GROUP ON EARTH OBSERVATIONS

Building a Global Earth Observation System of Systems (GEOSS)

5th Jubilee International Conference on Cartography & GIS

Barbara J. Ryan
Director, GEO Secretariat

16 June 2014
Varna, Bulgaria

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A Global, Coordinated, Comprehensive and Sustained System of Observing Systems

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GEO Objectives

- Improve and Coordinate Observation Systems
- Advance Broad Open Data Policies/Practices
- Foster Increased Use of EO Data and Information
- Build Capacity

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Created in 2005, to develop a coordinated and sustained Global Earth Observation System of Systems (GEOSS) to enhance decision making in nine Societal Benefit Areas (SBAs)

GEO today:

91 Members

77 Participating Organizations

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77 Participating Organizations

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A broad Commercial Sector spans the entire information value chain

Data providers





Value-Added providers



Downstream users





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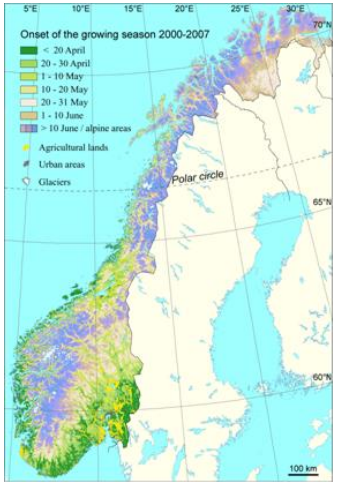
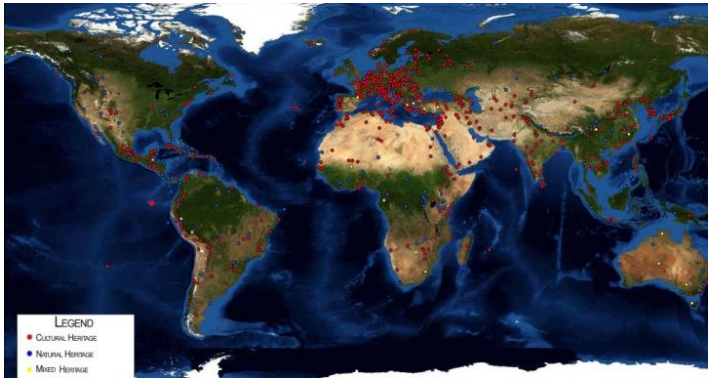
Ecosystem Classification & Mapping

(Australia, Austria, Brazil, Canada, China, EC, Italy, Paraguay, USA, RCMRD, UNESCO)





UNESCO

USGS science for a changing world

CHINESE ACADEMY OF SCIENCES

ABCC

* SHARE mountain stations operational
* All ecosystem mapping data available; DataCORE
* New maps of growing season
* Atlas of 40 Chinese World Heritage Sites
* Decision-making support: ABCC program

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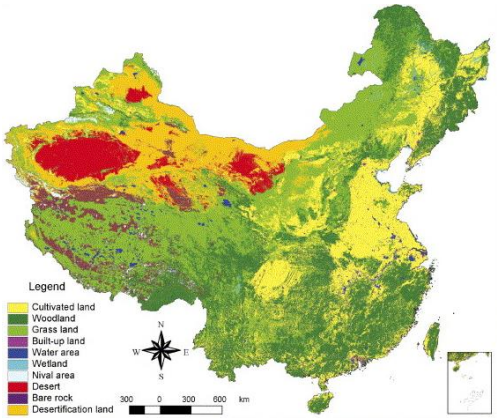
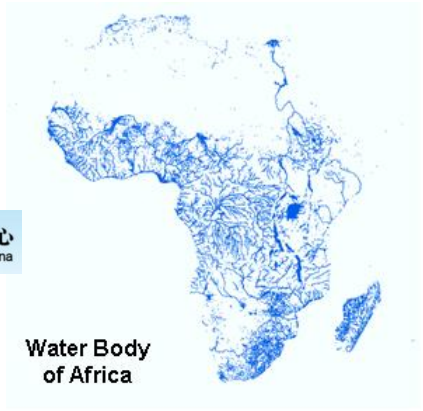
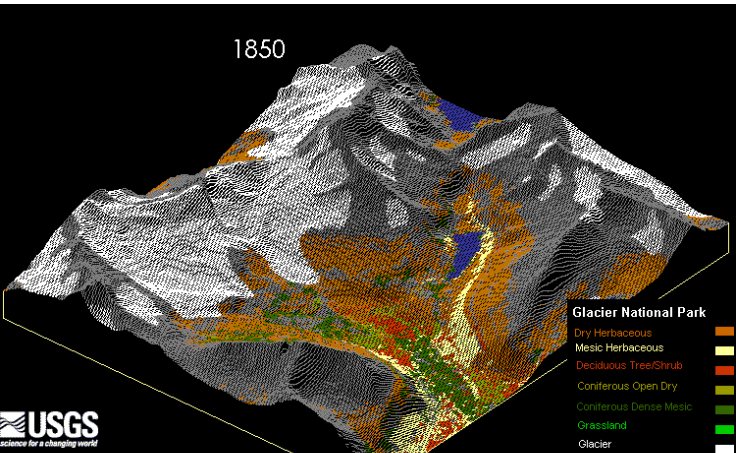
Advanced Land-Cover Products

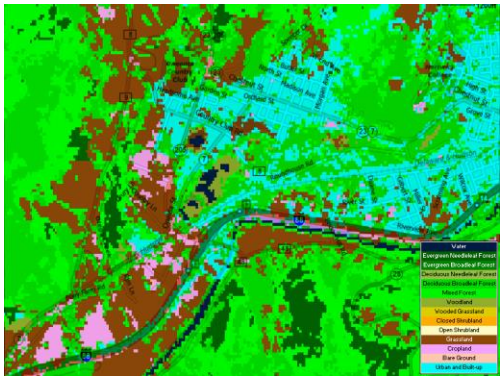
(Canada, China, EC, Greece, Japan, Netherlands, Nigeria, Spain, Sweden, UK, USA, Spain, EEA, ESA, GTOS, ISPRS)



国家基础地理信息中心
NGCC National Geomatics Center of China







* Global 30m products
* Major land cover types (eg. wetland)
* Independent validation databases
* Global Land Cover Portal
* Growing int'l consensus

GOFC-GOLD GLOBAL OBSERVATION OF FOREST AND LAND COVER DYNAMICS

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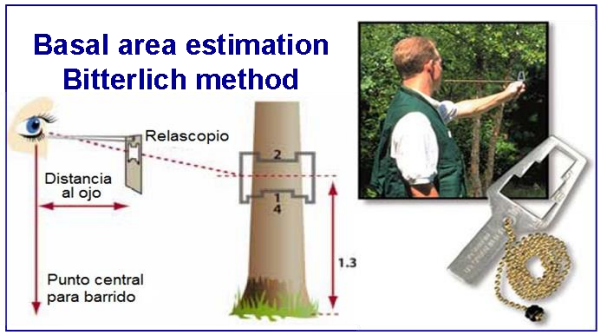
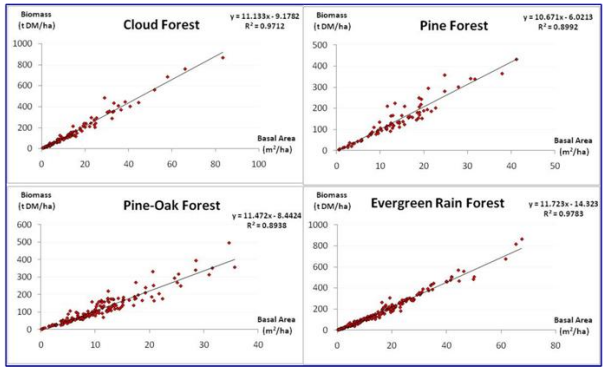
Global Forest Information System

(Australia, Canada, Japan, Norway, USA, CEOS, FAO)

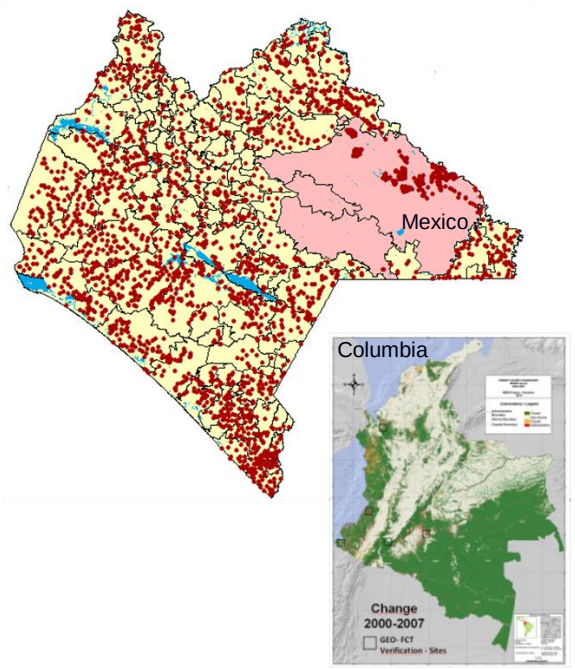
Rapid Carbon Appraisal Inventories





In-situ forest measurements

2011 field campaign: 3,000 samples



* Forest Carbon Tracking ongoing
* Demo in 12 countries (Congo)
* Coordinated space data acquisition
* In-situ validation
* Regional capacity building growing (US Silvacarbon)

