UK-EOF Data Solutions Workshop

Garden Organic, Ryton

25th June 2009

Environment Research
Funders' Forum

UK-EOF Data Solutions Workshop

WELCOME

Mary Barkham
Head ERFF

Environment Research Funders' Forum

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

NATURAL ENGLAND

NATURAL ENVIRONMENT RESEARCH COUNCIL

HSE

Environment Agency

DEPARTMENT OF ENERGY & CLIMATE CHANGE

bbsrc
biotechnology and biological sciences research council

'Maximising the coherence and effectiveness of UK environmental research funding'

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

MRC Medical Research Council

Department for Transport

SEPA Scottish Environment Protection Agency

Met Office

DFID Department for International Development

EPSRC
Engineering and Physical Sciences Research Council

NIEA Northern Ireland Environment Agency
www.ni-environment.gov.uk

The Scottish Government

defra
Department for Environment Food and Rural Affairs

FOOD STANDARDS AGENCY

Forestry Commission

Today’s Aims

- Share and get your input to UKEOF data initiative plans
- Update on INSPIRE and SEIS
- Discuss and share best practice for sharing environmental data

UK-EOF Data Solutions: **Agenda**

- Session 1 – Vision
- Session 2 – Steps towards vision
- Session 3 – Your views in 4 key areas
- Session 4 – Some inspiration!

  – Stalls and demos
  – Acronym buster
  – Initiatives map
  – Comments / questions board

UK-EOF Data Solutions Workshop

A Common Vision

Beth Greenaway

Contents

- UK-EOF and its overall vision
- Deliverables 2009/ 2010
- The Catalogue and the Data Initiative
- Today's aims

The picture in 2007

- FRAGMENTED
- UNCOORDINATED
- LACKS STRATEGIC DIRECTION
- NO OVERALL OWNER

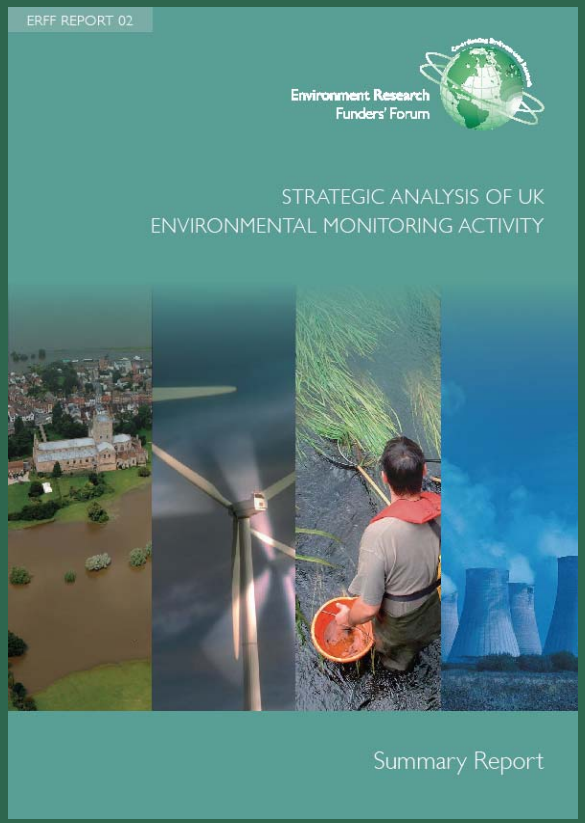
Risk of

- Missed opportunities for knowledge
- Poor data sharing
- Funding stopped for key time series data
- Duplication of effort

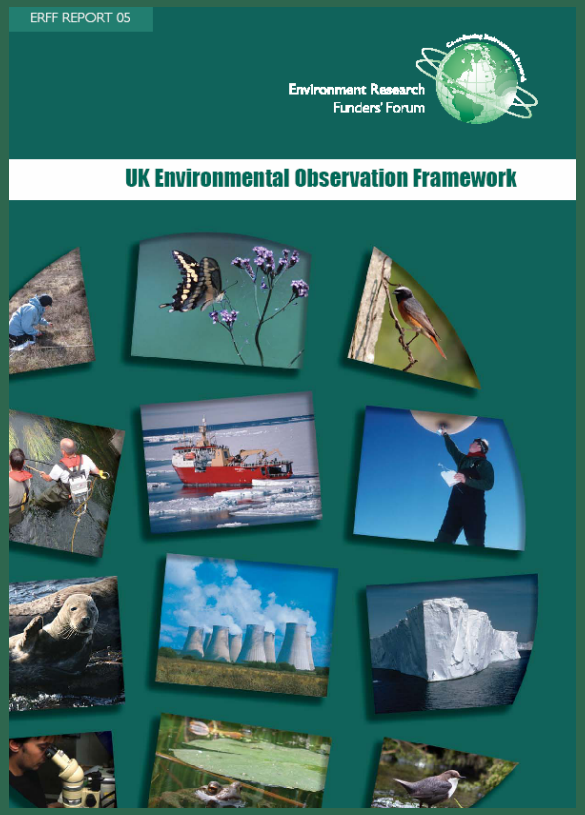
Refs (ADAS, 2006), (UKMMAS Defra, 2005), GECC (2006)

UK Environmental Observation Framework

ERFF review of Environmental Monitoring 2006



To UK-EOF



Environment Research
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Development of the UK-EOF

- Environmental Observations are an essential part of the evidence base

- At least 5yr initiative within ERFF

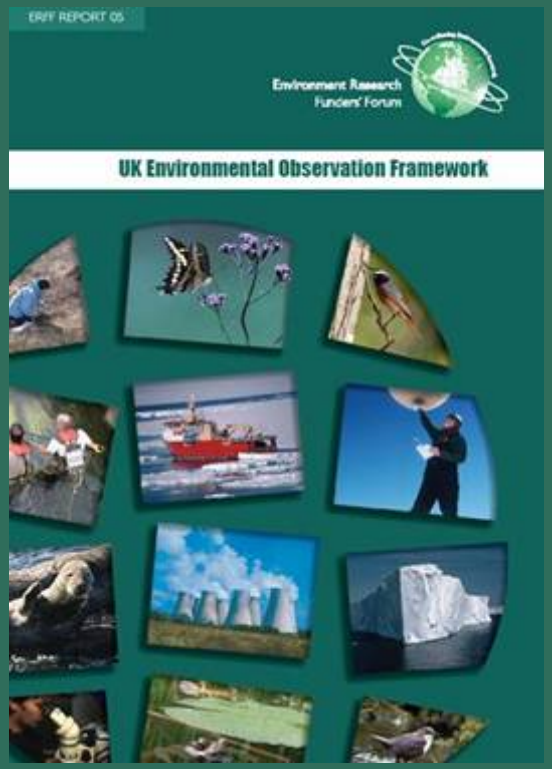
- 13 organisations sponsor but community much wider

Officially launched and published

17th July 2008

UK EOF Launched, July 2008

Outcomes for Observations by 2013



- Develop an holistic picture of the overall evidence needs of the UK and the role of observations in providing the information
- Share Knowledge & Information i.e. who is investing in what, where, how.
- Understand the range of assessments using observation data & the tools for knowledge transfer
- Enable funding mechanisms for long-term observation needs
- Strong community sharing data & expertise

UK-EOF Structure

ENVIRONMENT RESEARCH FUNDERS' FORUM MAIN BOARD

Own framework, collective aspiration and outputs. Ask for the evidence and use the outputs

Biannual meetings

Key funders and senior policy players across government and the Devolved Administrations.

