

Space and Global Environmental Stewardship

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European Commission

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Apollo 8 Dec. 24.1968

The emergence of a global consciousness

A bit of history:

- * The earth as a “system” ...a finite earth
Apollo 1968 : an iconic symbol, an awakening**
- * The Limits to Growth Club of Rome 1972**
- * The Brundtland Reports on Our Common Future
1987**
- * Rio 92 : rise of global concern - stewardship of the
global environment**

A bit of history– cont'd:

At the EU level

*** Environmental European Policy – the global dimension**

- Integrated approach of the 4th EAP (1987-92)
- Emergence of global threats at the end of the 80ies (climate change, hazards).

“.....tool for strengthening European integration and the Commission's own role in international politics”.

*** Green diplomacy network (2002 – Barcelona Council of General Affairs)**

Large number (!) of international environmental agreements to which the EU is partner (+MS)

- ***UNFCCC*, UN Framework Convention on Climate Change 1994**
- **Kyoto Protocol 1997,2005**
- ***UNCCD*, UN Convention to Combat Desertification 1994**
- ***CBD*, UN Convention on Biodiversity**
- ***Ramsar*, Intergovernmental Convention on Wetlands**
- ***WHC*, World Heritage Convention**
- **Many others**

A bit of history- Cont'd

Earth Observation

*** Civilian EO**

AVHRR 1967 Meteorological instrument ****

ERTS-1 1972 and series of LANDSAT

**The 1990ies early stages of global access with
ENVISAT, SPOT, VGT, METEOSAT +,..**

*** 1998 Launch of GMES !**

Baveno Manifesto – GMES May 1998

"In this emerging context,

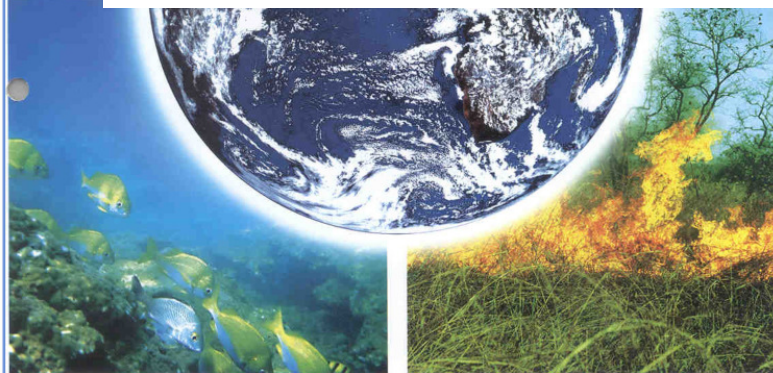
global environmental information will, more than ever, be at the core of the decision making process of political

Global Monitoring for Environmental Security

A Manifesto for a New European Initiative

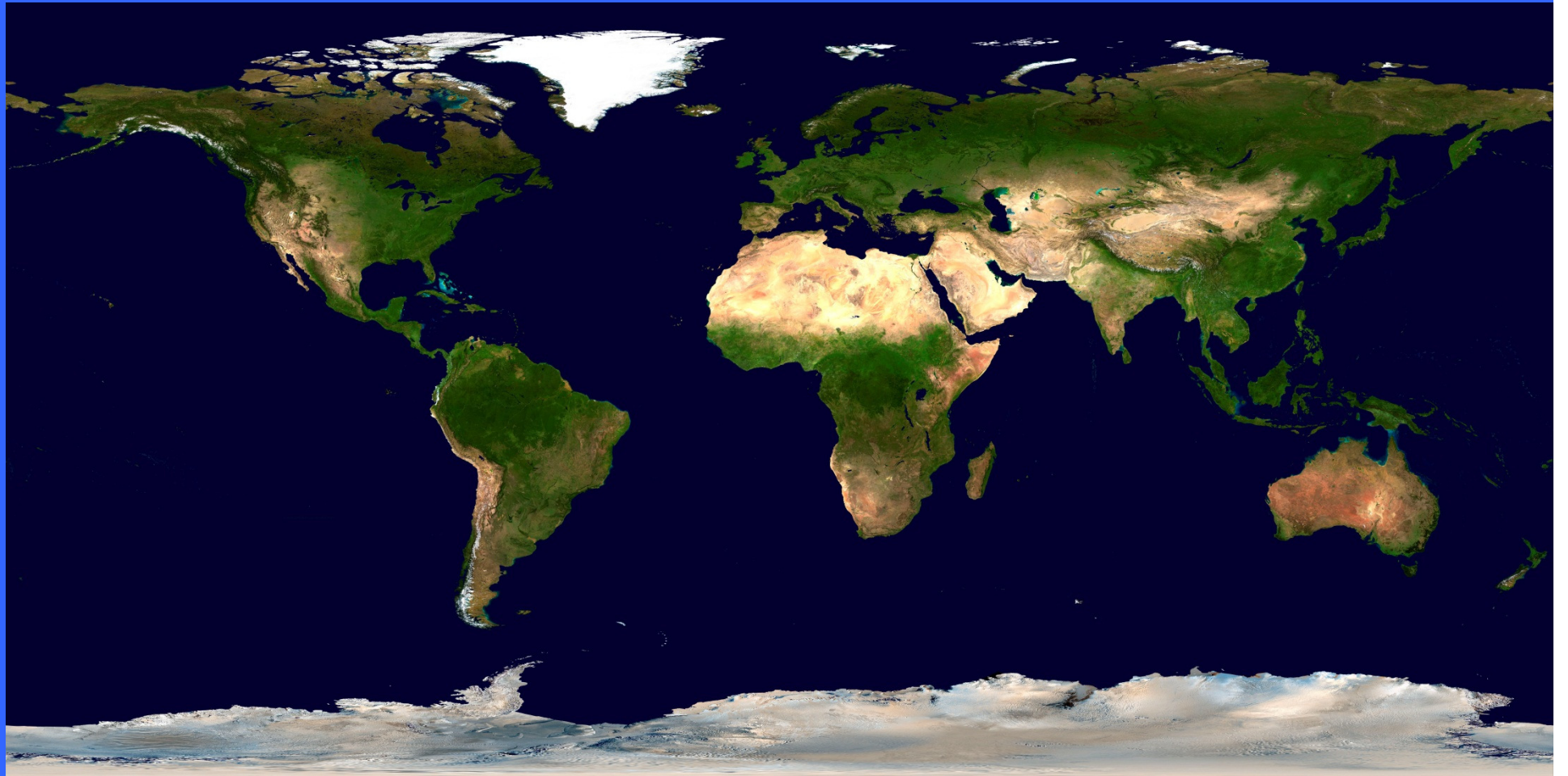


.....global environmental information will, more than ever, be at the core of the decision making process of political entities wishing to play a role in world affairs.....