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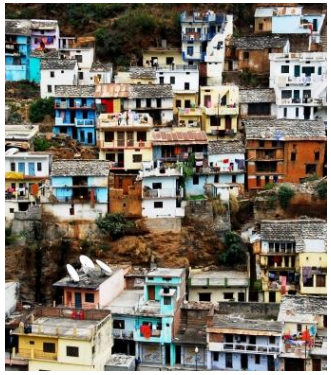
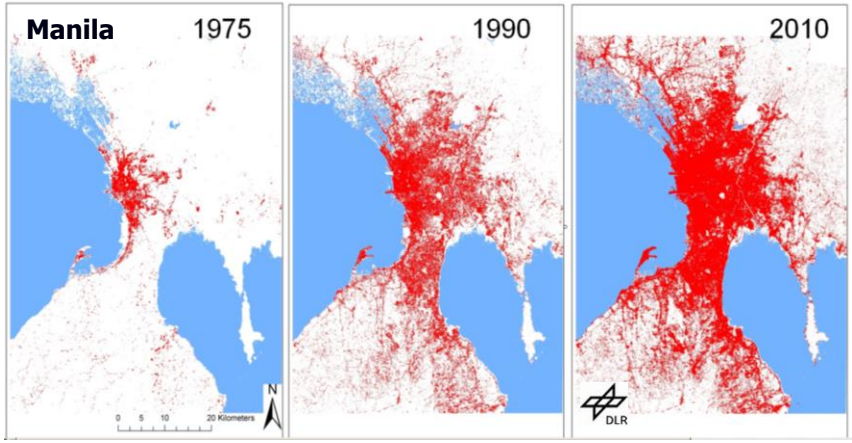
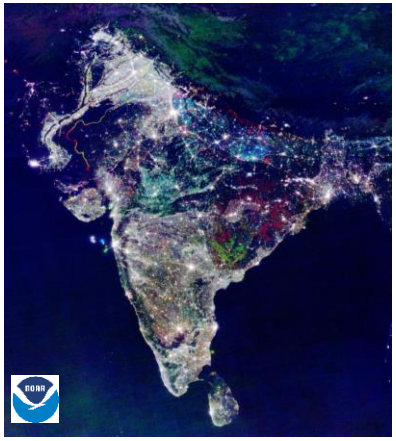
Global & Local Urban Footprints

(China, EC, Germany, Greece, Italy, Pakistan, USA)







* 35-yr evolution of 26 mega-cities
* Global night-time lights for 2012
* Urban Heat Island patterns
* Over 3’700 cities mapped using ASTER (15m)

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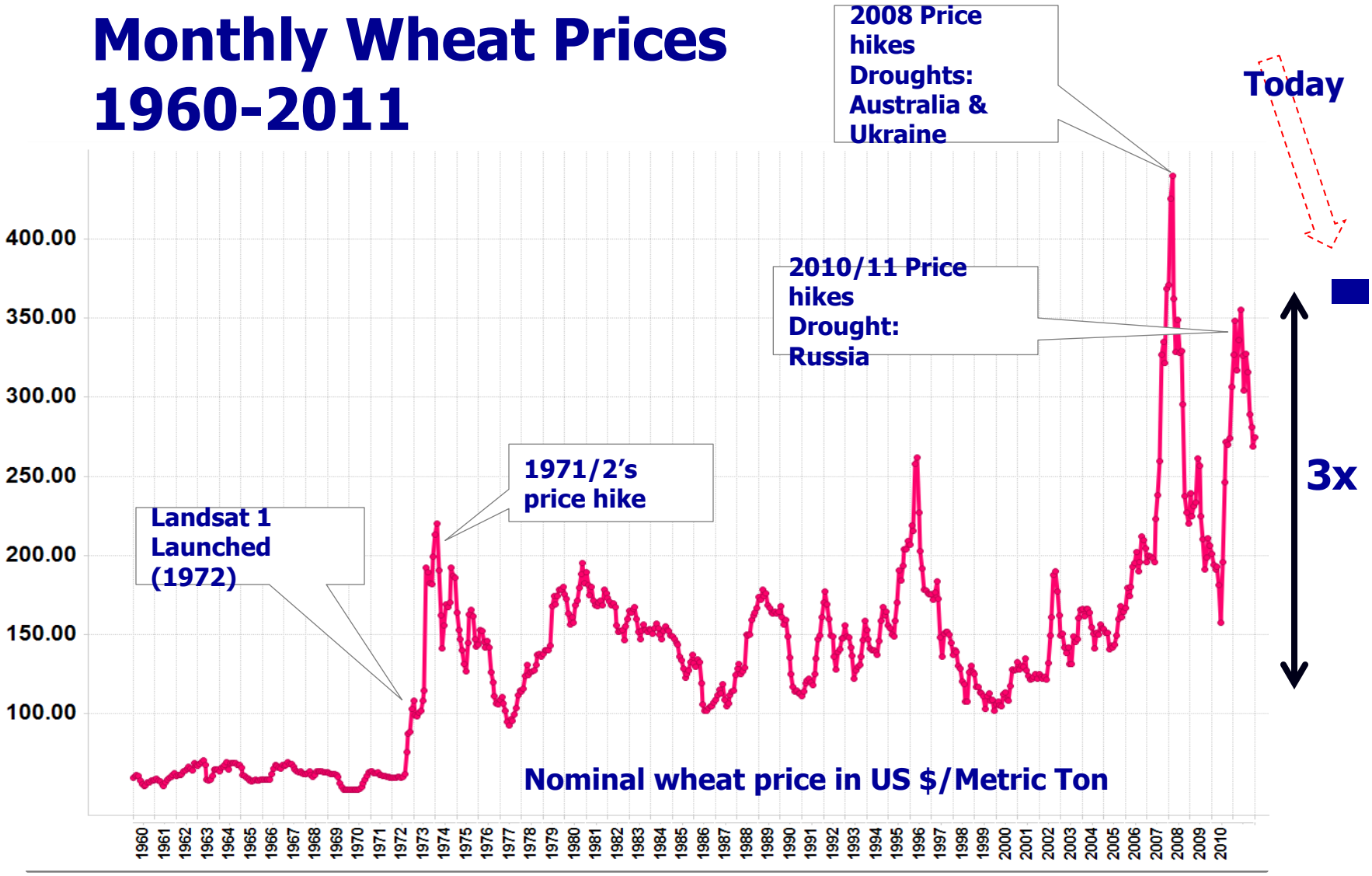
Monthly Wheat Prices 1960-2011



Source: World Bank

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Crop Information for Decision-Making

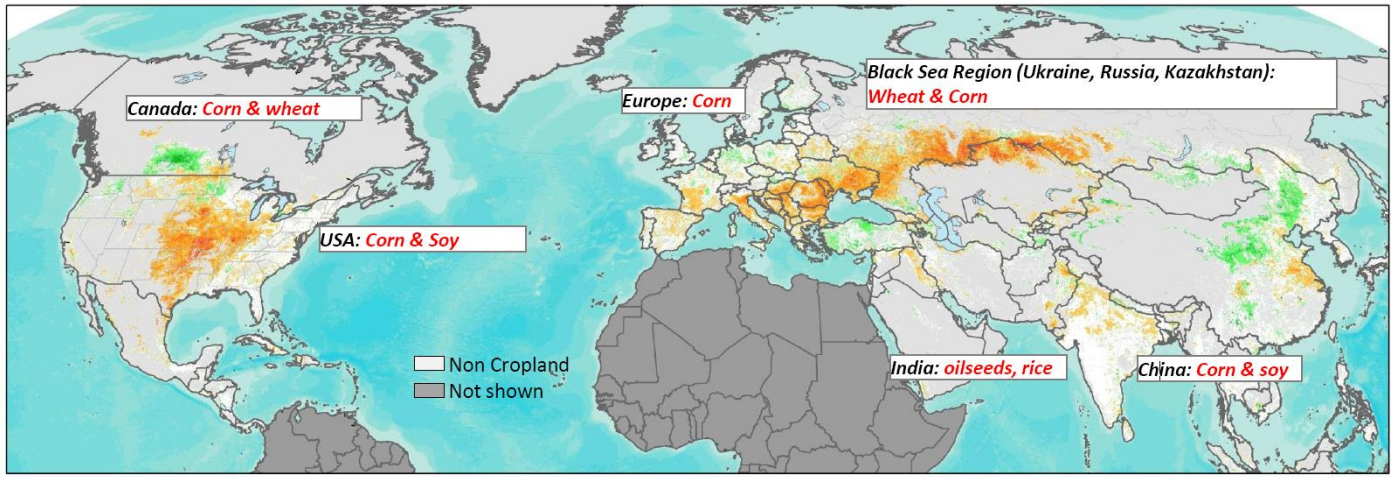
(Canada, China, EC, France, Japan, Kazakhstan, India, Mexico, Russia, USA, CEOS, FAO)

