ESFRI Environment in relation to GBIF

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Research Infrastructures

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High-Resolution Global Maps of 21st-Century Forest Cover Change

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Quantification of global forest change has been lacking despite the recognized importance of forest ecosystem services. In this study, Earth observation satellite data were used to map global forest loss (2.3 million square kilometers) and gain (0.8 million square kilometers) from 2000 to 2012 at a spatial resolution of 30 meters. The tropics were the only climate domain to exhibit a trend, with forest loss increasing by 2101 square kilometers per year. Brazil's

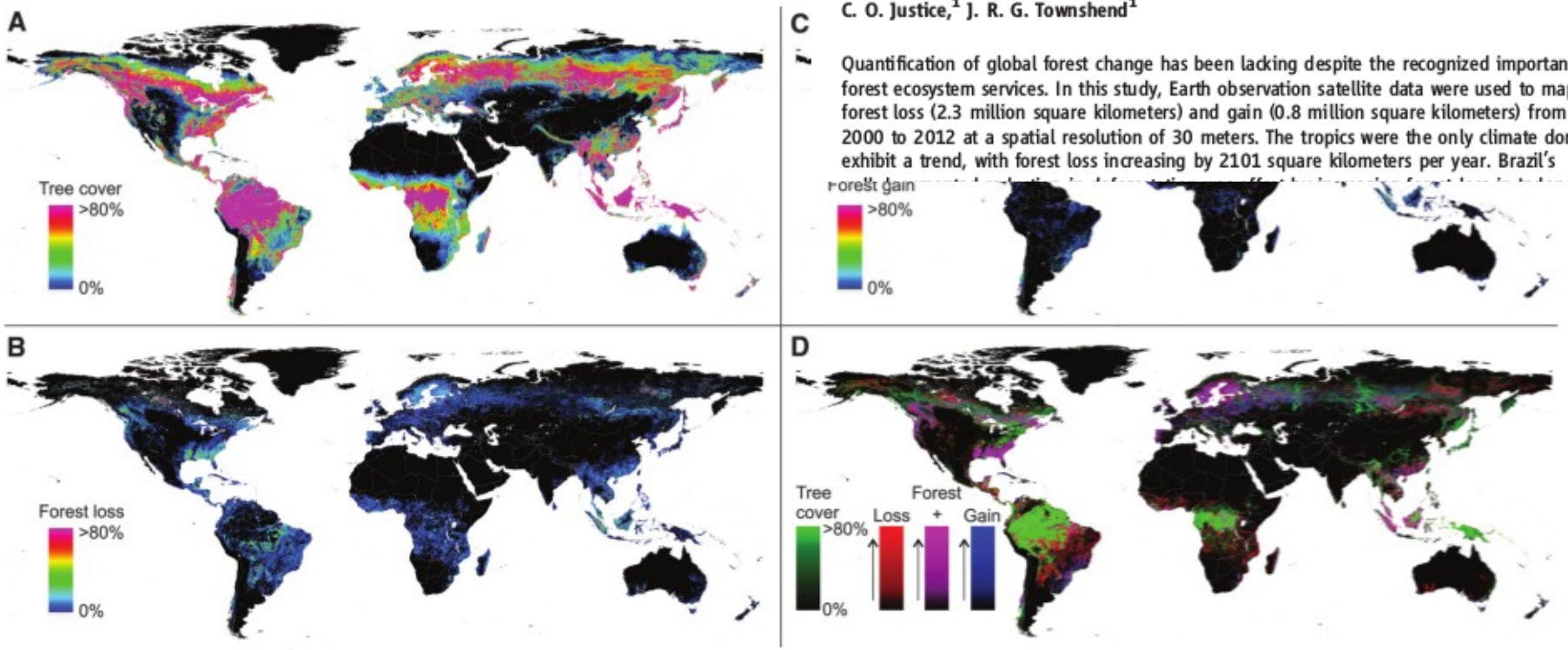


Fig. 1. (A) Tree cover, (B) forest loss, and (C) forest gain. A color composite of tree cover in green, forest loss in red, forest gain in blue, and forest loss and gain in magenta is shown in (**D**), with loss and gain enhanced for improved visualization. All map layers have been resampled for display purposes from the 30-m observation scale to a 0.05° geographic grid.