Champion of the UK- EOF Professor Bob Watson, Defra

UK-EOF Management Group
Decision making group to facilitate the workstreams and initiate, advocate and champion the issues.
Responsible for active project management of the work streams, UK-EOF accounting and guidance of the Programme Manager
All parts of the community represented.
Up to 4 meetings per year

Central Coordination

UK-EOF Programme Manager and **Secretariat**

The Community: in clusters delivering efficient and effective evidence.

Data Advisory Group

Work Programme

WORKSTREAM 1
Collective Aspiration
Articulating the questions
Decision-making framework

WORKSTREAM 2
Knowledge Base
Metadata including costs and quality
Data policy
Sound Science

WORKSTREAM 3
Assessments co-ordination and Knowledge Transfer
Assessments catalogue

WORKSTREAM 4
Financing Mechanisms
Internal
Inter-Departmental
International
Long-term

WORKSTREAM 5
Community
Communications
Annual Conference
Website
Newsletter
Who's Who

2009 Strategic Analysis

Will provide an overview of:

- Why the UK observes the environment
- What questions we want/need to answer
- Where the gaps and opportunities in capability are to collect the evidence we need
- How much we invest and in what
- The risks/ financial security of observations

In order to develop:

- A framework in which to make joined- up decisions
- Initial recommendations –action plan for 2010 – 2012

UK-EOF Capability Analysis – Example – One per Issue e.g. climate

VARIABLES / PARAMETERS	GEOGRAPHICAL COVERAGE	TEMPORAL COVERAGE	2010	2011	2012	2013	2014	2015	2016 - 2020	2021 - 2025	ACTIVITIES / PROGRAMMES	COMMENTS
Atmosphere												
X												
Y												
Biosphere												
V												
A												
Cryosphere												
P												
C												
Freshwater + Groundwater												
L												
B												
Lithosphere												
G												
J												
Marine												
T												
H												

Full Capability	
Partial Capability	
No Capability	

If full Capability then:

T: Technology available (to use) to meet the requirements

A : Activities are funded (& therefore programmes are in place).

P: People; there are adequate numbers of people with the appropriate skills and knowledge.

UK-EOF Deliverables for 2009

- **'Towards a Statement of Need' document and workshops (WS1) -** ***articulating what observations we need for each domain and fundamental issue***
- **The Observation Activity catalogue (WS2a) - w*hat observations are being undertaken and by whom?***
- **Business Case for Data Sharing and workshop to stimulate solutions**
- **The Investment Study (WS4a) – understanding how much we are currently spending on observations and where. Financial Mechanisms (W4b) – what are the issues that organisations have identified in funding observation activities?**
- **Conceptual Decision Making Framework (WS1b)**

Challenge 1: Statement of Need

We need scientific expertise and strategic thinking to capture needs and match to current capability

Very large numbers of players (funders and do-ers) with numerous needs ….

Statement of Need – A Summary

The UK needs a balanced suite of environmental observations to tackle the challenges associated with our changing natural environment. The balanced programme must span all environmental media, accommodate temporal and spatial variability, and allow changes to be assessed in the short, medium and long terms, in local, national and international contexts.

Environmental observations

Vital source of evidence from global to local scale for:

- **understanding and managing our changing environment**
- **guiding current and future policy, science and innovation**
- **economic benefit and quality of life**

Includes all monitoring/ surveillance, all technologies from satellite data to butterfly counts or genomics - for or by the UK

Challenge 2: Knowing what's going on now and what we spend

we need information from across 250 organisations

- In the right format
- At a useful level of aggregation
- Financial and Scientific

- We are building a catalogue to store and share this

Discovery Catalogue

UK-EOF Observation Activity Catalogue

Users requiring a strategic overview of activities e.g. are we investing the right areas of science to address the big societal issues?

Users requiring information about specific activities e.g. To join up activities and share platforms and resources

Users requiring access to the outputs and data the activity generates

UK Environmental Observation Framework

I want to find out...

home | search

Who is observing the environment?

Search by organisation:

What is being observed?

Search by title or description of the activity:

Search by environmental domain:
- Atmosphere
- Biosphere
- Cryosphere
- Freshwater

Search by variable/parameter:

Where is the work occurring?

Search by location:
- United Kingdom
- Great Britain
- England
- Wales

Why are the observations being collected?

Search for activities collecting information for:
- Basic science
- Characterising environmental issues/soluti
- Complying with legislation
- Data collection

Send results to screen Send results to spreadsheet

SEARCH

Environment Research Funders' Forum

Help and advice | Contact Us | What's in this catalogue? | What downloaded info means

UK Environmental Observation Framework

home | search | results

WHO: All
WHAT: (Environmental domain) Atmosphere
WHERE: All
WHY: All

Your search matches 91 records in the catalogue.

Title of activity	Lead Organisation	Lead Funder	Domain	UK-EOF Id	Start Year	End Year	
National Atmospheric Emissions Inventory (UK)	AEAT	Defra	Atmosphere	451400	1905		Detail
Rural Trace Element Network	AEAT	Defra	Lithosphere, Freshwater, Atmosphere	451328			Detail
Urban non automatic NO2 database	AEAT	Defra	Atmosphere	451356	1905	2008	Detail
Geosciences Survey	BAS	NERC	Atmosphere, Marine, Cryosphere	453056			Detail
Effective Atmospheric Angular Momentum (EAAM)	BADC	BADC	Atmosphere	453178			Detail
Waste Management Compliance Monitoring in Scotland	SEPA		Lithosphere, Atmosphere	472379			Detail
Manual Climate Observing Stations	Met Office	Met Office	Atmosphere	469166			Detail
Deep ocean buoys	Met Office	Met Office	Atmosphere	469223			Detail
International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)	FC		Biosphere, Atmosphere	467592			Detail
Met Office Weather observations from commercial aircraft (AMDAR)	Met Office	Met Office	Atmosphere	469483			Detail
Defra Radioactive Incident Monitoring Network sites (RIMNET)	Derfa	Derfa	Atmosphere	464266			Detail
TOMPS Network	Derfa	Derfa	Atmosphere	464288	1905	2006	Detail
UK Environmental Change Network: atmospheric chemistry	CEH	CEH	Atmosphere	457340	1905		Detail
Atmospheric and Oceanographic Monitoring	BAS	NERC	Atmosphere, Cryosphere	452880			Detail
QA/QC of Automatic Urban and Rural Monitoring Network (AURN)	AEAT	Defra	Atmosphere	451864	1905		Detail
Air Quality Database for Scotland, Pilot Study	AEAT	SG	Atmosphere	451973	1905		Detail
Auditing of compliance monitoring for Part A and Part B processes under EPA 1990 in Scotland	SEPA		Atmosphere	472139			Detail
Sun Photometer	PML	NERC	Atmosphere	471120	1905		Detail
ECMWF Operational Analyses	ECMWF	ECMWF	Atmosphere	467189			Detail
Met Office Radiosonde Network	Met Office	Met Office	Atmosphere	469071			Detail