G20 FRANCE 2011 NEW WORLD NEW IDEAS

G2012 MÉXICO

GEOGLAM Global Agricultural Monitoring

Northern Hemisphere NDVI Crop Anomaly, August 13th, 2012



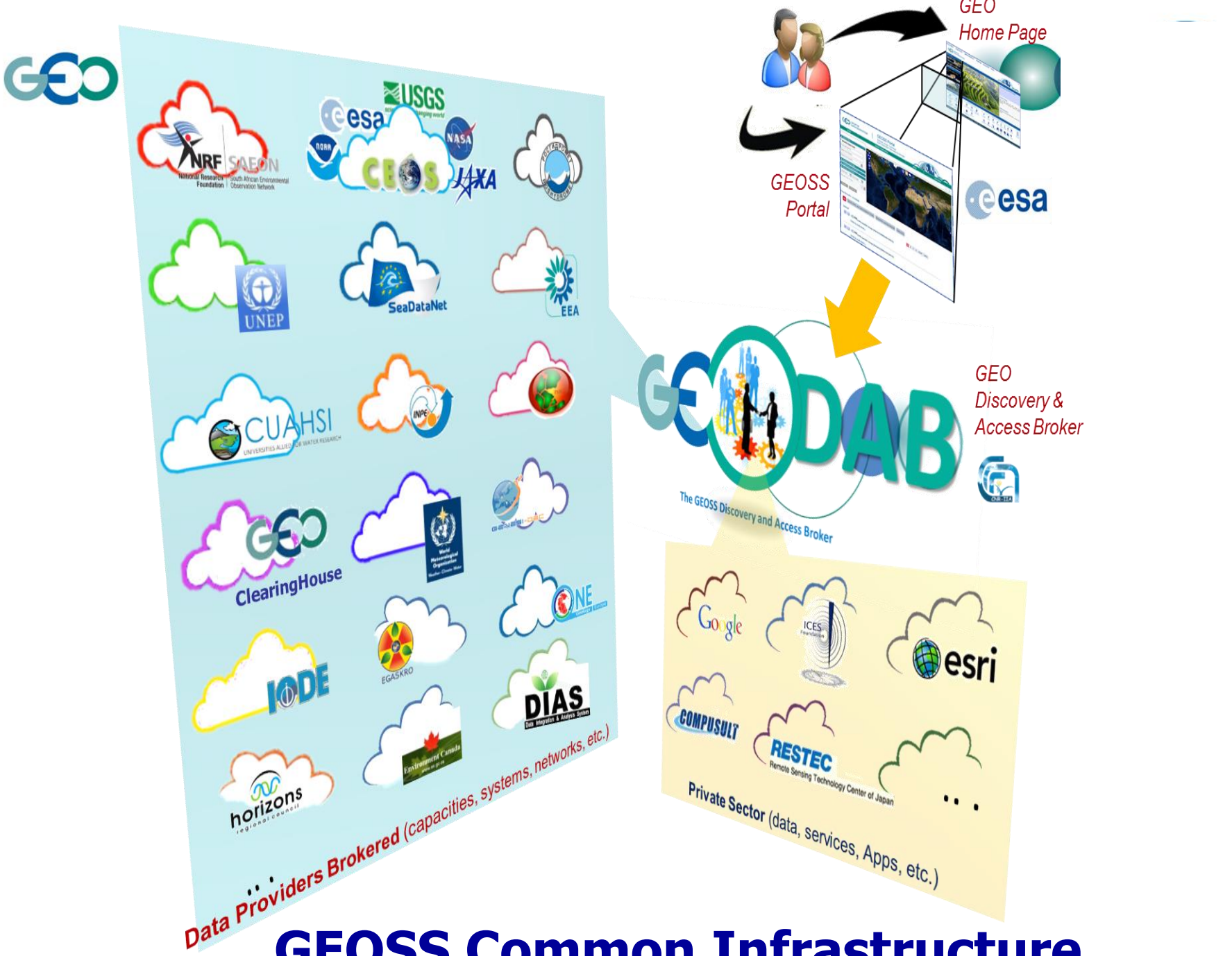
Crop NDVI Anomaly

-0.4 Worse than normal | 0 normal | 0.4 Better than normal

Observed highlights:

- Drought conditions persist in US, south eastern Ukraine, Russia, and Kazakhstan, with slight improvement in some areas in northern Kazakhstan
- Rains in India mitigate dry conditions

* GEOGLAM part of G20 Action Plan on Food Price Volatility
* New crop outlook
* Rice crop monitoring
* Draft space strategy



GEOSS Common Infrastructure

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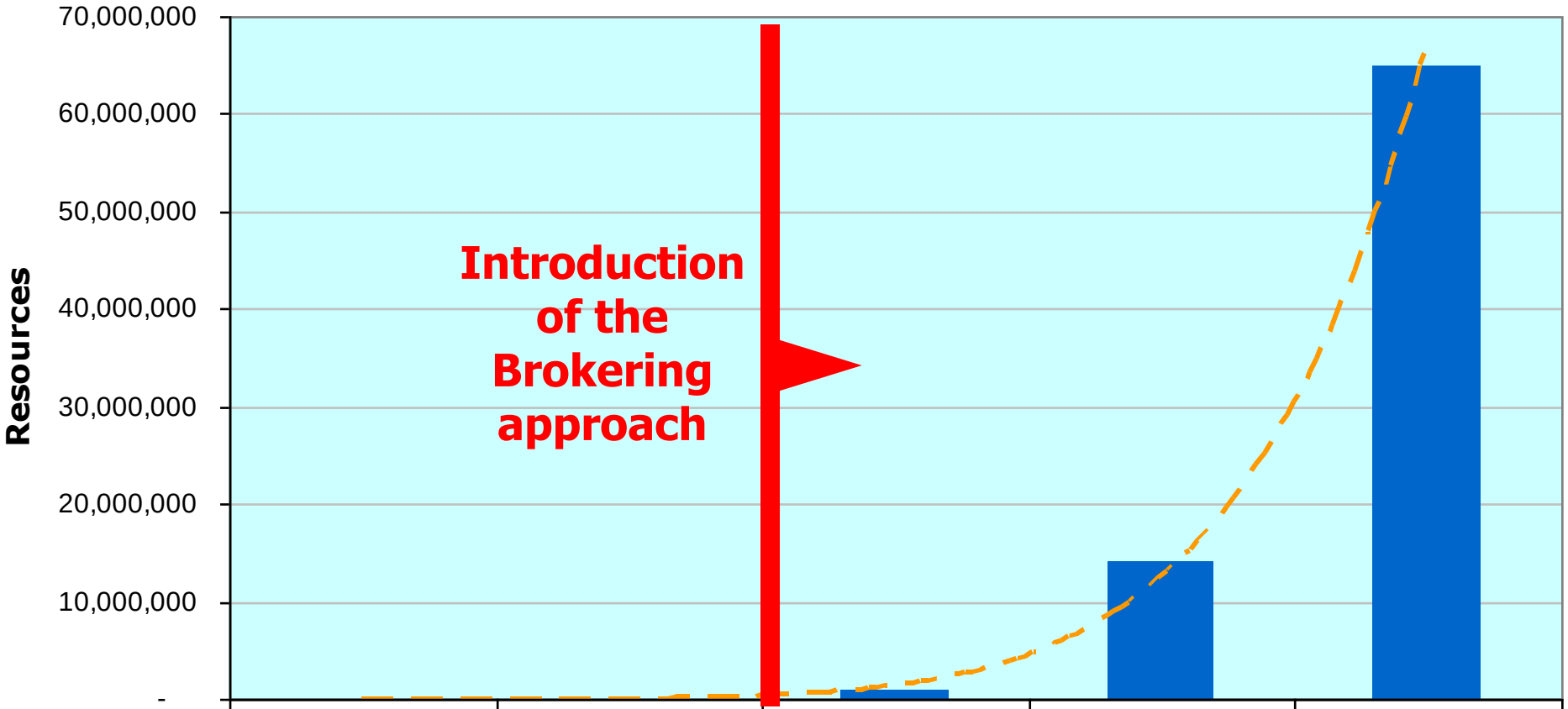
GEOSS Resources



	2010	2011 (Sep)	2011 (Nov)	2012 (Nov)	2014 (Apr)
Resources	300	100,000	1,002,000	14,000,000	65,000,000

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GEOSS Current Assets (May 2014)