appropriate interventions, exploiting the economic advantage of advance knowledge or implementing remedial measures. In critical situations, the political demand for independent and impartial information will grow accordingly.

The importance for Europe of guaranteeing (such) independent knowledge on environmental security issues is increasingly evident. **To reach such objective it is necessary to forge a renewed alliance between political, scientific, technological, industrial and institutional partners.**"



The 2000 era:

Addressing **global issues (ecosystem services, resources, climate)**

Answering **societal needs (food, energy, security)**

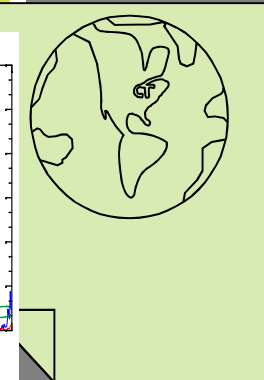
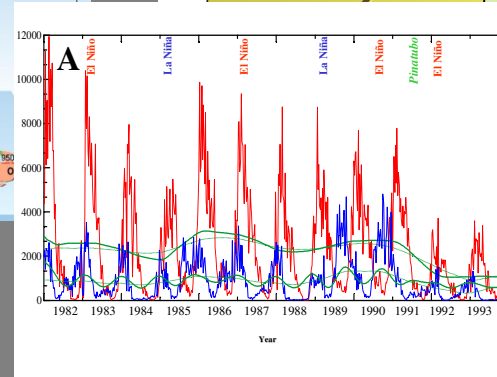
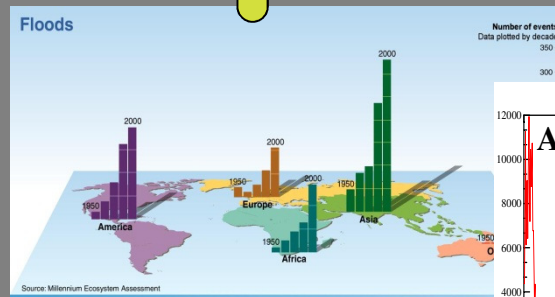
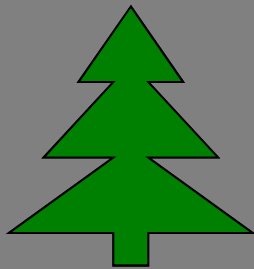
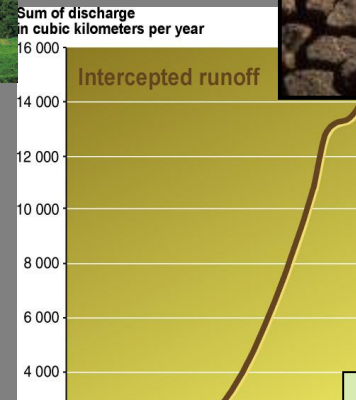
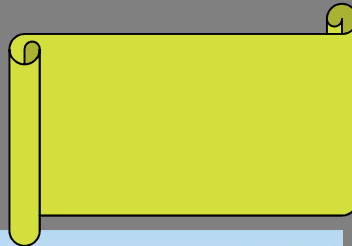
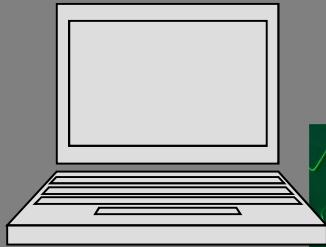
Supporting **policies**

Focus is on detecting , measuring and understanding the

«  »

Entering the Anthropocene !

Searching for the « »



Three functions of satellite observations in supporting global stewardship

-MONITORING : securing continuity in observation service as required by the particular application at global scale

-DETECTION : securing a capacity to detect, interpret and assess events of significance in the area of concern