1 2 3 4 5

EXCEL EXPORT

UK Environmental Observation Framework

Title: UK Acid Deposition Monitoring Network

Description: Rainfall chemistry has been monitored systmatically in the UK since the mid 1980s with a varyng number of sites across the country. Two types of site were originally defined; primary sites with daily collection, the data used for attribution of sources (linked to meteorology and validation of models); and secondary sites with lower frequency sampling for mapping purposes. Analysis undertaken of major ions in rainwater (sodium, ammonium, sulphate, nitrate, free acidity, magnesium, calcium, potassium) and electrical conductivity. Data are quality controlled for ion balance and comparison of measured and theoretical conductivity. The Current measurement activity on; http://www.airquality.co.uk/archive/reports/cat04/0601101046_acid2004_issue1.pdf. 38 sites across the UK - Details of sites in http://www.airquality.co.uk/archive/aciddep_sites.xls. Water samples are returned to a central laboratory for chemical analysis. Data collection frequency varies with site from daily, fortnightly to monthly.

Type of Activity: Rainfall chemistry has been monitored systmatically in the UK since the mid 1980s with a varyng number of sites across the country. Two types of site were originally defined; primary sites with daily collection, the data used for attribution of sources (linked to meteorology and validation of models); and secondary sites with lower frequency sampling for mapping purposes. Analysis undertaken of major ions in rainwater (sodium, ammonium, sulphate, nitrate, free acidity, magnesium, calcium, potassium) and electrical conductivity. Data are quality controlled for ion balance and comparison of measured and theoretical conductivity. The Current measurement activity on;
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http://www.airquality.co.uk/archive/aciddep_sites.xls. Water samples are returned to a central laboratory for chemical analysis. Data collection frequency varies with site from daily, fortnightly to monthly.

Lead Organisation: AEAT

Lead Funder: Defra

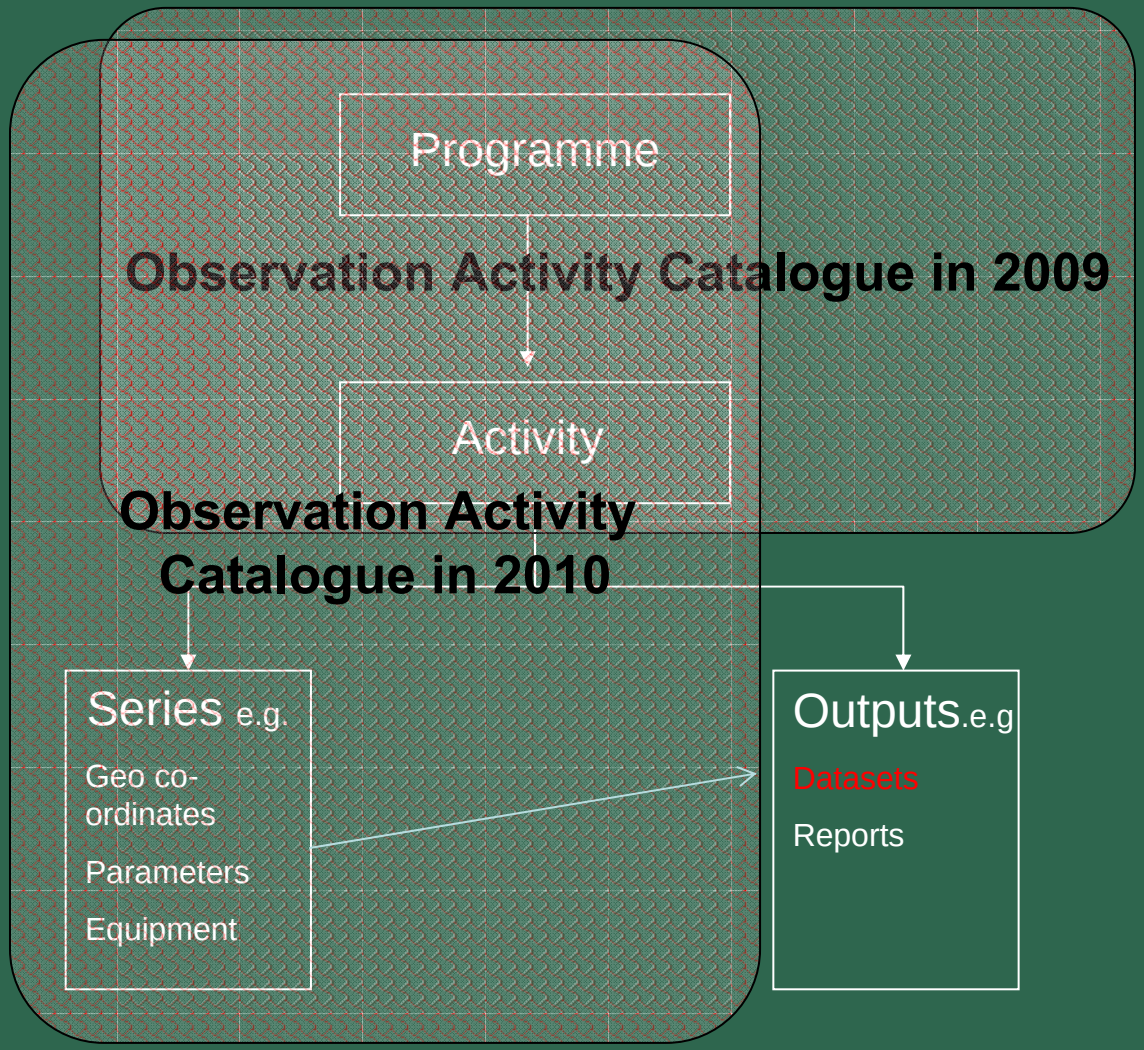
Status: Ongoing

Environmental Domain: Atmosphere

Reasons for Collection: Basic science
Characterising environmental issues/solutions
Complying with legislation
UK Contribution to pan-European Programme

Variables/Parameters: Conductivity
base cations in aerosol
hydrogen chloride
inorganic anions in aerosol
major anions in rain
major cations in rain
nitric acid
nitrogen dioxide
pH

