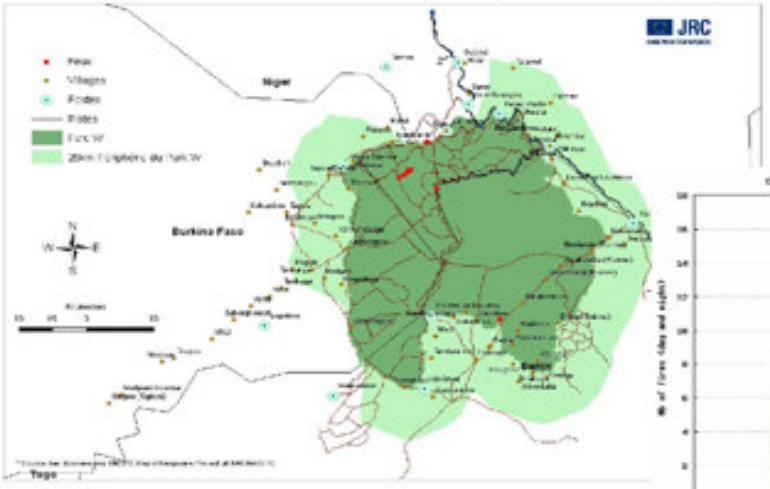
ACP observatory - reporting

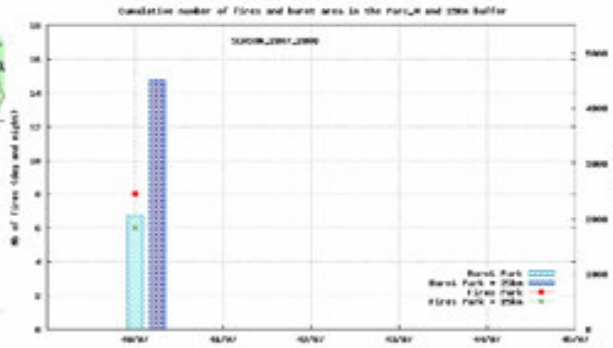


ACP observatory - reporting

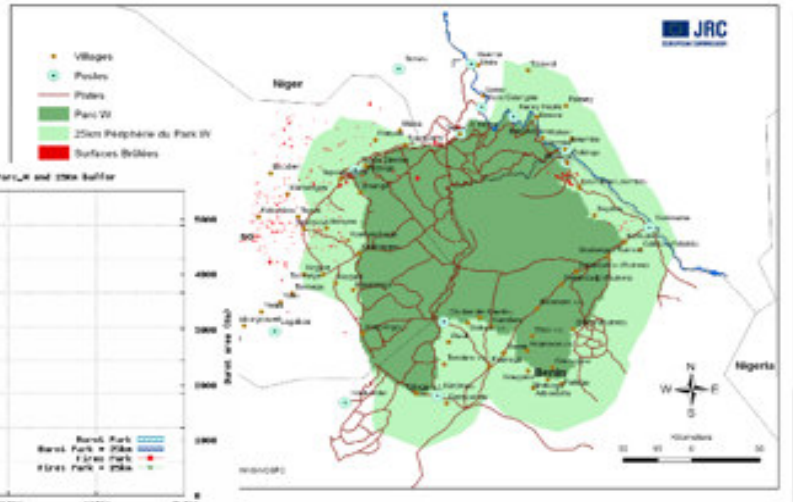
Bulletin de suivi des feux dans les aires protégées d'Afrique - **Parc du W** (Bénin, Burkina, Niger) - **semaine 2007 # 40: 01 – 07 Oct.**

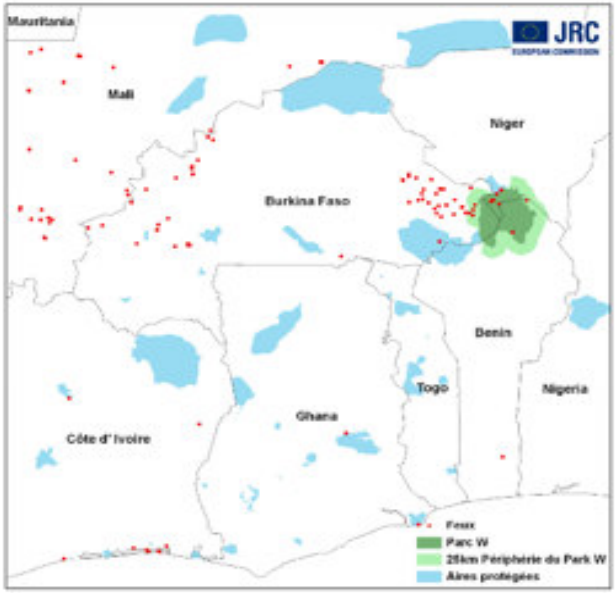
Feux du 01 au 07 Oct 2007 dans les aires du Parc W