Research Infrastructures

Research Infrastructures (from the ESFRI Roadmap 2010)

- contribute to the implementation of **Europe 2020** strategy
- enable **excellent research** not being realisable without the access to these facilities
- Provide environments for excellent researchers to do **outstanding science** at European and international level
- enable **research not realisable** so far due to a lack of capacities (e.g. lacking opportunities to obtain the necessary mouse mutants, access to research data or beam time at excellent instruments)
- unique opportunities to **train scientists and engineers** while facilitating knowledge, technology transfer and innovation
- offer **stimulating research environments** that attract researchers from different countries, regions and disciplines

What is ESFRI

ESFRI (European Strategic Forum on RI) is a strategic instrument created in 2002 by the Member States and the European Commission to develop the **scientific integration of Europe** and to **strengthen its international outreach**.

- gives national authorities the opportunity to **explore common and integrated activities** for the best development and use of RI
- integrates national policies and brings together national and EU resources to develop the European Research Area (Lisbon Agenda)
- delegates work together to develop a **joint vision** and a **common strategy**
- provides Europe with the most **up-to-date** RI, responding to the needs of rapidly evolving fields of science, advancing knowledge-based technologies and their extended use

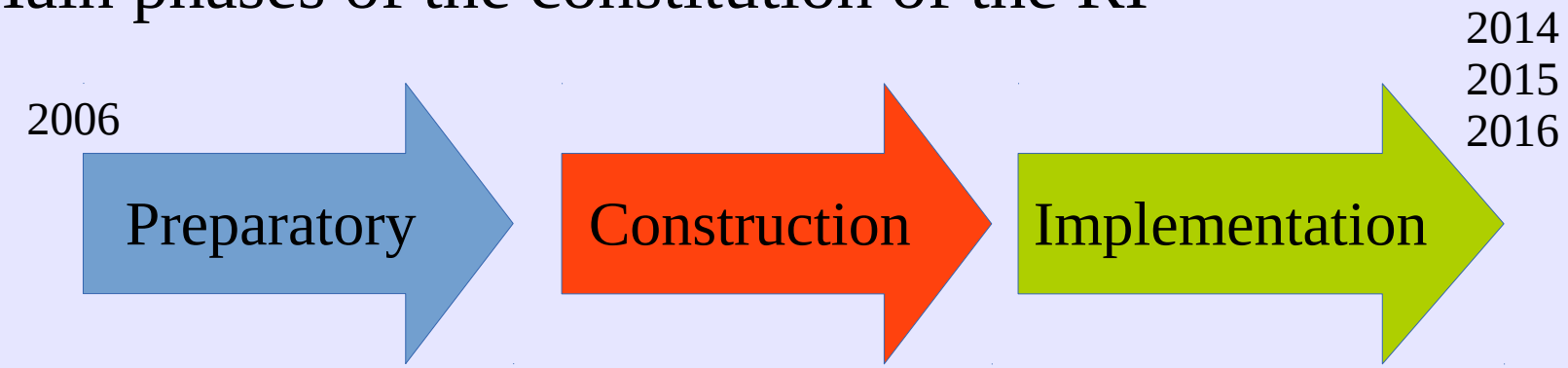
What is a ERIC <> Network

A European Distributed Research Infrastructure, as recognised by ESFRI, is a RI with:

- a common **legal form**
- a **single management** board
- a **governance structure** including
  - a Strategy and Development Plan
  - one access point for users
- it must be of **pan-European interest** and ensure open access to all interested researchers
- must **bring significant improvement** in the relevant scientific and technological fields