Environmental Data - Terminology

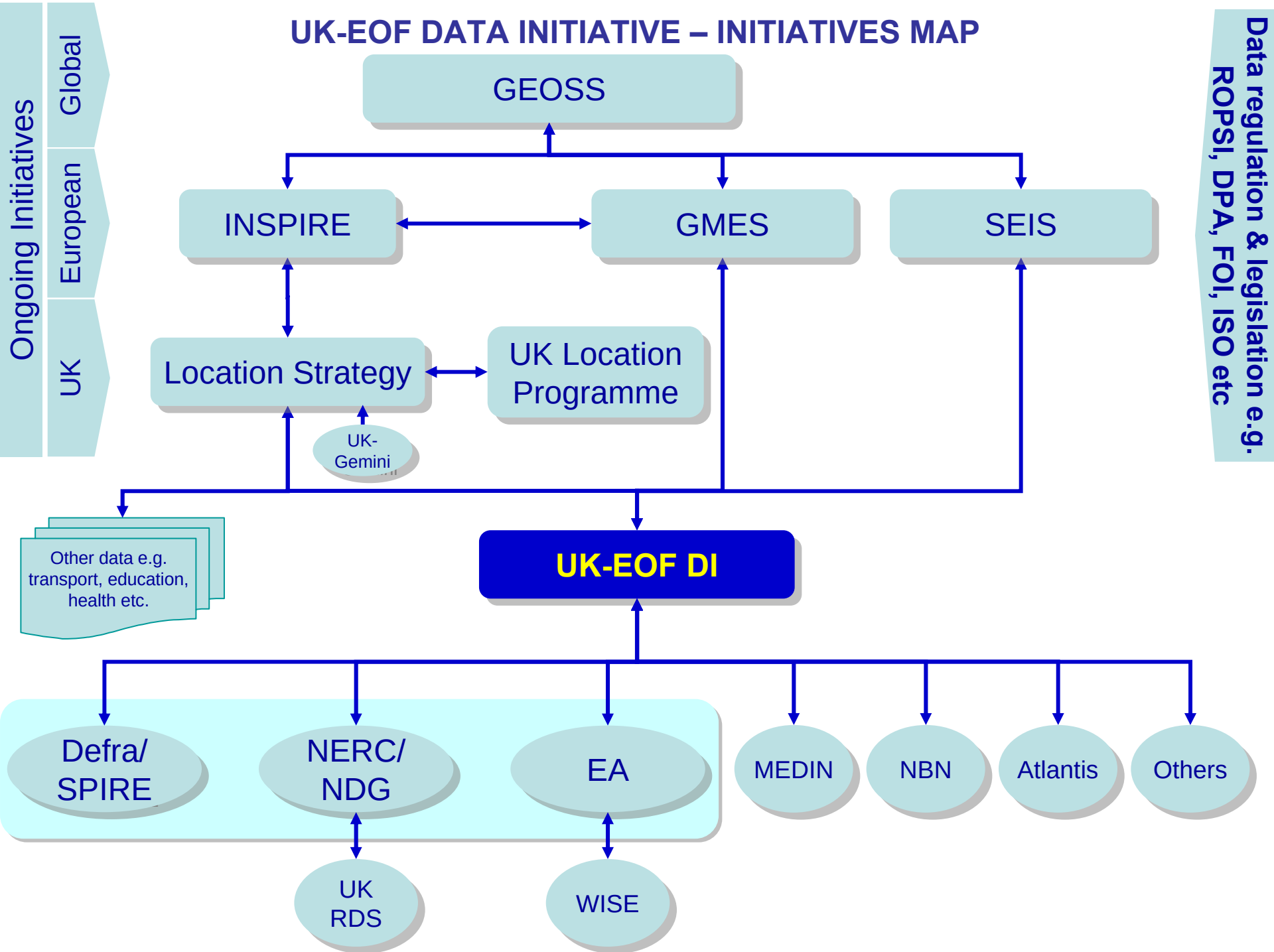


Challenge 3: Data Sharing

We want to enable data to be reused

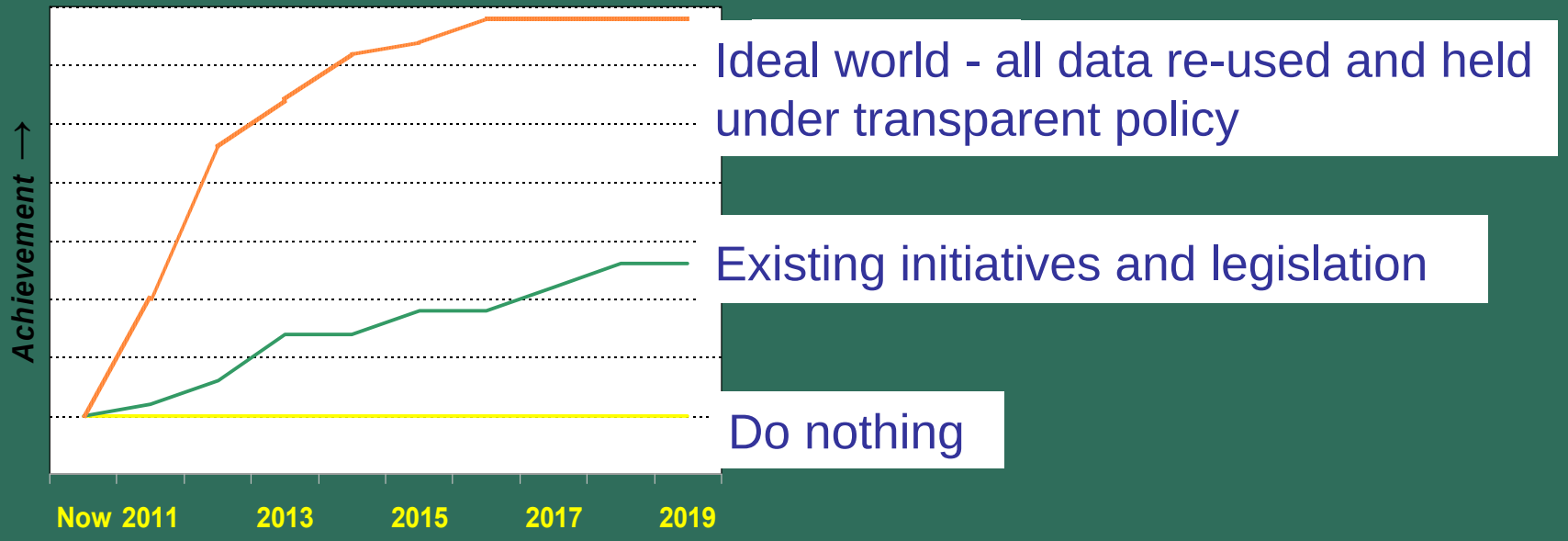
but are not the only ones trying to do this…