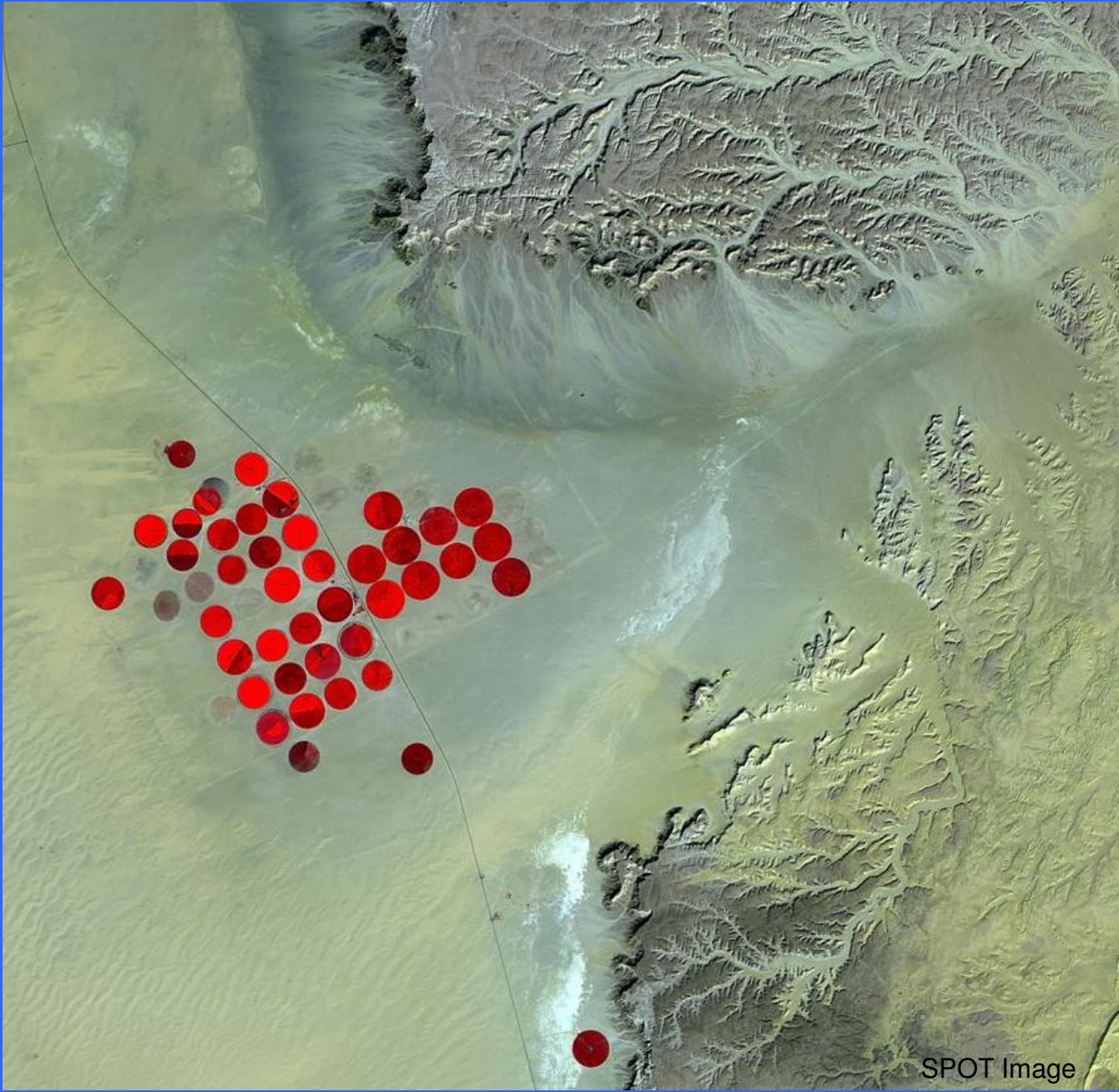
-VERIFICATION : based on system of such quality that it can be used to guarantee (or otherwise) the application of public policies (compliance regimes eg. **UN Convention on Climate Change, REDD**, regulations, contractual situations, claims, etc..)

**The earth is being rapidly transformed
....under our very (satellite!) eyes**

**Those changes lead to a new world
configuration....**

EO:

- awareness, early signals
- measurements and trends
- verification of compliance