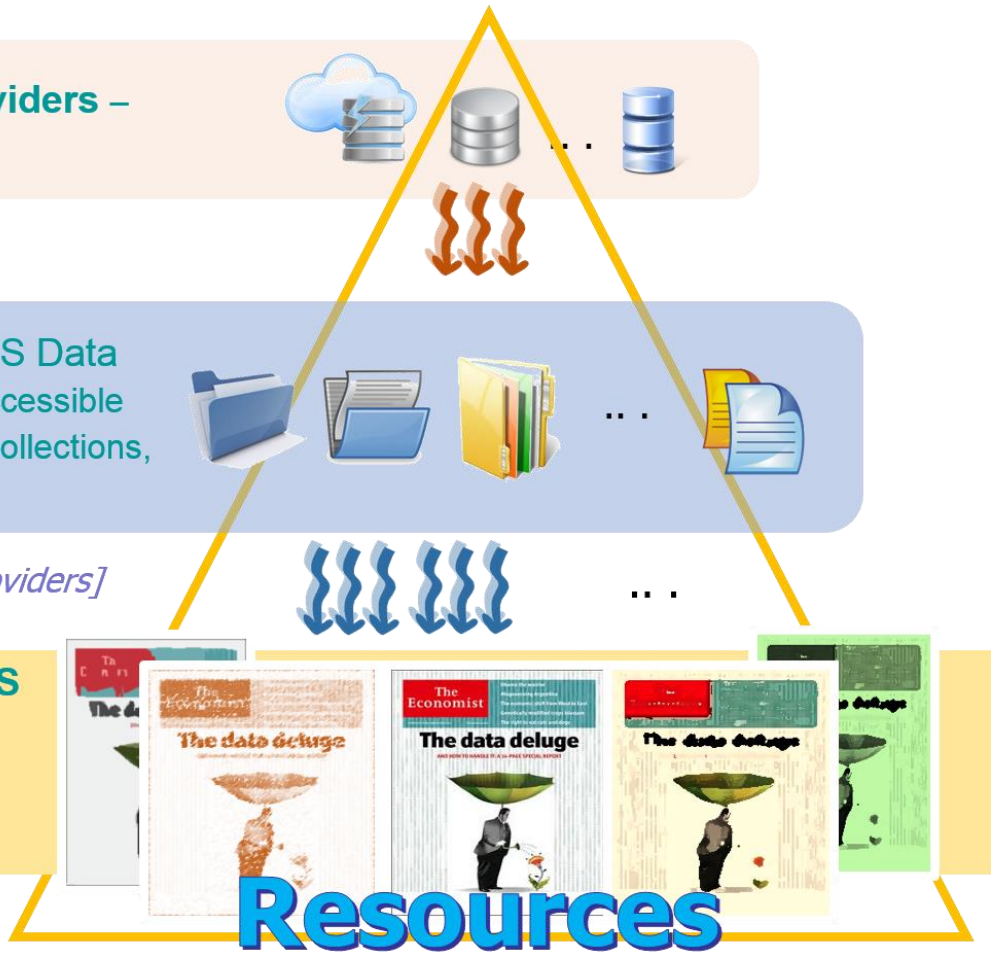
More than **30 brokered Data Providers** – capacities, systems, Communities

Publish

About 13 Million (1.2 Million GEOSS Data Core) Discoverable and potentially Accessible **first level resources** (mix of data collections, datasets and individual images)

Contain [source: data providers]

More than **70 Million (51 Million GEOSS Data Core)** Discoverable and potentially Accessible **individual resources** (e.g. satellite scenes, rain gauge records)



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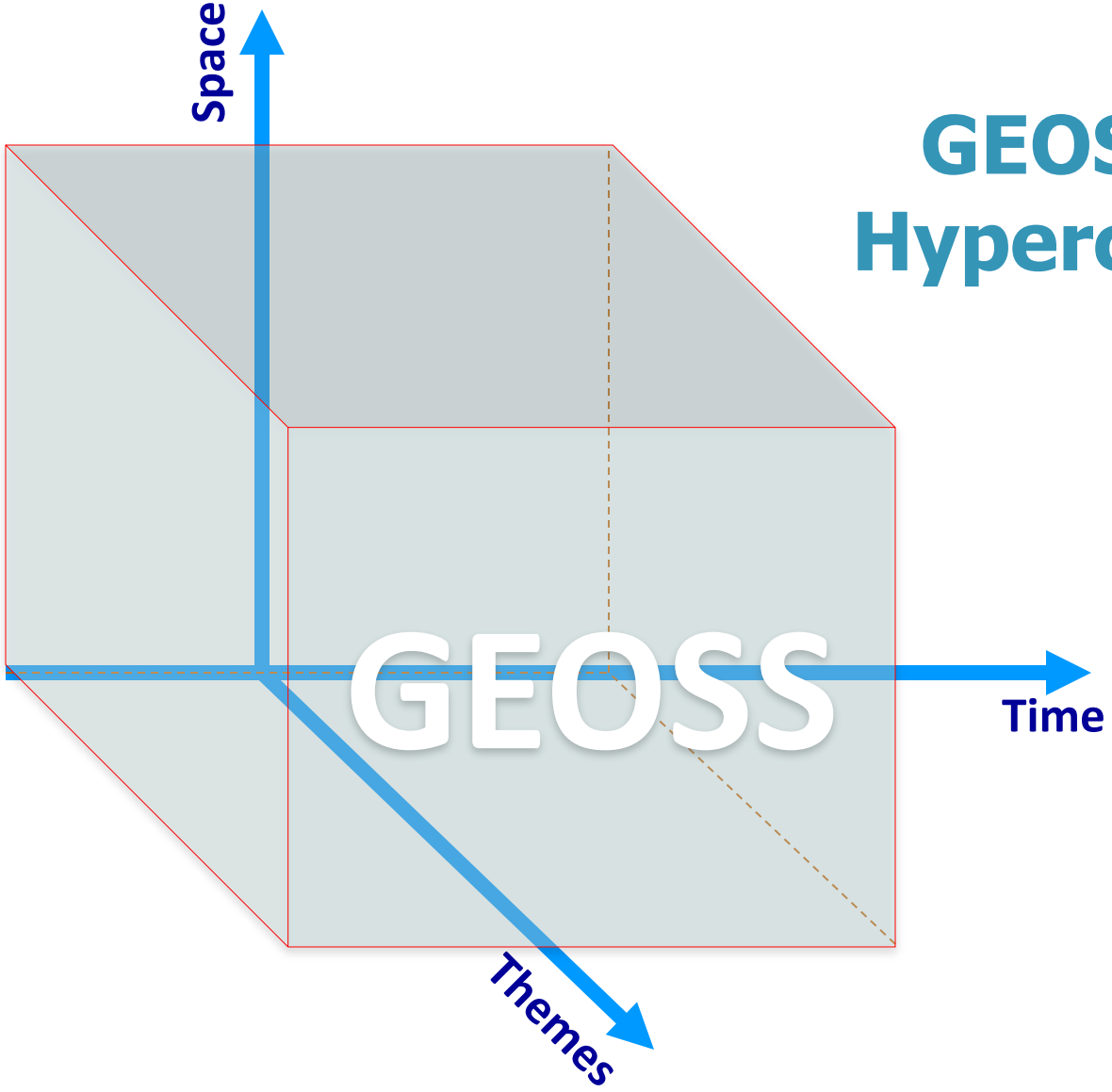
GEOSS Hypercube



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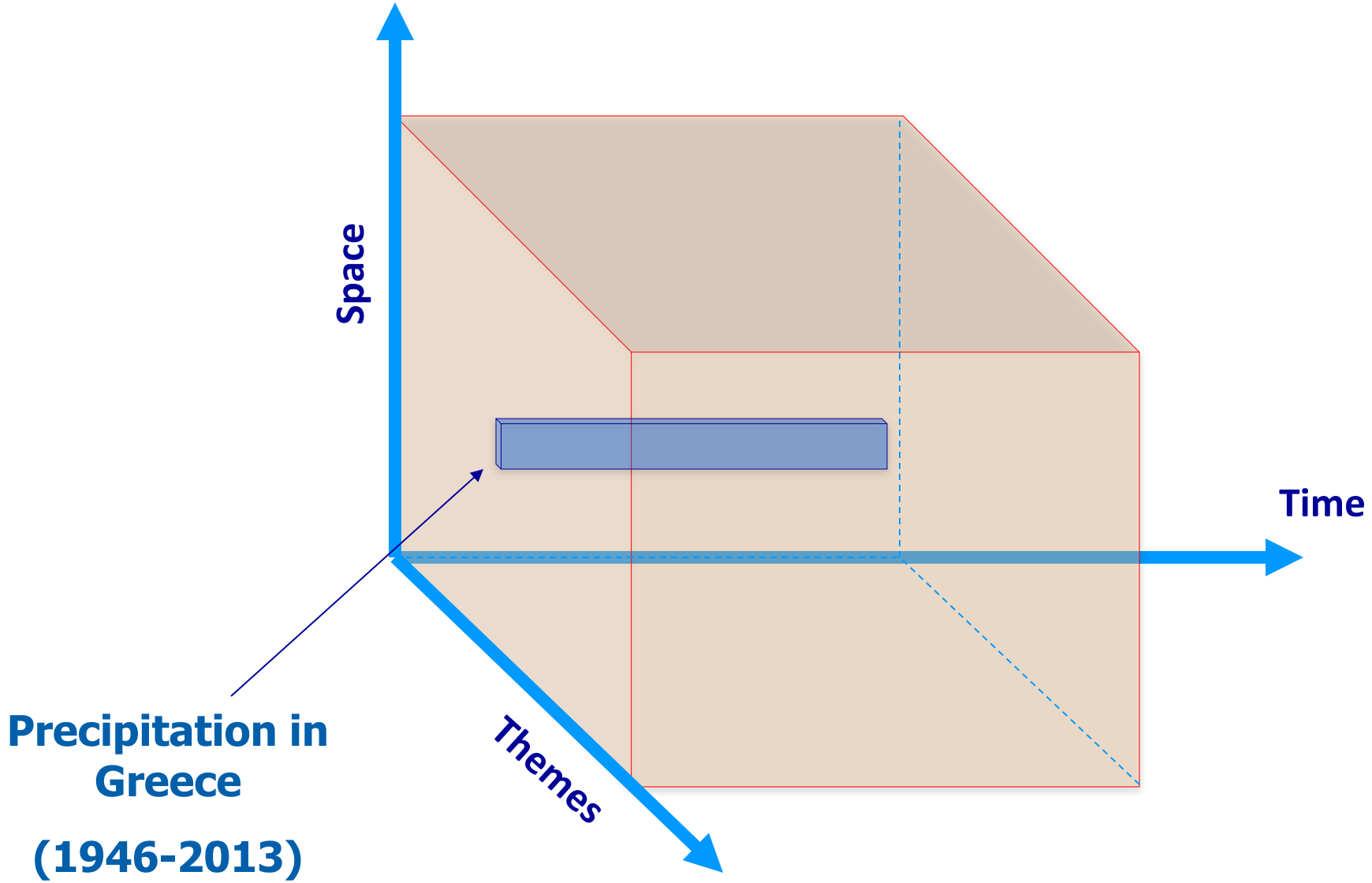
GEOSS Targeted Gaps