UK-EOF DATA INITIATIVE – INITIATIVES MAP



Conceptual model from the Think Tank

Addressing data issues in the UK



- Unanimous agreement at senior Gov level – there are complex and challenging problems across the UK
- Existing / forthcoming legislation tackles only part of the story but the new ‘Location Strategy’, INSPIRE and SEIS will help
- Senior leadership is essential to change the culture and organisational issues
- A project is required to realise the objectives – this is called the UK-EOF: DI

A vision for success

People/organisations in UK plc actually share and reuse environmental observation data to inform policy decisions, expand knowledge, improve their responses to a changing environment, contribute to international activities and stimulate markets for innovation

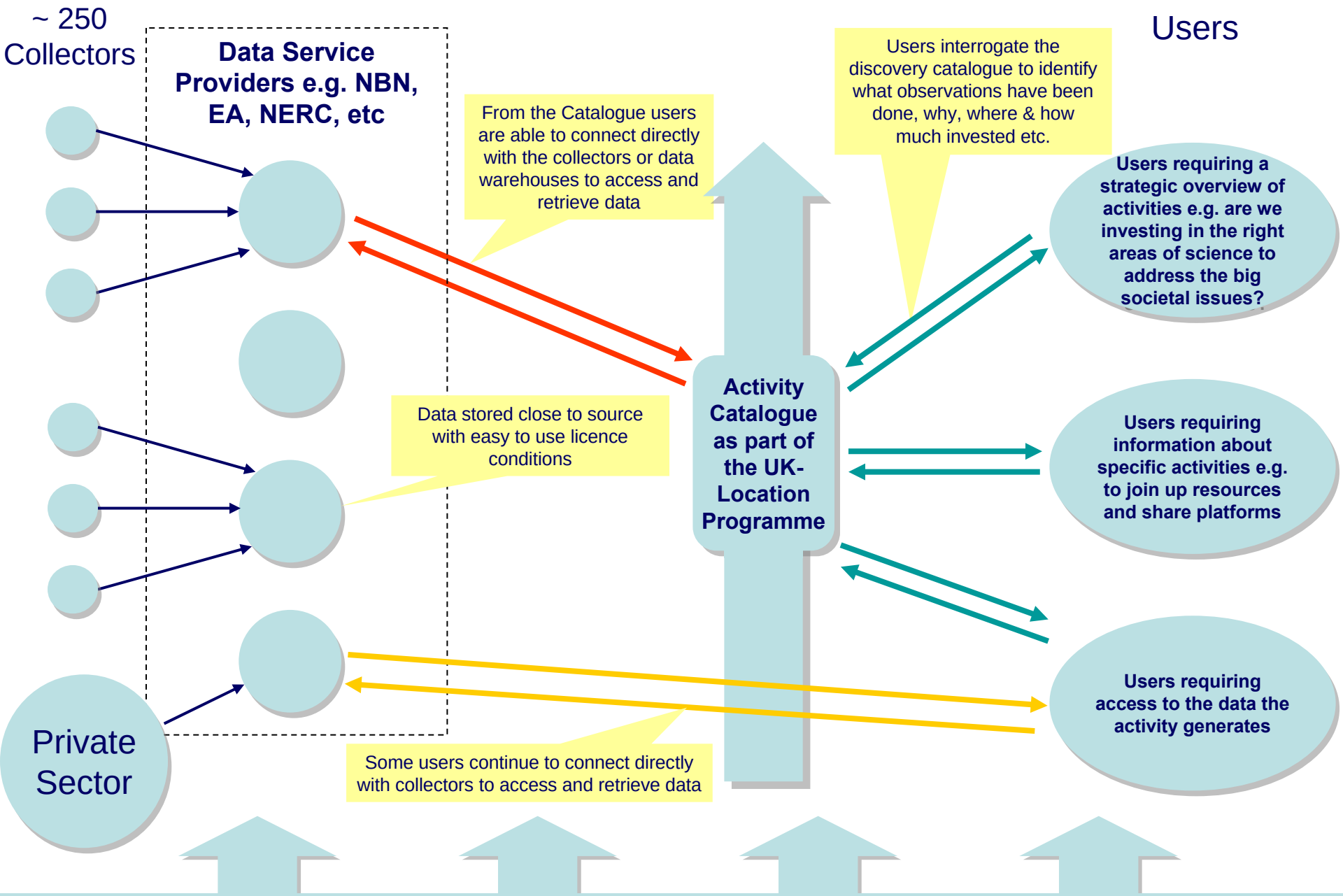
Change areas

Discovery

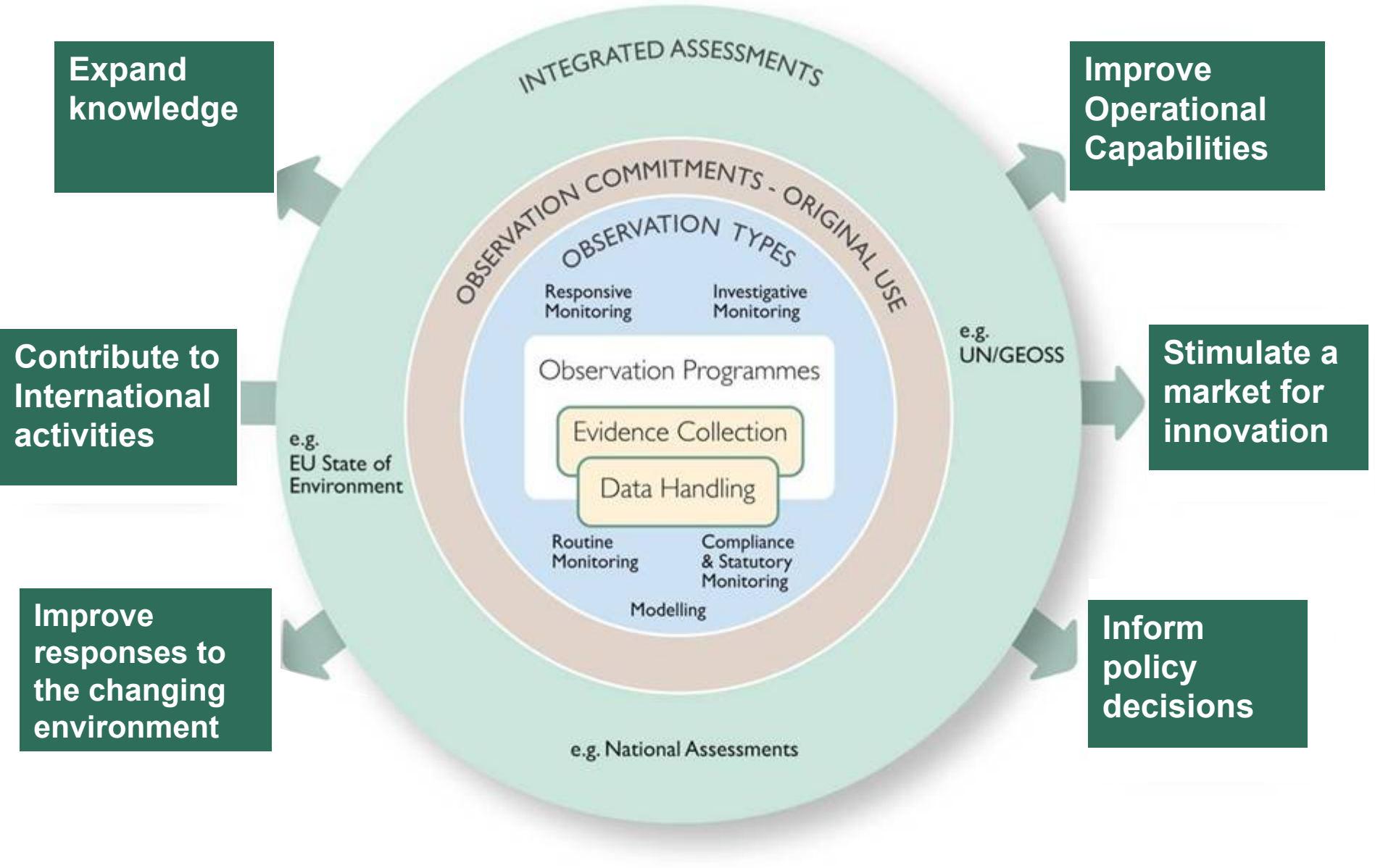
Technical

Organisational

Governance


~ 250 Collectors
Data Service Providers e.g. NBN, EA, NERC, etc
From the Catalogue users are able to connect directly with the collectors or data warehouses to access and retrieve data
Users interrogate the discovery catalogue to identify what observations have been done, why, where & how much invested etc.
Users
Users requiring a strategic overview of activities e.g. are we investing in the right areas of science to address the big societal issues?
Activity Catalogue as part of the UK-Location Programme
Data stored close to source with easy to use licence conditions
Users requiring information about specific activities e.g. to join up resources and share platforms
Users requiring access to the data the activity generates
Private Sector
Some users continue to connect directly with collectors to access and retrieve data
CONTRACTS & STANDARDS (via Location Council)