Surfaces brûlées cumulées au 5 Oct. 2007





Activité dans le parc:
- W-Burkina: aucun feu détecté;
- W-Bénin: un épisode isolé (5 octobre), en lisière Sud du parc, le long de la piste longeant le Pako;
- W-Niger: un foyer important (7 octobre), non loin de la frontière avec le Burkina; un épisode isolé le 7 octobre, en lisière Nord du Parc, le long de la piste de ceinture entre Tyantyardi et Tapoa; un épisode isolé, le 5 octobre, sur la Mékrou.
-Estimations des surfaces brûlées: ~ 2000 ha entre le 1er et le 5 octobre, pour l'ensemble des 3 Ws; ~ 5000 ha dans la zone tampon de 25 km.

Activité dans la zone tampon de 25 km:
Quasiment inexistante, à l'exception de 3 épisodes de feu entre le 5 et le 7 octobre, à proximité de Diapaga et un épisode le 2 octobre en lisière N-W du W-Bénin, à proximité de Loumbou Loumbou.

Activité au niveau régional:
Aucune activité des feux n'a été détectée dans les autres parcs de la région.

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The Lisbon process on GMES - Africa

GMES - Africa

- **Initial step: "Lisbon process on GMES and Africa", Dec 2007, approved by the EU – Africa summit**

→ **High political visibility**

- **Objectives:**
  - Identify and integrate policy makers requirements for the provision of GMES services to the African continent
  - avoid duplication by leveraging existing initiatives
  - develop long-term partnership between Europe and Africa

GMES - Africa

2-year process leading to the preparation of an Action Plan on "GMES and Africa partnership"

- **Consultation process**
  - Identify stakeholders
  - Propose a structure for dialogue
  - Identify elements of GMES services
  - Identify priorities
  - Identify funding instrument and mechanisms
  - Data access policy
  - Timetable for implementation

- **To be submitted to the EU-Africa Summit of end 2009**

- **Framework: Africa EU action plan 2008-10 / thematic partnership # 8 (science, info society & space)**

Lessons learnt

Lessons learnt

- **Although product generation over Africa can be most often done at marginal cost, decision is not automatic: a trigger is needed**
  - See recom EUMETSAT User Forum Brazzaville 2004 for LSA-SAF products
  - Additional products are needed for AMESD (e. g. ETP, see next slide)

- **Take up by African teams takes time**
  - Infrastructure with limited capacity (storage, sw,…)
  - Capacity building: training to understand products + to develop ad hoc applications (advanced products for un-sophisticated applications)

Data needs for AMESD (LSA SAF)

LSA SAF Products				THEMA Data Needs				
Id	Description	Status	Dissemination*	CEDEAO	CEMAC	IGAD	IOC	SADC
								TBD
LST	**Land Surface Temperature**	Operational	x					TBD
DSSF	**Down-welling Surface Short-wave Radiation Flux**	Operational	x					TBD
DSLF	**Down-welling Surface Long-wave Radiation Flux**	Operational	x					TBD
AL	**Surface Albedo**	Pre-Operation	x					TBD
SC	**Snow Cover**	Pre-Operation	x					TBD
ET	**Evapotranspiration**	Development	x		**x**			TBD
FVC	**Fraction of Vegetation Cover**	Pre-Operation	x	**x**		**x**		TBD
LAI	**Leaf Area Index**	Pre-Operation	x	**x**				TBD
fAPAR	**Fraction of Absorbed Photosynthecally Active Radiat**	Pre-Operation	x	**x**				TBD
FRP	**Fire Radiative Power**	Development		**x**				TBD

Courtesy F. Cazaban, Thales, for AMESD

Lessons learnt (2)

Because of distances / poor communications, every problem requires more effort to be sorted out

- Providers should make significant efforts to become more user-friendly:
  - improve documentation, don't expect that the user have the same background as the provider, the provider must make the effort to adapt the material to the user
  - Improve product's ergonomy: file format, data description (coding, geometric properties, …)
- Providers should reinforce training efforts
  - demo & training material,
  - Training sessions
  - On-the-job training
  - Validation / calibration campaigns also in Africa! → confidence building

Lessons learnt (3)

Is product harmonization needed?

- **Soon a problem in Africa!**
- **A same name can hide significantly different products**
- **Multi-source data availability**
  - is good because increases guarantee of access
  - Requires benchmarking capacity by the user to rank the offer according to suitability: a dream?

Conclusions

- There is a need to generate bio-geophysical parameters and environmental indicators over Africa not only to feed models in European monitoring and forecast centres, but also for users in Africa

- Production is not enough: knowledge transfer efforts need to be fostered to ensure use

- The existing framework will be consolidated / reinforced with a long-term perspective by the "GMES Africa partnership"