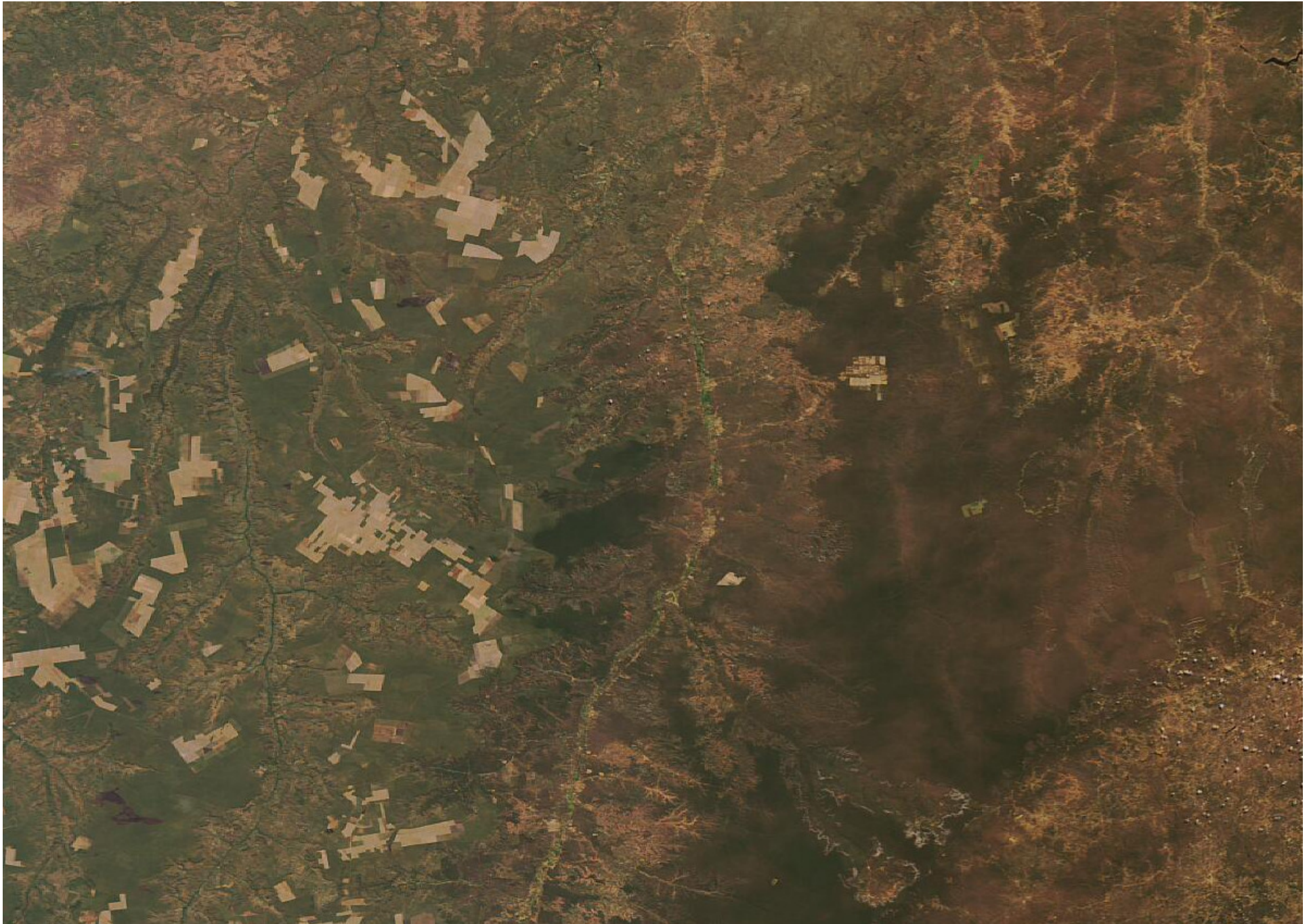


SPOT Image

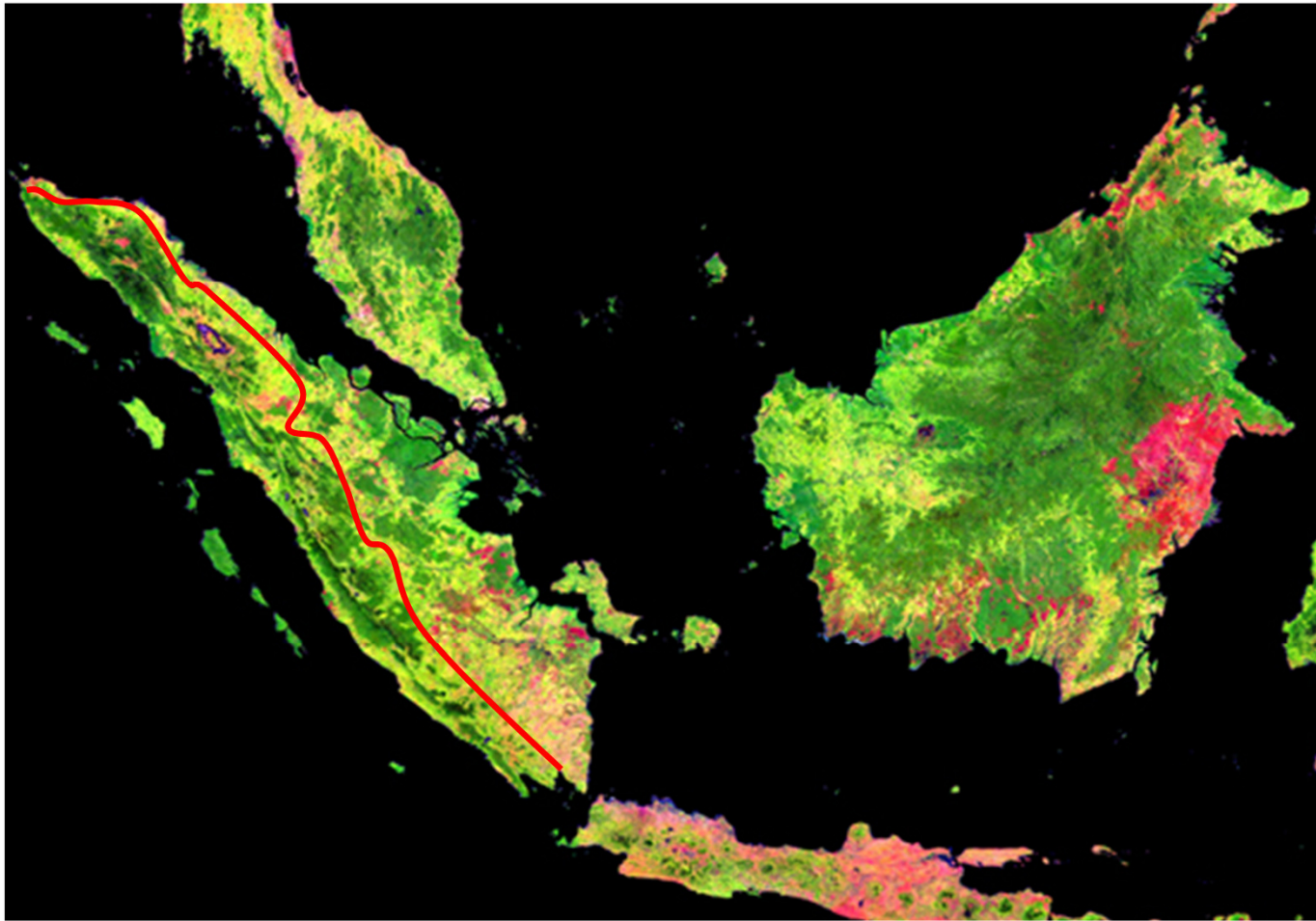
DETECTING



Saudi Arabia : pivot irrigation for grain production using deep underground fossil water- not sustainable but driven by food security concerns



Août 2008 Brazil, Mato Grosso: global change under or own eyes !!!!