Implementation of a RI

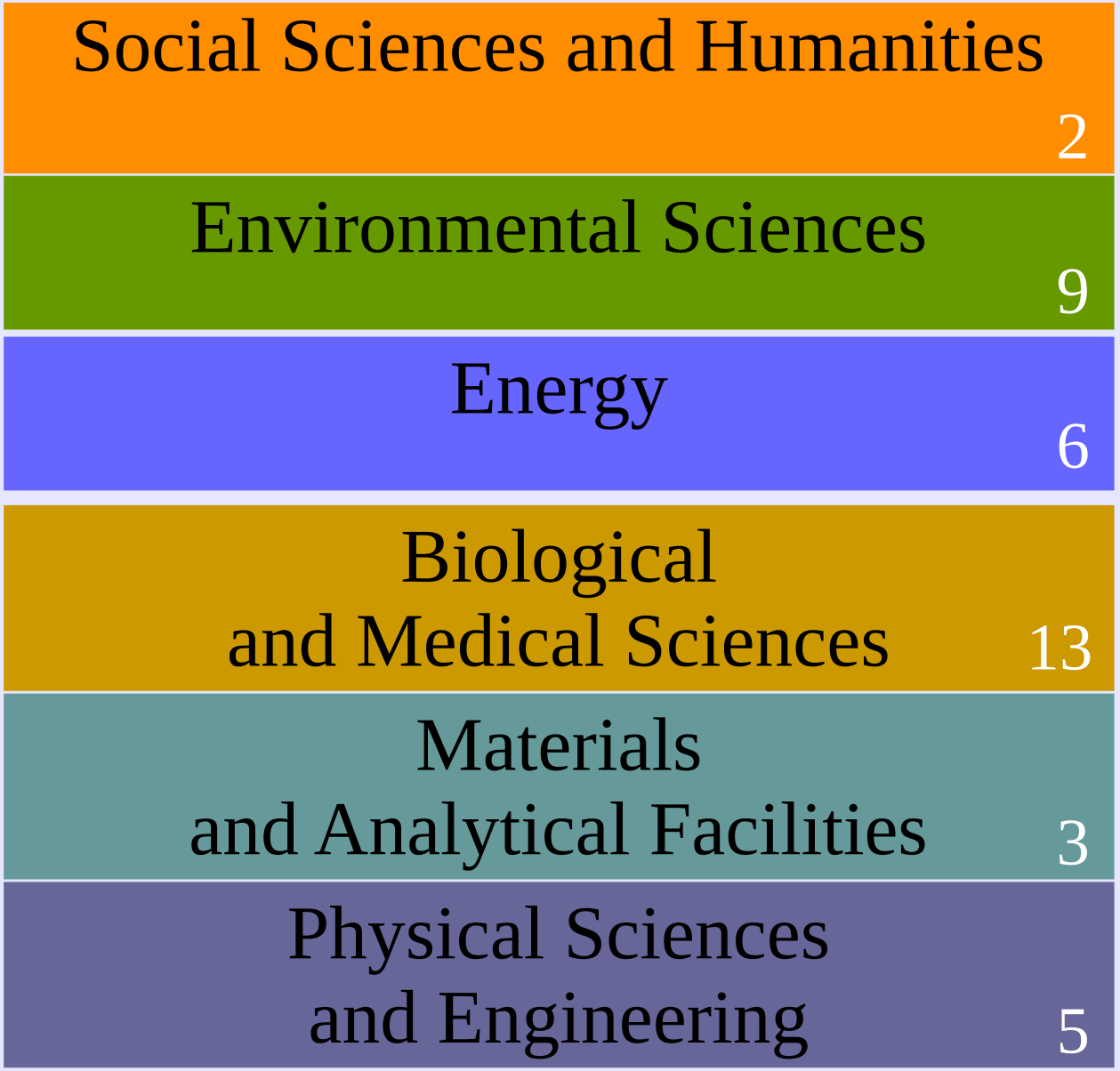
Main phases of the constitution of the RI



What is ESFRI

European Strategy Forum on Research Infrastructures - Roadmap

ESFRI areas in the Roadmap 2010



ESFRI areas in the Roadmap 2010

Environmental Sciences

EPOS	European Plate Observing System
EISCAT_3D	The next generation European incoherent scatter radar system
EURO-ARGO	Global Ocean Observing Infrastructure
IAGOS	In service aircraft for a global observing system
ICOS	Integrated carbon observation system
LIFEWATCH	Science and Technology Infrastructure for Research on Biodiversity and Ecosystems
SIOS	The Svalbard Integrated Arctic Earth Observing System
EMSO	European Multidisciplinary Seafloor Observatory

Atmosphere

Earth

Ocean

Biodiversity

ESFRI ENV Projects

EPOS	European Plate Observing System

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Understanding of the physical processes controlling earthquakes, volcanic eruptions, unrest episodes and tsunamis as well as those driving tectonics and Earth surface dynamics	18	-	-	-

- Seismology: ground motion time series recorded at seismic stations (seismograms), or generated by
- specific algorithms (synthetic seismograms).
- Volcanology: Sample of magmatic rocks
- Geodesy: Raw & Rinex GNSS; GNSS data streams.
- Experimental and analytical: metadata.
- Magnetic observations: Primary data product of vector magnetometers; output of vector
- magnetometers.
- Induced seismicity: Waveforms; Station and sensor information; production, geometry and auxiliary
- parametric data.