Large spatial and temporal gaps in specific data sets



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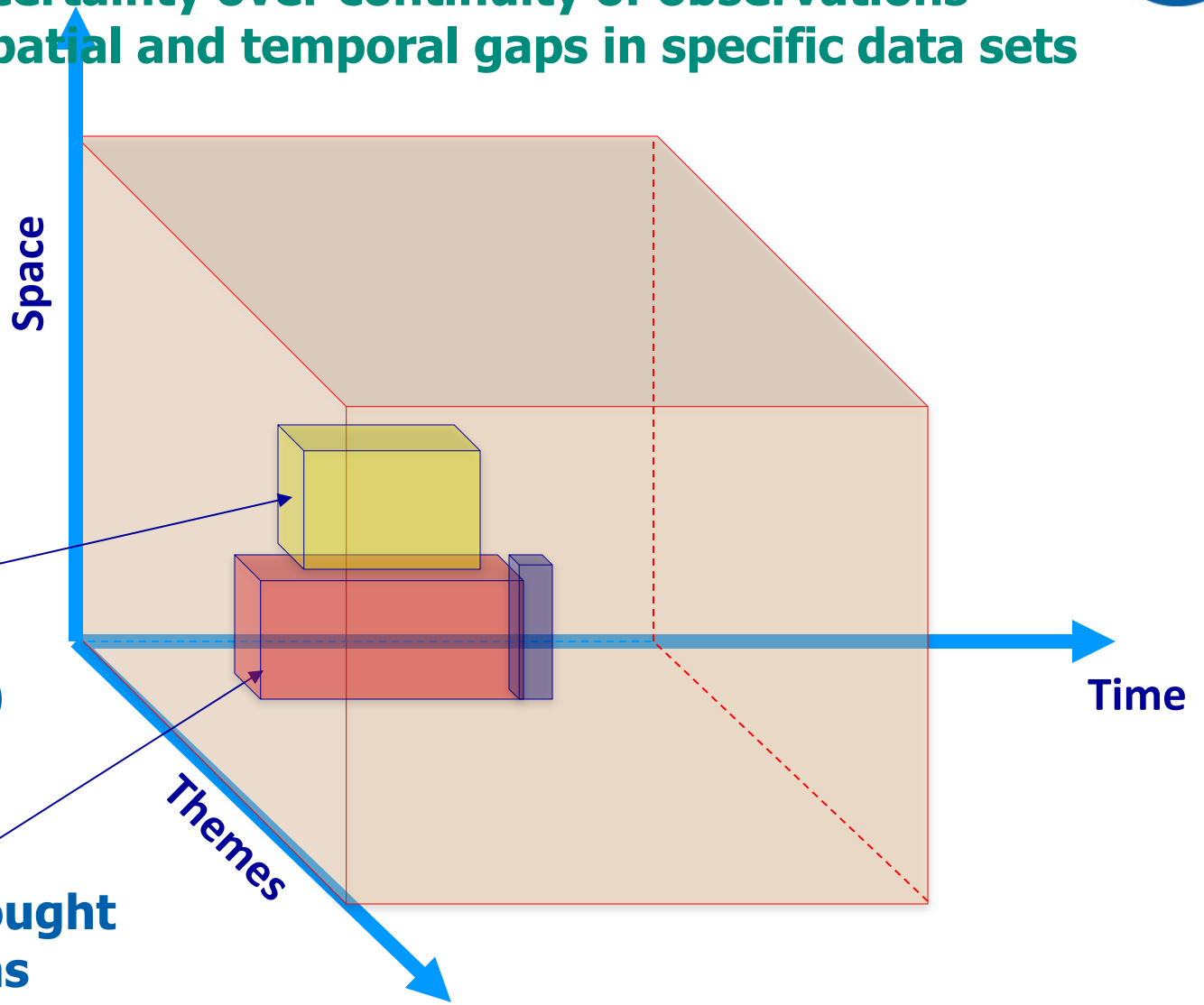
GEOSS Targeted Gaps

Uncertainty over continuity of observations

Large spatial and temporal gaps in specific data sets



East Africa drought observations (2010 – 2012)

West Africa drought observations (1995–2013)

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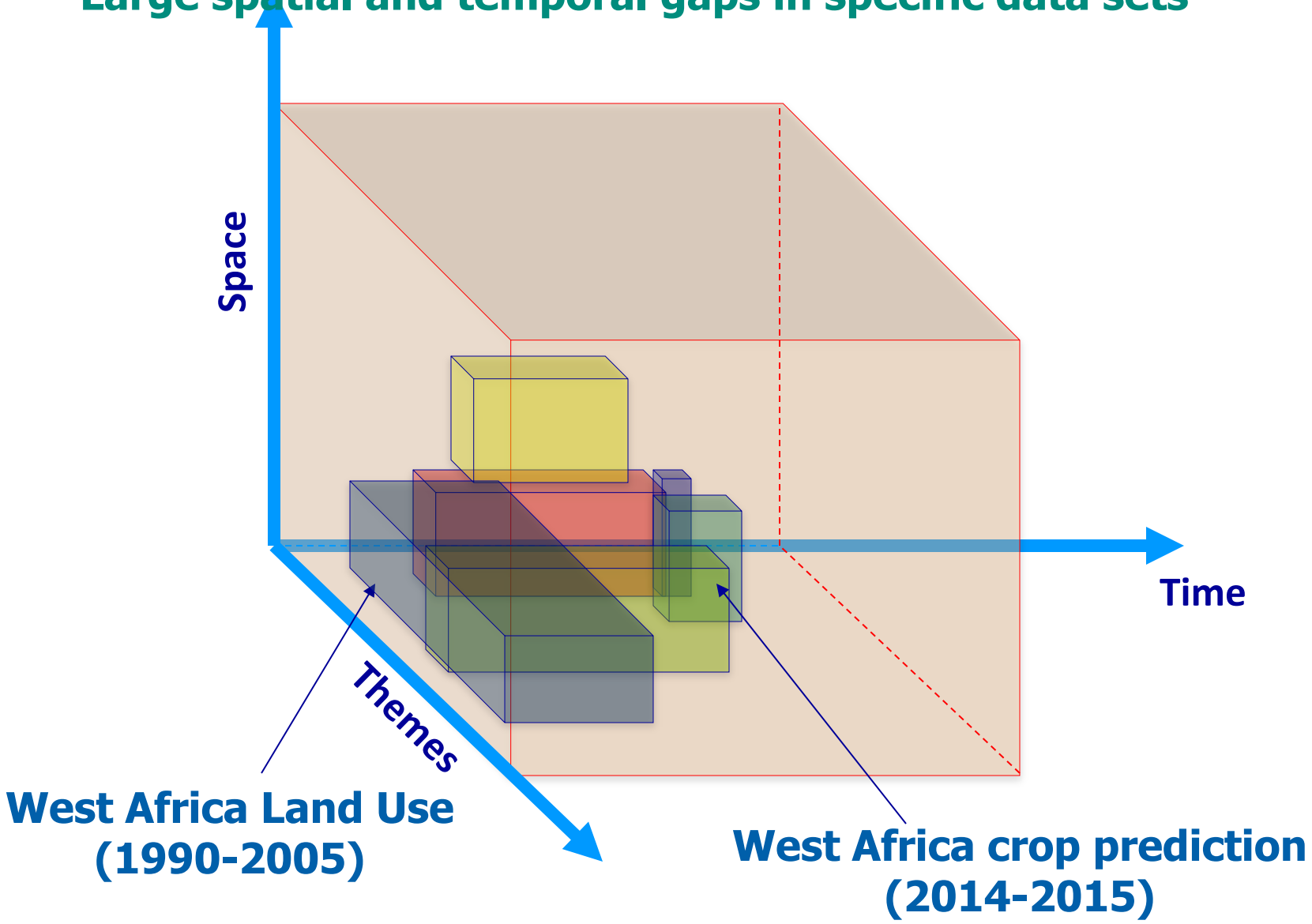
GEOSS Targeted Gaps