UK-EOF Concept “valuing observations for all needs”



UK -EOF Summary

- Ambitious programme but much enthusiasm across all stakeholders
- Will enable better decision making and more data sharing
- Now need to understand and cost what really needs to change to achieve the vision

Contacts

Contact us: *bethg@erff.org.uk*
ukeof@erff.org.uk

UK Environmental Observation Framework

Session 2
Steps to achieve the vision

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Session 3
Breakout Sessions

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Breakout Sessions

- 13.30 – 14.30 First session
- Tea break – and move
- 14.45 – 15.45 Second session
- Plenary

Breakout Sessions Feedback

A : Quality – Doubleday Room - Kieran

B: Metadata – Brace Room Sam

C: Infrastructure – Hills Room - David

D: Legal – Marr Room – Miles

UK Environmental Observation Framework

Session 4
Key Note
Ian Townend HR Wallingford

Environment Research
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UK Environmental Observation Framework

Conclusions

Next Steps

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Funders' Forum

Key Conclusions:

Next Steps –UK

- Workshop summary on website
- Breakout sessions
  - A : Report and DAG to discuss next steps
  - B: The catalogue upgrade take account of feedback
  - C: Fundamental to business case
  - D: Report and DAG to discuss next steps
- UKEOF DI Business Case – October
  - Please send comments on the PID and brief to davidl@erff.org.uk by 3ist July

Next Steps –EU

SEIS

GMES

GEOSS

Next Steps - You

- You spread the word and good practice
- Comment on the PID
- Contact DAG or MG rep

TALK TO US !!

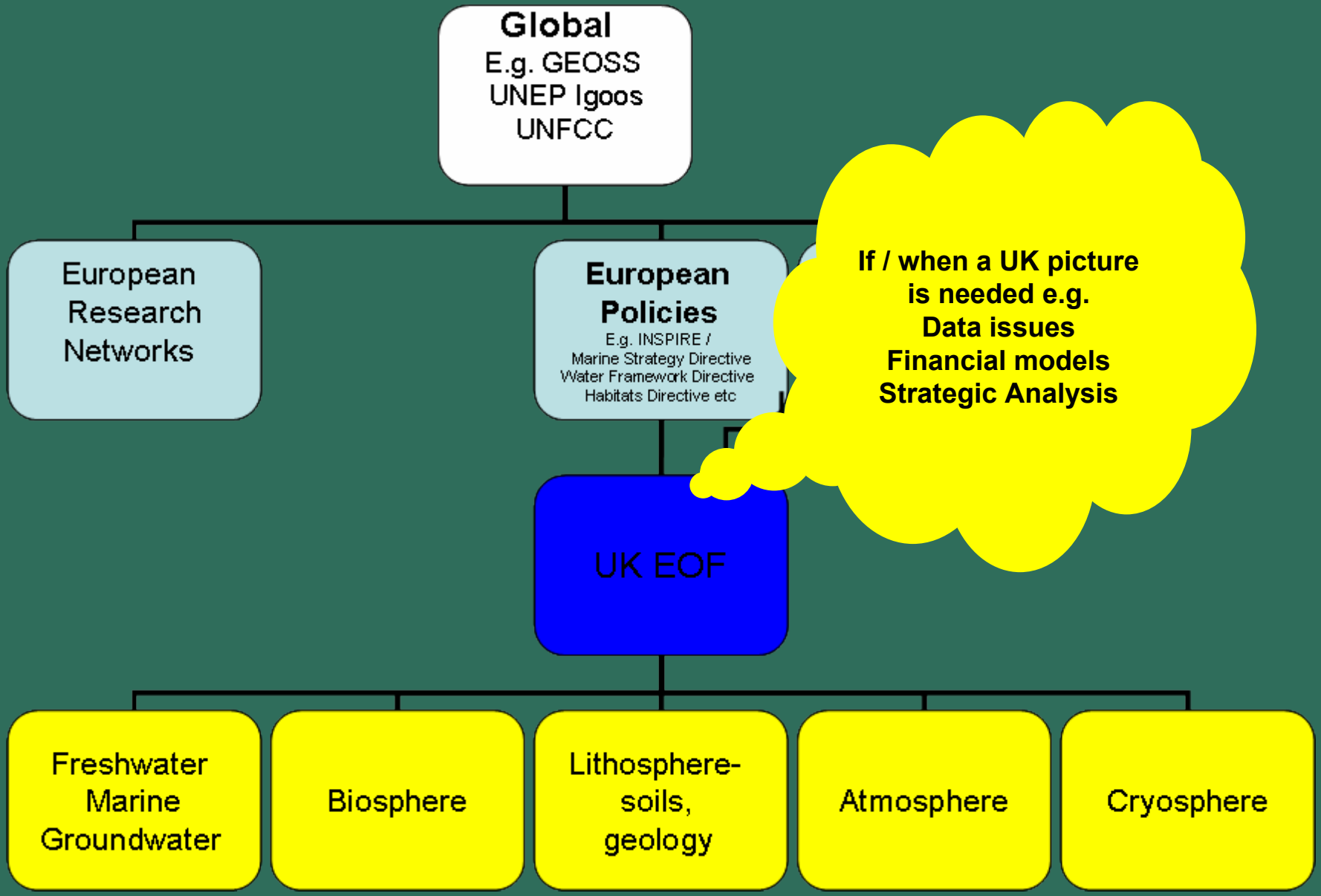
‘Towards a Statement of Need’

Aim

- Holistic picture of overall current and future natural environmental evidence needs & role of observations in providing this.