ESFRI ENV Projects

EISCAT_3D	The next generation European incoherent scatter radar system

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Three-dimensional imaging radar for atmospheric and geo-space research, it will make continuous measurements of the geospace environment and its coupling to the Earth's atmosphere from its location in the auroral zone at the southern edge of the northern polar vortex	4	-	-	-

Plasma density, electron and ion temperature, ion velocity and arctic ionosphere coupling with atmosphere at the transition from space to atmosphere (60 to 1200 km altitude) and help understand how the sun influences the Earth

ESFRI ENV Projects

EURO-ARGO	Global Ocean Observing Infrastructure

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Large number of floats worldwide to collect global data sets to understand and predict ocean and climate changes	8	-	-	+

3500 profiling floats worldwide measuring the temperature and salinity to a depth of 2000 m

ESFRI ENV Projects

IAGOS	In service aircraft for a global observing system

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Long-term observations of atmospheric composition, aerosol and cloud particles on a global scale from a fleet of initially 10-20 longrange in-service aircraft of internationally operating airlines	5	-	-	-

– atm. chemical composition (H_2O, O_3 , CO, NO_x , NO_y , CO_2 , CH_4)
– aerosol number concentration and size
– cloud particle number concentration and size

ESFRI ENV Projects

ICOS	Integrated carbon observation system

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Standardised long-term high precision monitoring of atmospheric and greenhouse gas concentrations, ecosystem fluxes and oceanic essential carbon cycling variables	12	-	-	+

Atmospheric stations - the greenhouse gas (CO_2, CH_4, N_2O), 30 sites

Ecosystem Stations - monitoring the functioning of land ecosystems and the exchange of energy and greenhouse gases between the ecosystems and the atmosphere, 40-60 observation sites

Marine ICOS - network of ships and fixed stations will be monitoring carbon exchange between the surface ocean and the atmosphere, acidification of oceans, surface temperature, salinity and other variables.

ESFRI ENV Projects

LIFEWATCH	Science and Technology Infrastructure for Research on Biodiversity and Ecosystems

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Infrastructure for research on the protection, management and sustainable use of biodiversity	8	+	+	+

E-infrastructure that produces and aggregates data: GBIF, LTER, remote sensing, climate data

ESFRI ENV Projects

SIOS	The Svalbard Integrated Arctic Earth Observing System

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Observational research infrastructure for integrating studies of geophysical, chemical and biological processes in the Arctic region	12	-	-	-

Will study the single processes, but additionally look at the interaction of all levels between the five spheres biosphere, geosphere, atmosphere, cryosphere and hydrosphere.

ESFRI ENV Projects

EMSO	European Multidisciplinary Seafloor Observatory

Description	Countries	GBIF User	GBIF Provider	GBIF Combined
Long term permanent monitoring of the ocean margin environment around Europe	13	-	+	+

- Seismic ground motion
- Gravity
- Magnetism
- Geodesy and seafloor deformation
- Fluid related processes monitoring
- Chemical and Aqueous Transport (CAT)
- Pore pressure
- Gas hydrate monitoring
- Dissolved Fe, Mn and sulfide species
- Acoustic tomography
- CTD equipment for hydrothermal vents
- Methane
- Carbon dioxide
- Heat Flow
- Nutrient analyzers
- pH, Eh and alkalinity
- hydrocarbon fluorescence
- In situ Mass spectrometer
- Particle flux trap
- Image based particle flux
- Pigment fluorescence
- Deep biosphere sensors
- Time-Lapse Cameras
- Holographic imaging
- Videos
- Passive and active acoustics
- Zooplankton sampling
- In situ sample processors with molecular/genetic probes
- In situ respiration

ESFRI Projects

Biological and Medical Sciences

ANAEE	Analysis and Experimentation on Ecosystems	Experimental manipulation of managed and unmanaged terrestrial and aquatic ecosystems. It will strongly support scientists in their analysis, assessment and forecasting of the impact of climate and other global changes on the services that ecosystems provide to society
EMBRC	European Marine Biological Resource Centre	It brings 12 leading marine stations and EMBL together. These institutes study marine organisms (microbes, plants, animals) with the latest technologies to study our seas.

ESFRI Projects – Wrap up

GBIF USER	GBIF PROVIDER	GBIF COMBINED
LIFEWATCH EMBRC	LIFEWATCH EMSO EMBRC	EURO-ARGO ICOS LIFEWATCH EMSO ANAEE EMBRC

Questions for discussion:

How relevant are ESFRI RI for GBIF?

How to promote/manage the relationship between GBIF and ESFRI?