Large spatial and temporal gaps in specific data sets



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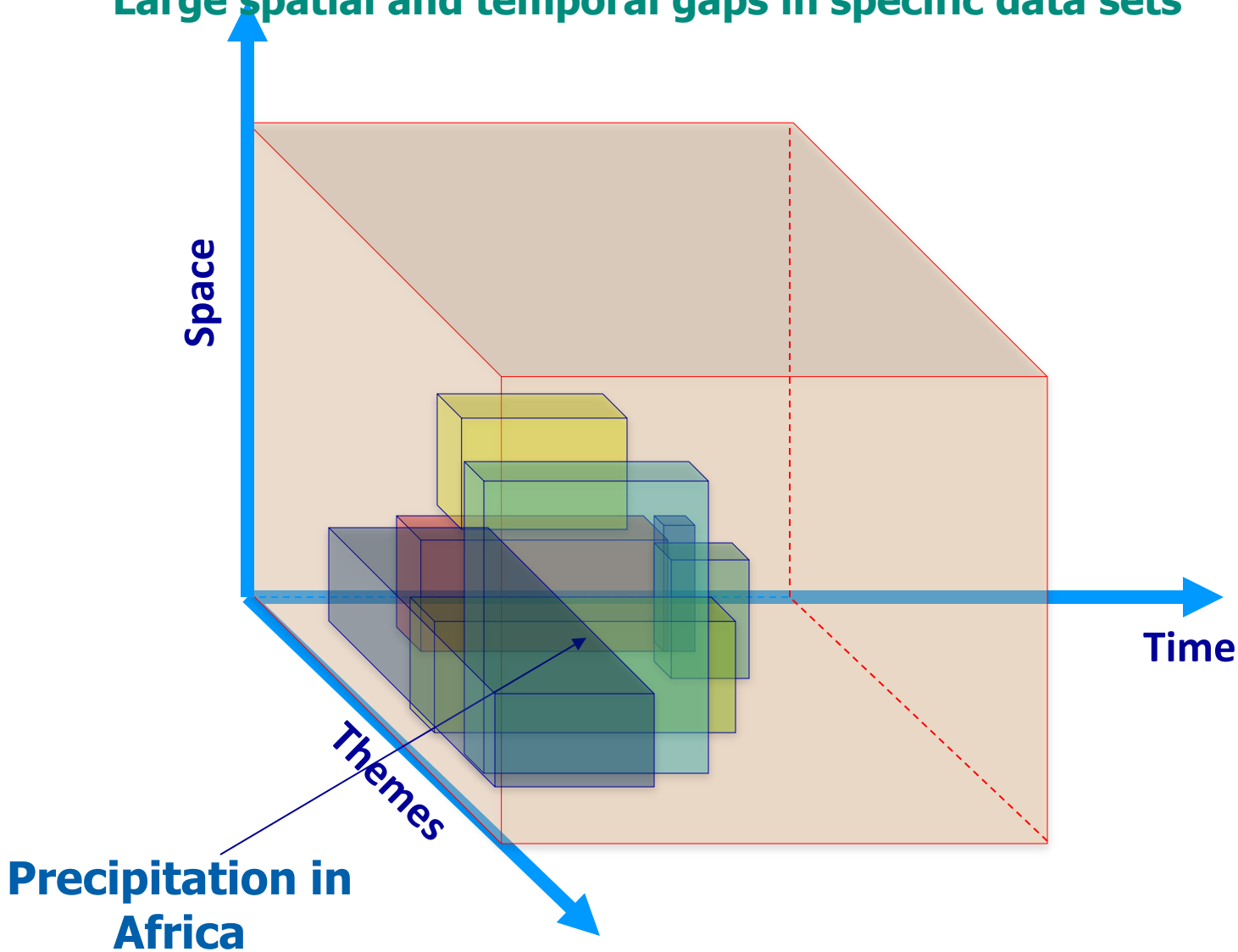

Precipitation in Africa (1992-2012)

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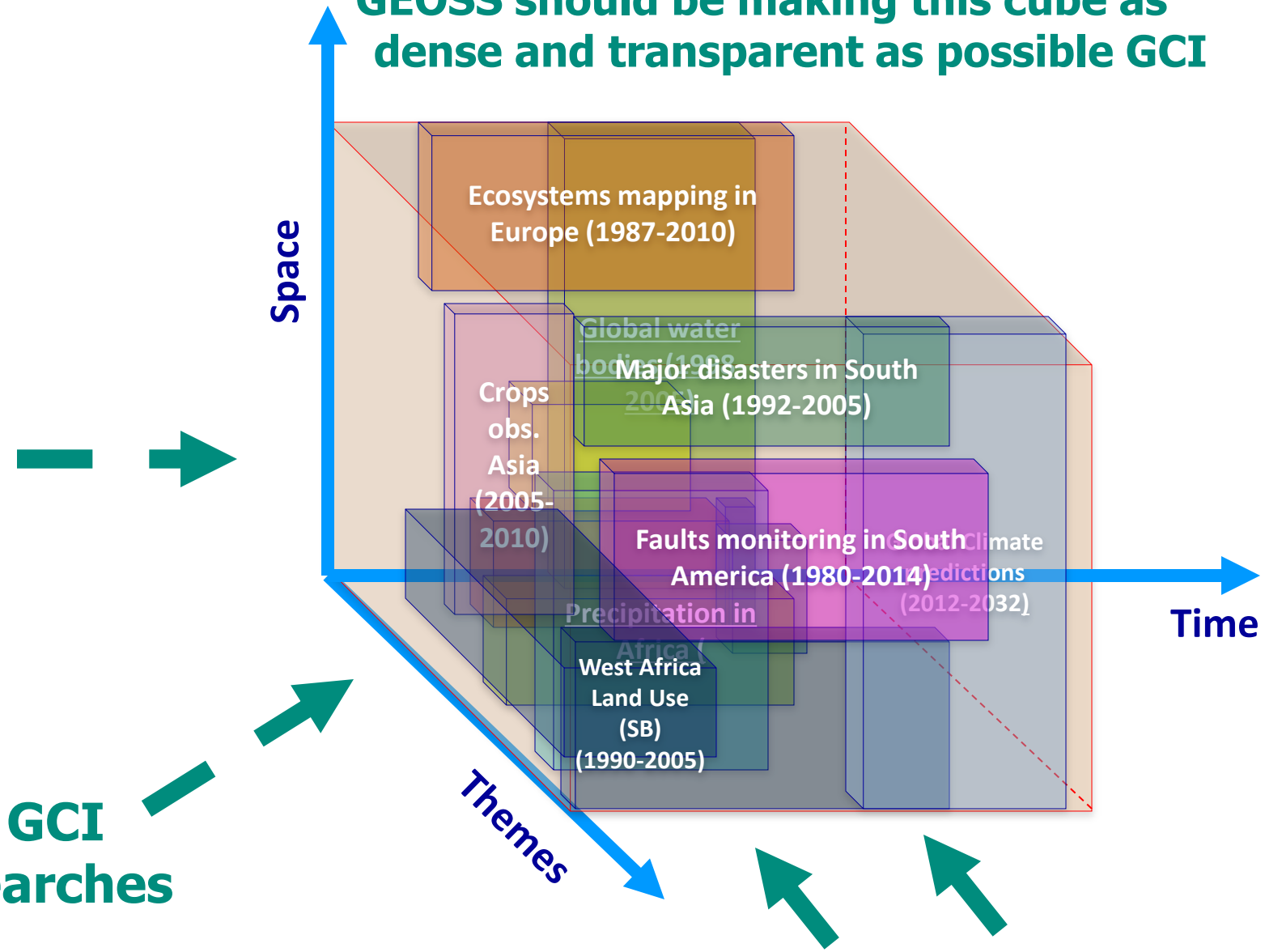
GEOSS should be making this cube as dense and transparent as possible GCI



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GEOSS Implementation Requires: *Data Sharing Principles*

- Full and Open Exchange of Data
- Data and Products at Minimum Time Delay and at Minimum Cost
- Free of Charge or Cost of Reproduction