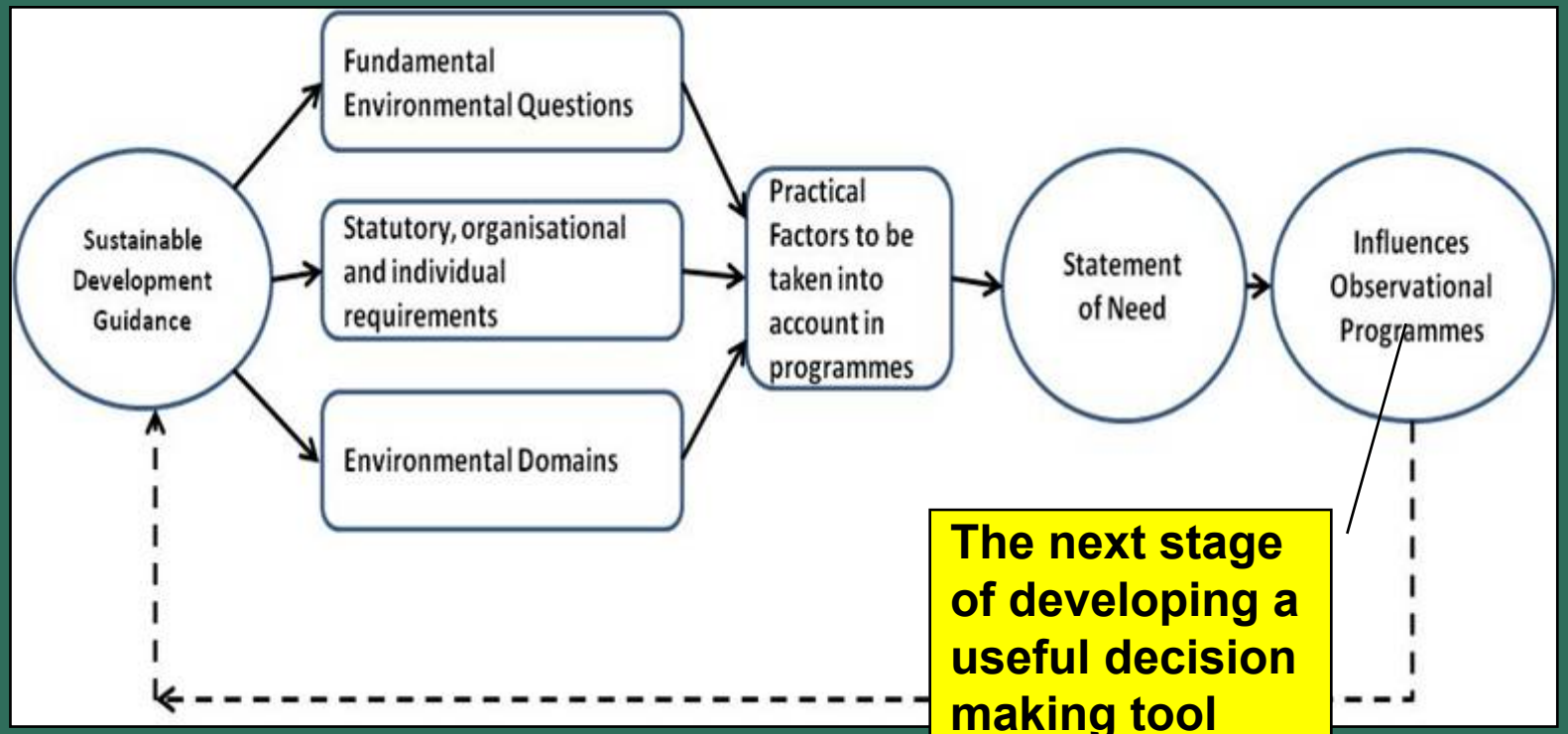
Why?

- Inform future phases of the UK-EOF (infrastructure, skills, funding, gap identification).
- Inform strategic decision making within and across funders who between them spend up to £500m per year



Note this is schematic

Statement of Need: process and structure



UK-EOF: Scope

- **Quality and Access Standards – Best Practice:**
  - Coordination with other initiatives e.g. INSPIRE, Location Strategy, SEIS, GEOSS etc.
  - Translating and promoting best practice standards and guidelines across the diverse community
  - Providing points of contact/ simple tools.
  - Scoping study (Atkins) to define way forward in this area