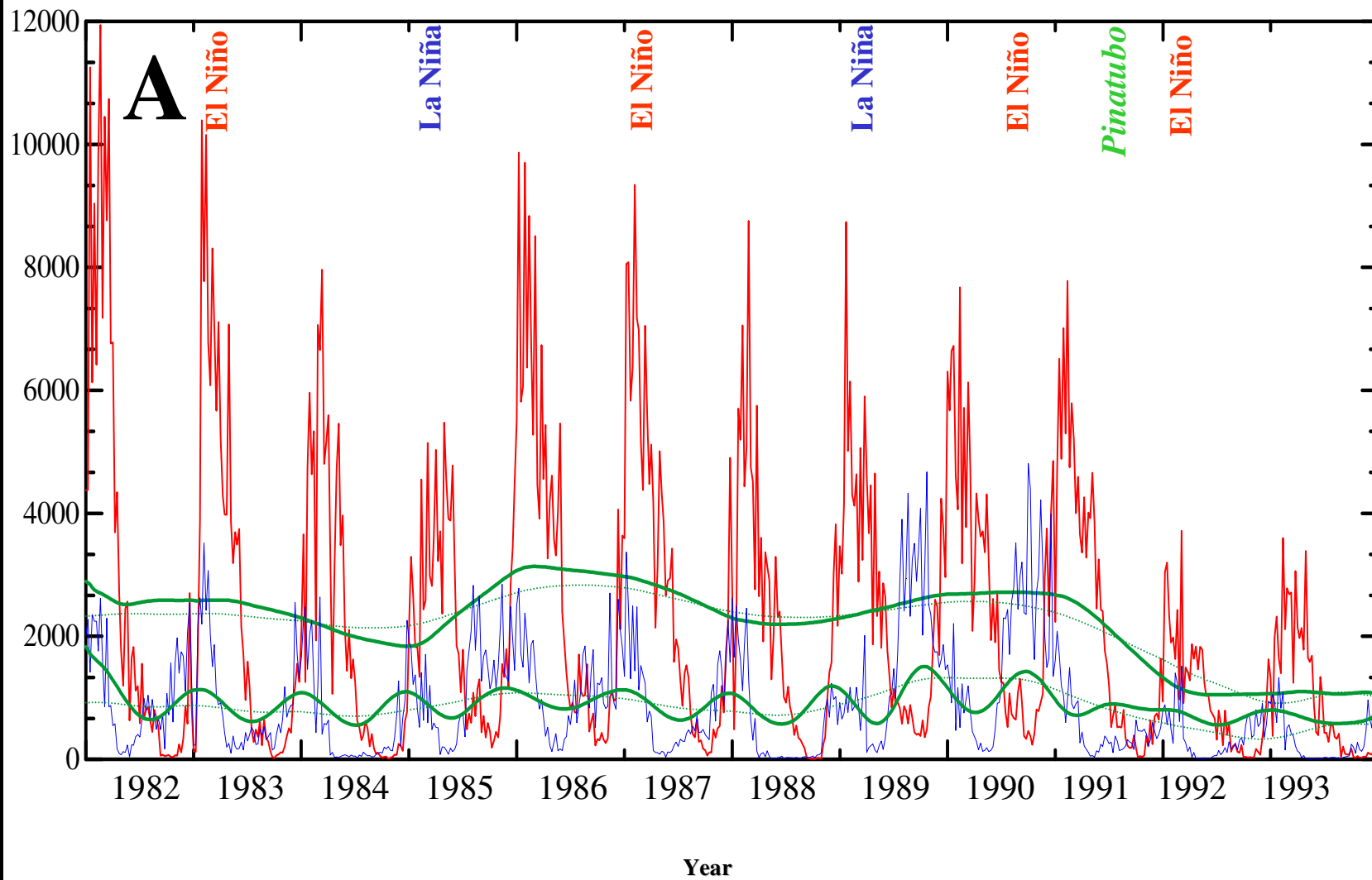


SPOT VEGETATION
composite 1998-99





Greenhouses Spain , Almeria- 2004



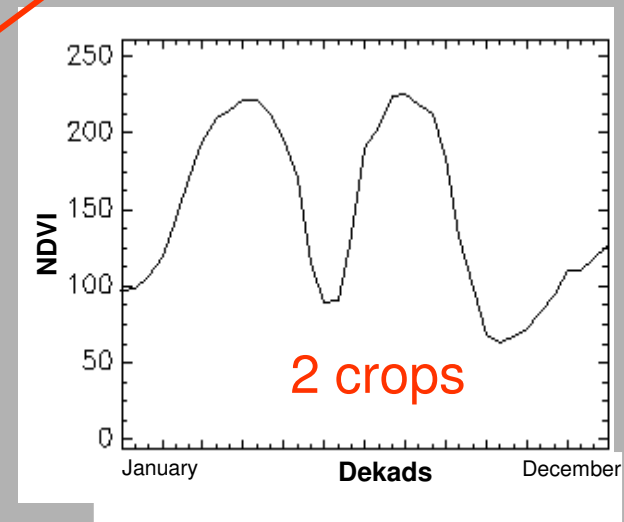
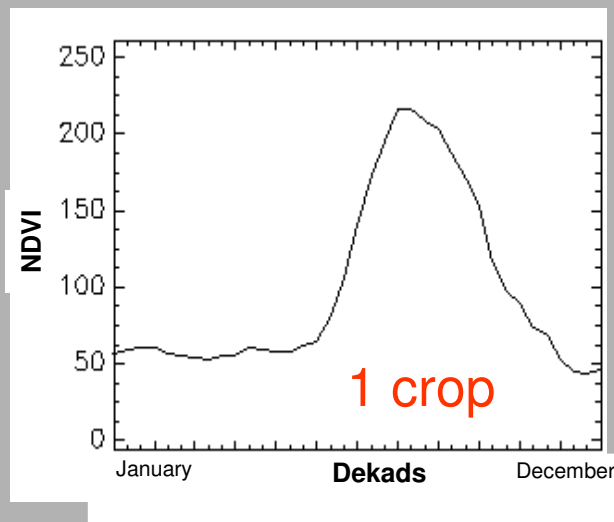
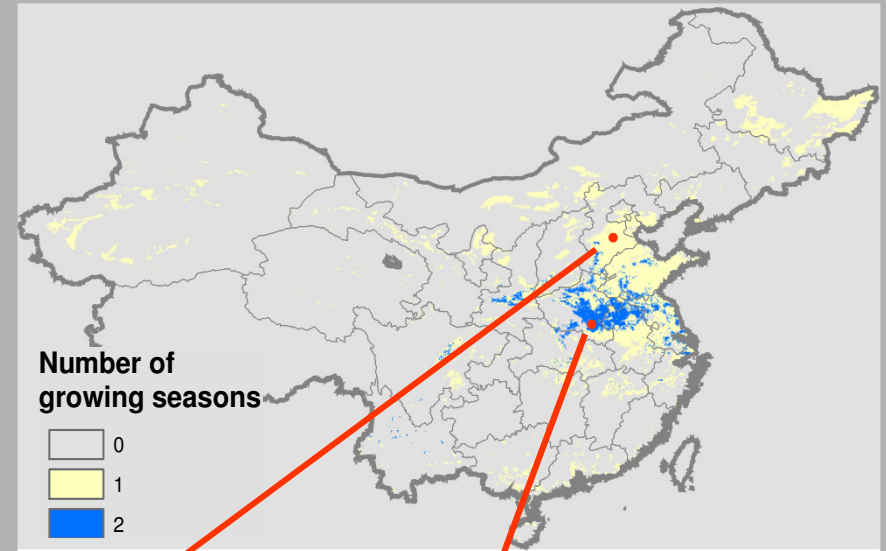
China - Identification of rice growing seasons