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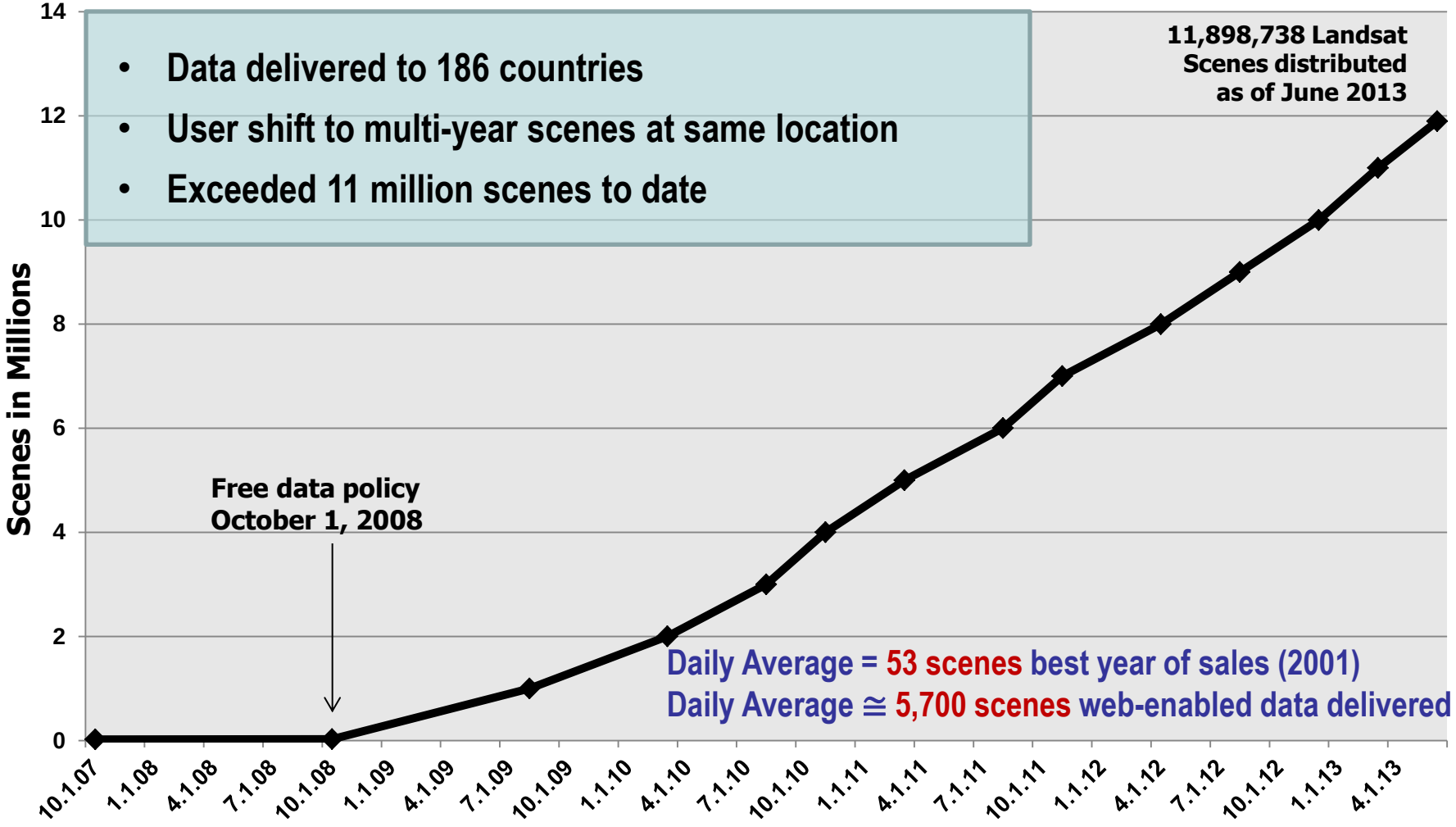
Increasing Demand for Free Landsat Data



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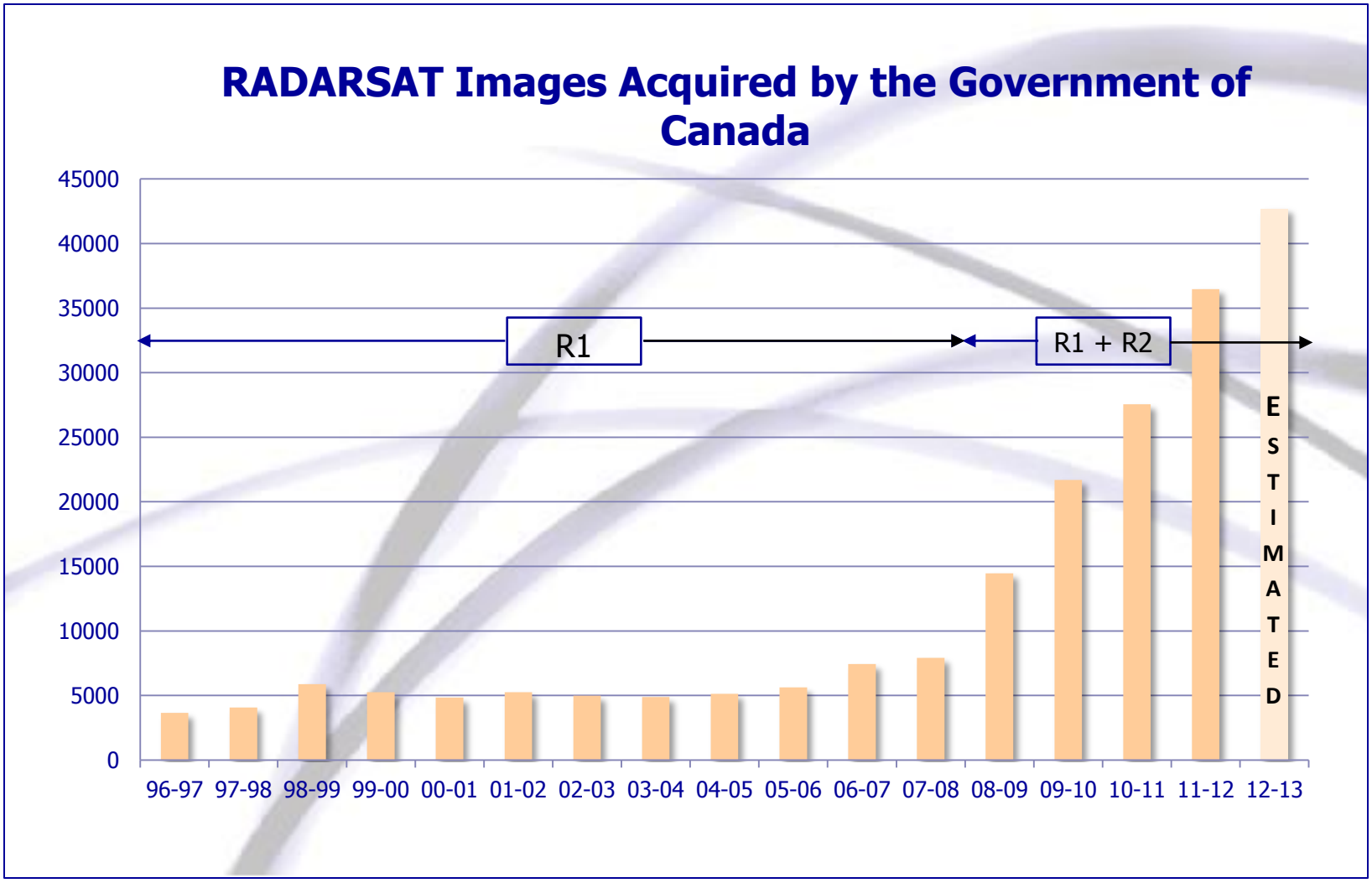
Canada's Experience