Dataset

- SPOT-VGT, NDVI, 10 daily
- Rice crop mask (JRC)

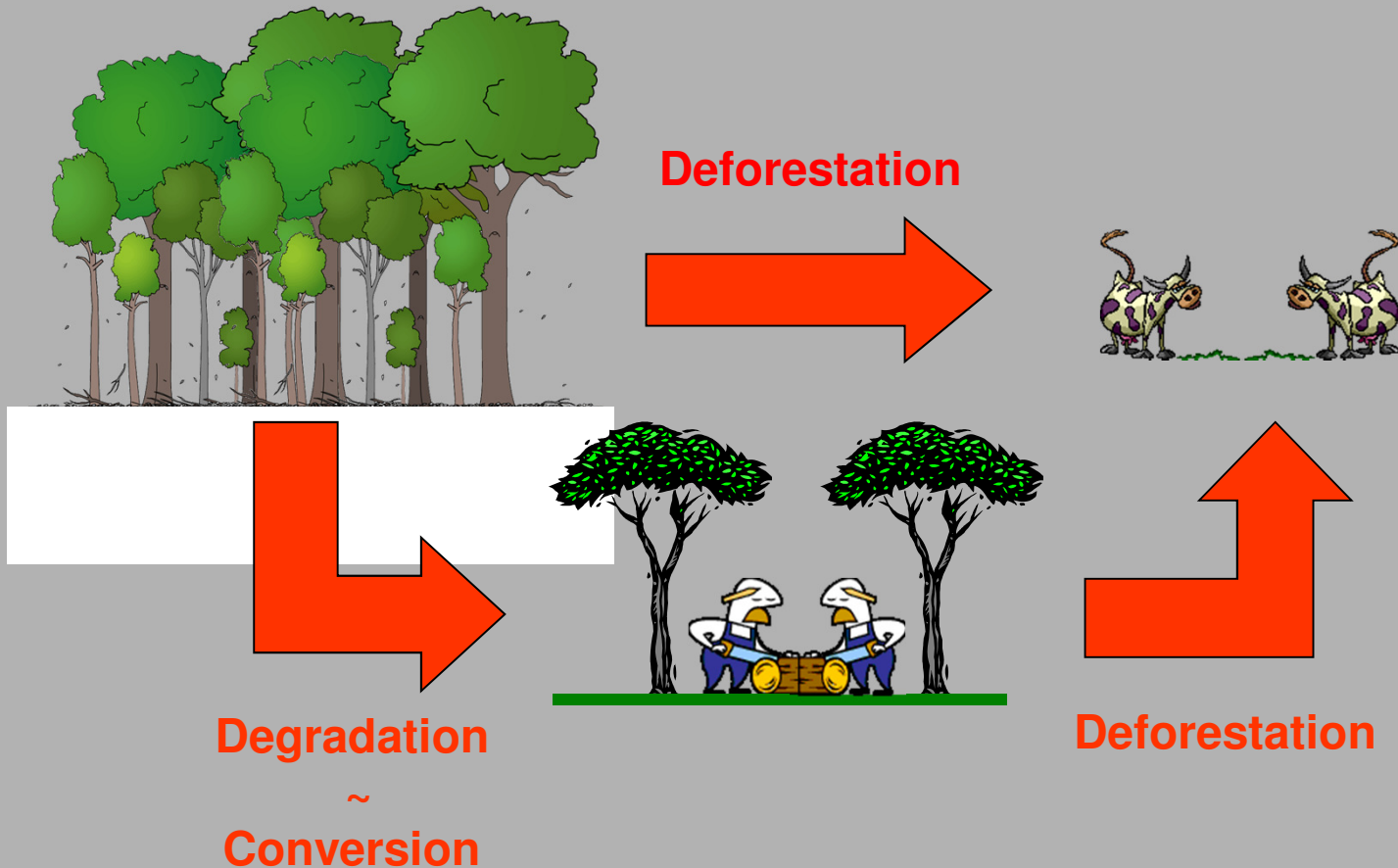
Methodology

- Auto-correlation
- Comparison with FAO statistics



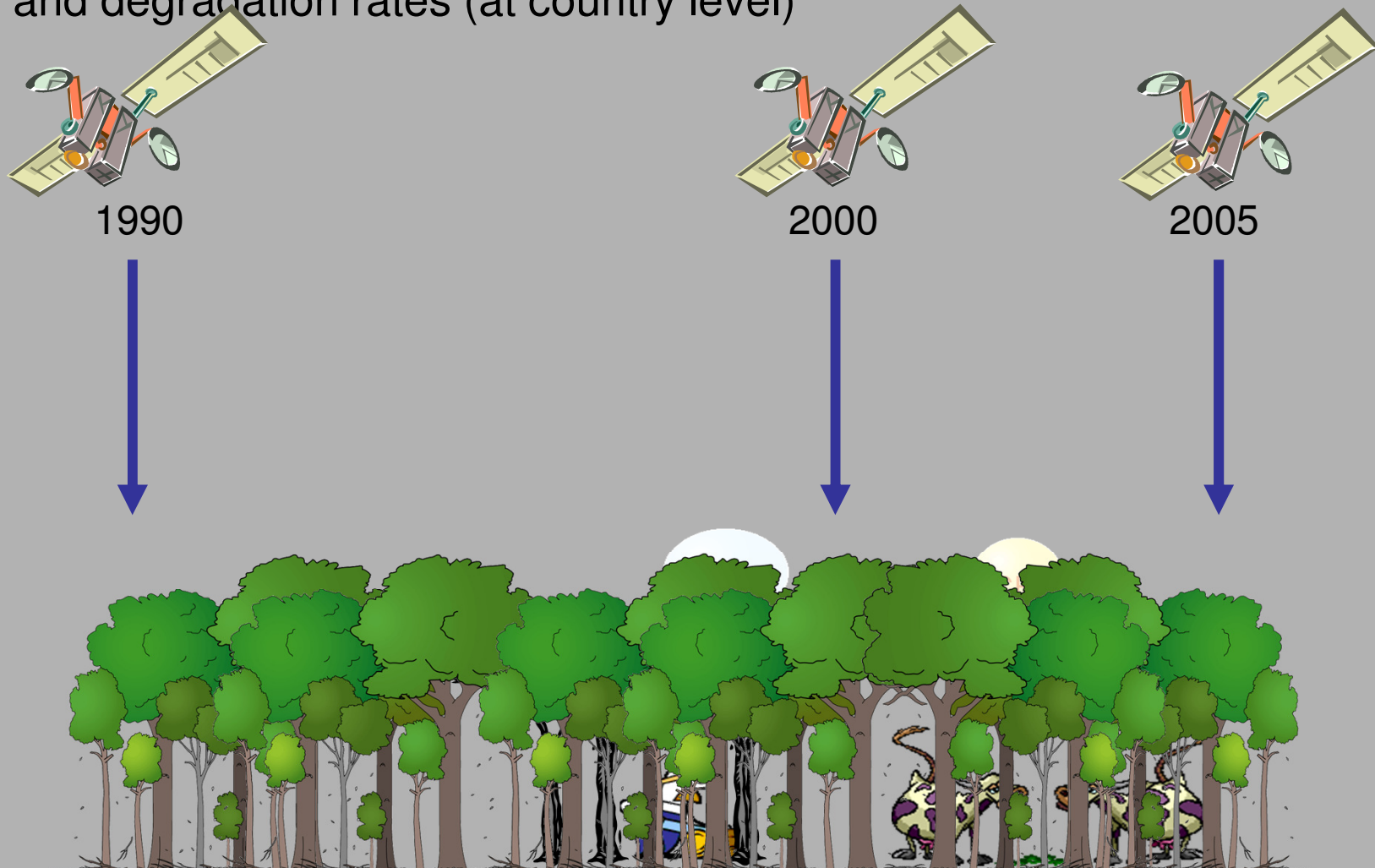
Climate Change: REDD mechanism

To account for **gross carbon emission reductions** and non-CO2 emission reductions only **in existing forest areas on a national basis**.



Historical Reference

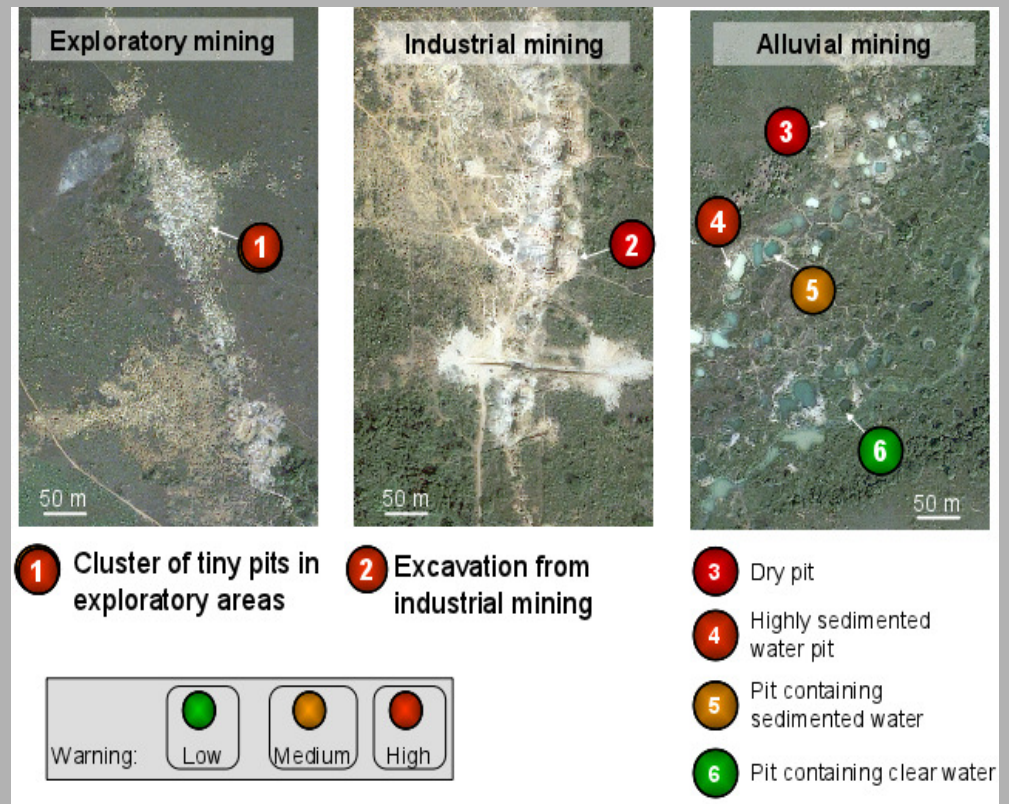
- Future emissions will need to be compared to a national reference emission scenario
- Such scenario will be mainly based on historical deforestation and degradation rates (at country level)



Kimberley Process Certification Scheme (KPCS)

In 2003, the Kimberley Process Certification Scheme (KPCS) was setup to prevent trade in conflict diamonds through obliging governments to certify that rough diamond shipments are conflict-free. *On Ivory Coast*

This certification system deploys a number of tools to monitor diamond production on the ground (statistical research, satellite monitoring, field visits).