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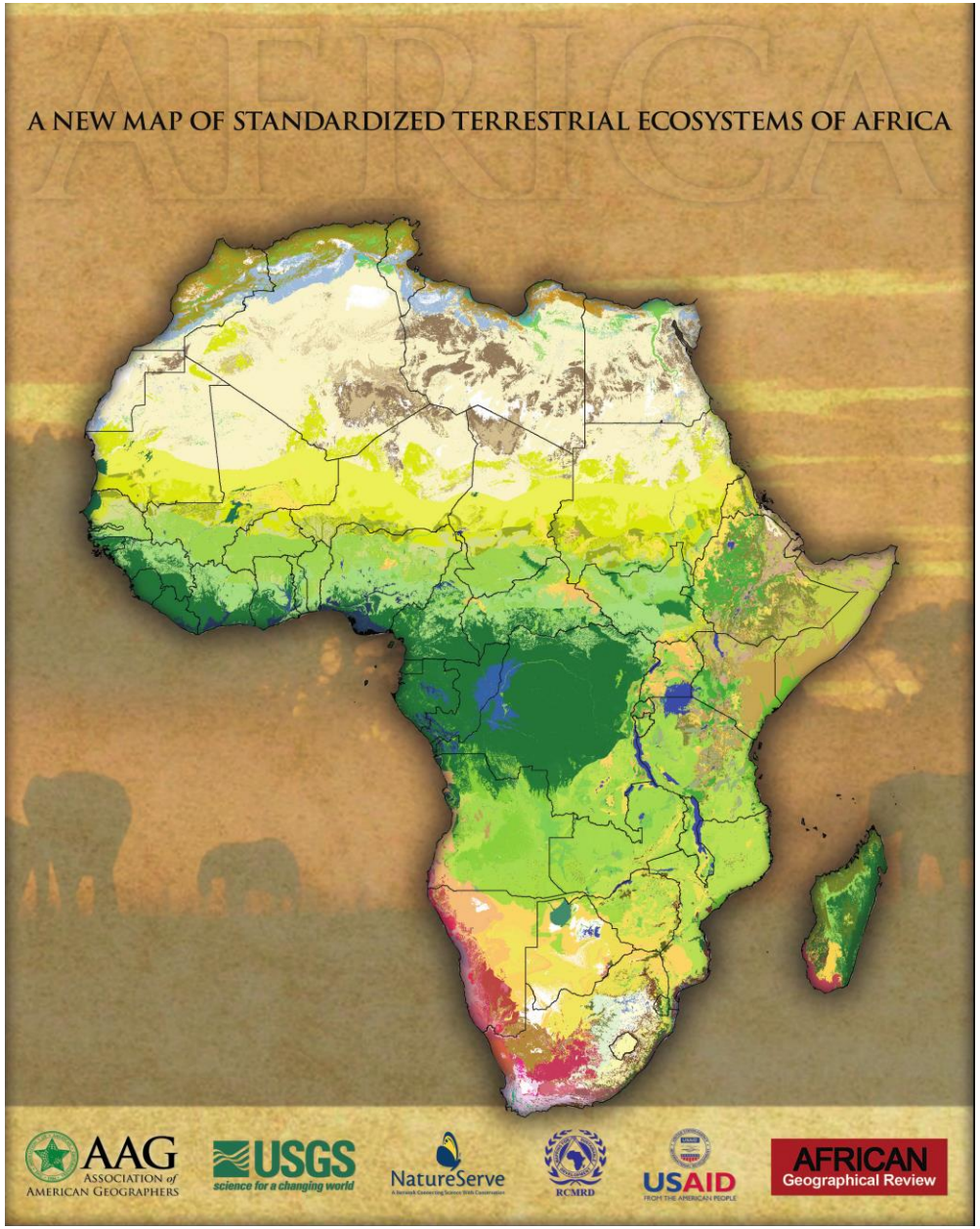

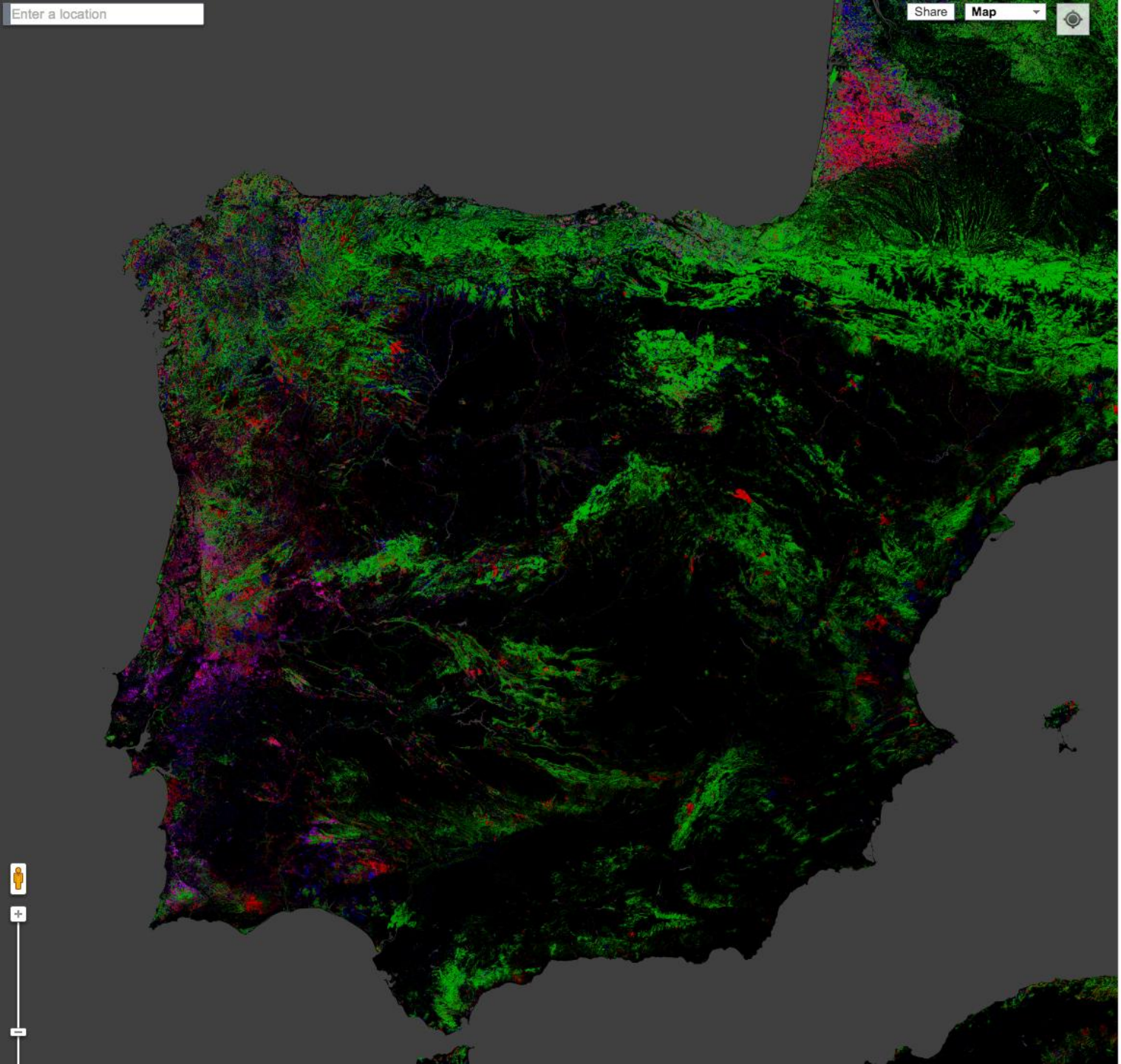

Global Forest Change

Published by Hansen, Potapov, Moore, Hancher et al.

UNIVERSITY OF MARYLAND
DEPARTMENT OF GEOGRAPHICAL SCIENCES

Results from time-series analysis of 654,178 Landsat images in characterizing forest extent and change, 2000–2012.

Trees are defined as all vegetation taller than 5m in height and are expressed as a percentage per output grid cell as '2000 Percent Tree Cover'. 'Forest Loss' is defined as a stand-replacement disturbance, or a change from a forest to non-forest state. 'Forest Gain' is defined as the inverse of loss, or a non-forest to forest change entirely within the study period. 'Forest Loss Year' is a disaggregation of total 'Forest Loss' to annual time scales.

Reference 2000 and 2012 imagery are median observations from a set of quality assessment-passed growing season observations.

Reset to default view

Data Products

Loss/Extent/Gain (Red/Green/Blue)

Legend
- Forest Loss 2000–2012
- Forest Gain 2000–2012
- Both Loss and Gain
- Forest Extent

Background Imagery

Year 2000 Bands 5/4/3

Example Locations

Forestry and Tornado in Alabama

Zoom to area

The trail of destruction from the April 27 2011 Tuscaloosa-Birmingham tornado is clearly visible in this location. This was one of 358 recorded tornadoes during the April 25-28, 2011 tornado outbreak, the most severe in US history.

Zoom out to spot tracks from other tornadoes nearby.


EXPLANATION
Corn
Soybeans
Small grains / Hay
Alfalfa
Fallow / Idle Cropland
Grass / Pasture / Non-ag
Woodland
Urban / Developed
NLCD-Developed/Low Intensity
NLCD-Developed-Open Space
NLCD-Developed/Medium Intensity
NLCD-Developed/High Intensity
NLCD-Barren
NLCD- Grassland, Herbaceous
NLCD-Deciduous Forest
NLCD-Pasture/Hay
NLCD-Woody Wetlands
N
0 0.5 1 2 KILOMETERS
0 0.5 1 2 MILES
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Waterloo

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Ministerial Guidance

- Continue improving Earth observations worldwide
- Urge the adoption and implementation of data sharing principles globally
- Advance the GEOSS information system
- Develop a comprehensive interdisciplinary knowledge base
- Cultivate global initiatives

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Summary

- Broad open data policies/practices essential for publically funded collections & must be strengthened

- Economic value in downstream elements – value-added products and services

- Broader stakeholder engagement needed, including the private sector

- Strengthen policy linkages/mandates

- National, Regional and International collaboration is essential

GEO Appathon 2014

UNLEASH THE POWER OF EARTH OBSERVATION DATA

Open worldwide to any non-commercial entity, individual or team (students, scientists and developers) wanting to unleash the power of Earth Observation data to allow us all to make smarter decisions.

Be inspired, unleash the power and win cash prizes ($20,000 USD).

Register by Thursday, 31 July 2014 and submit Apps by Sunday, August 31 2014.

Join in www.geoappathon.org

@geosec2025 #geoappathon

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GEO-XI Plenary
13-14 November 2014
Libreville, Gabon

Barbara J. Ryan
bryan@geosec.org

http://www.earthobservations.org