Deterrent? name, fame or shame.....



La Guardia di Finanza sta indagando !!!.

Consultando **Google Earth**, un **anonimo internauta** ha scoperto un'enorme macchia intorno a una nave. a largo di Montalto di Castro, nel Lazio. Ha così scoperto un mercantile che stava scaricando in mare, creando una chiazza di probabile origine oleosa.

La Repubblica, 23.09.2008

<http://www.repubblica.it/2006/12/gallerie/ambiente/nave-scarica/1.html>

Thanks to broad availability of satellite data

-All policemen?

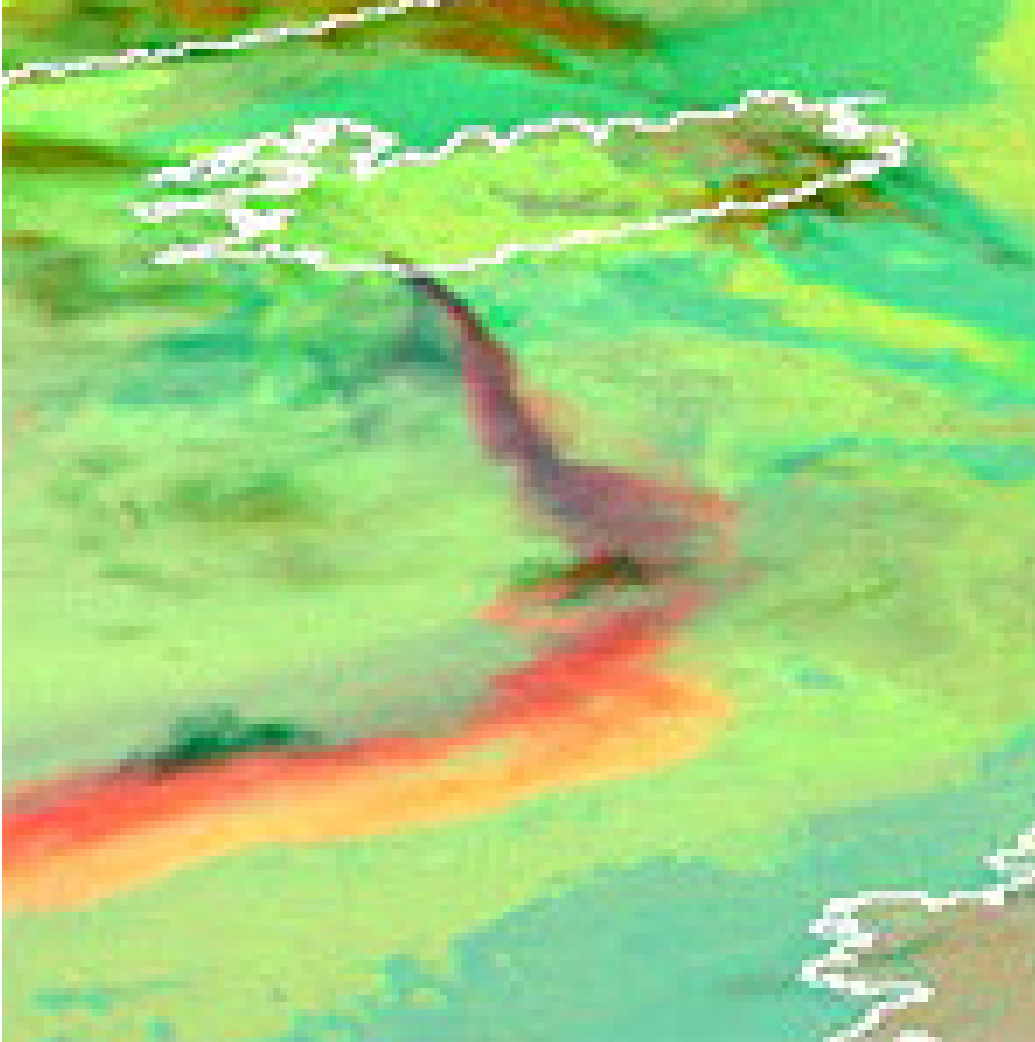
-All guardians of our environment?

-All responsible for the earth?

RESPONDING to CRISES



Eruption of the volcano Eyjafjallajökull in Iceland - April /May 2010



Threats to air navigation

**Satellite-based
quantification of ash
clouds associated with
volcanic eruptions**

EUMETSAT

**METEOSAT SECOND
GENERATION**

SEVIRI Instrument

Ash dispersion models + satellite observations → advisories

Future developments in satellite data for global analyses

Preconditions :

- Availability:** anywhere, anytime?
- Continuity:** essential, coherence, confidence
- Relevance:** from data to information
- Accessibility:** for whom, data policy

But,

the whole world has now become a potential source of networking, sharing, accessing and producing data

“Big data” is upon us:

**The assumption is that embedded
“in there” is the answer to my
question...!***

**The higher the n data, the higher
the probability that useful
information is indeed “in there”**

“Here is the evidence, now what is the hypothesis?”

Satellite data will be increasingly embedded in other information systems

- **the network (Big data !)**
- **ubiquitous ground sensors**
- **drones**

Defining the Earth Observing systems for 2030-50 starts today !

Why should Europe maintain global monitoring capabilities ?

- Large political entities such as EU need information on the condition and status of resources and environment worldwide.
- Such information is part of EU ambition to exercise global stewardship of our common resources and environment .
- Autonomy will increasingly be required in selected strategic areas

Satellites are the
true sentinels
of the
Earth !



But they will not be alone anymore...!