UK-EOF: Scope

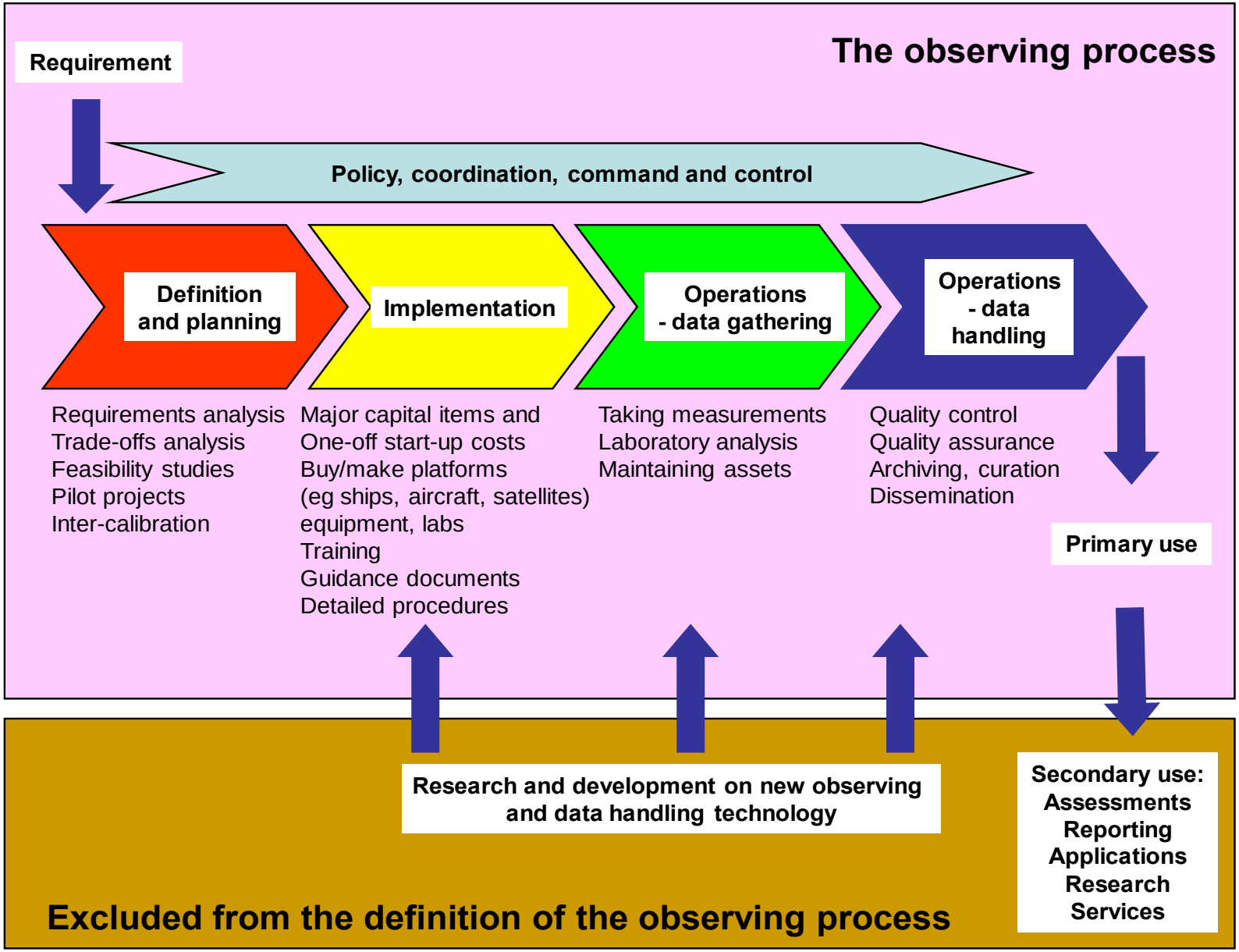
- **Data Protocols:**
  - Working with data funders, collectors, users and storage organisations to promote and help implement a data protocol
  - Organisations to enforce own policy but will be given tools and examples of best practise (and compliance) be ‘encouraged’ to adopt standard language and clauses.
  - Transparency and clarity are key
  - Reporting and enforcement to Location Council using Data Status Table

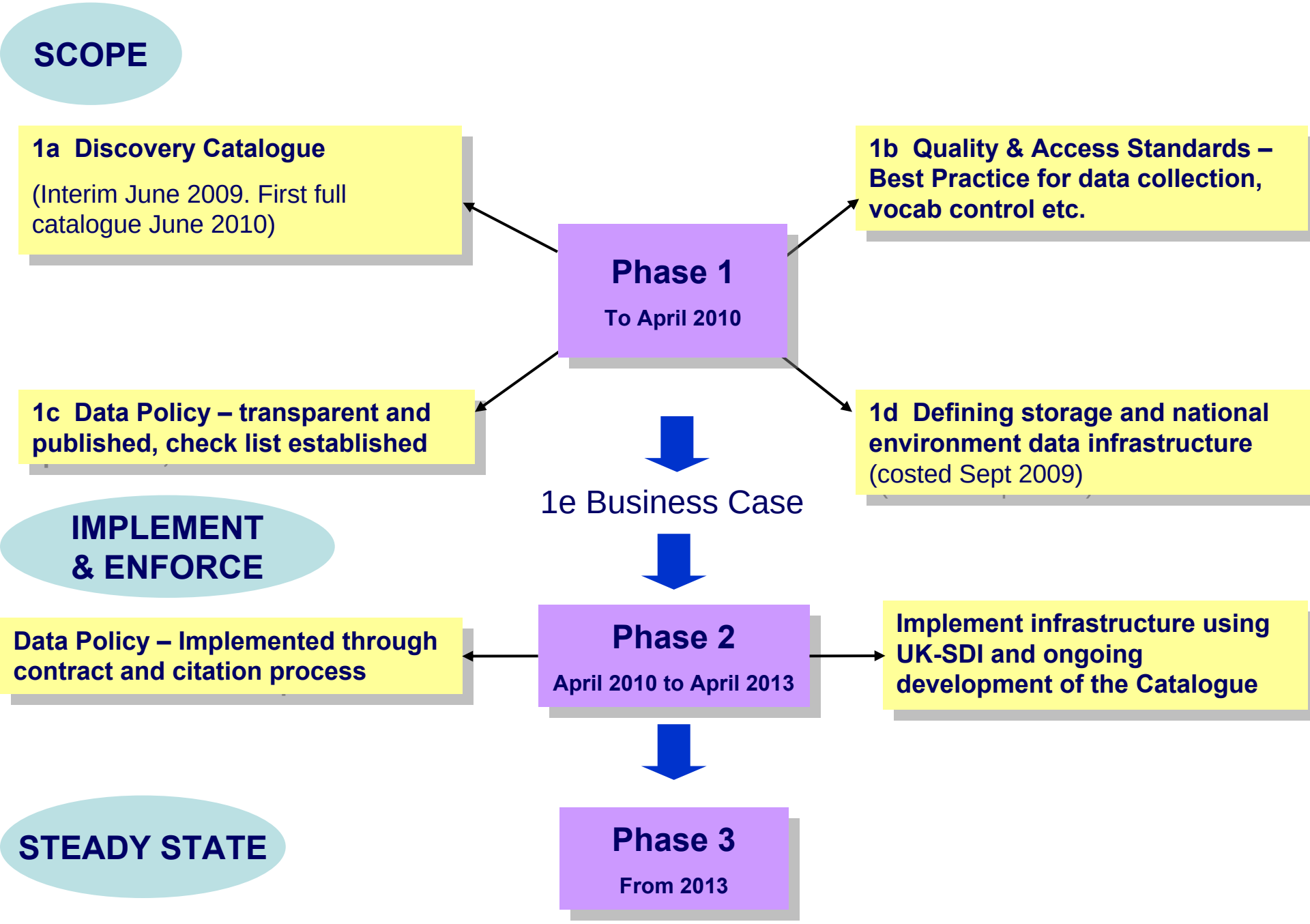
UK-EOF: Scope

- **National Environmental Data Infrastructure:**
  - Identify requirements for infrastructure for EDI to achieve vision
  - Identify how existing and planned capability can be harnessed
  - Develop a costed plan for filling the gaps – Business Case Oct 2009

EDI: Implement & Enforce

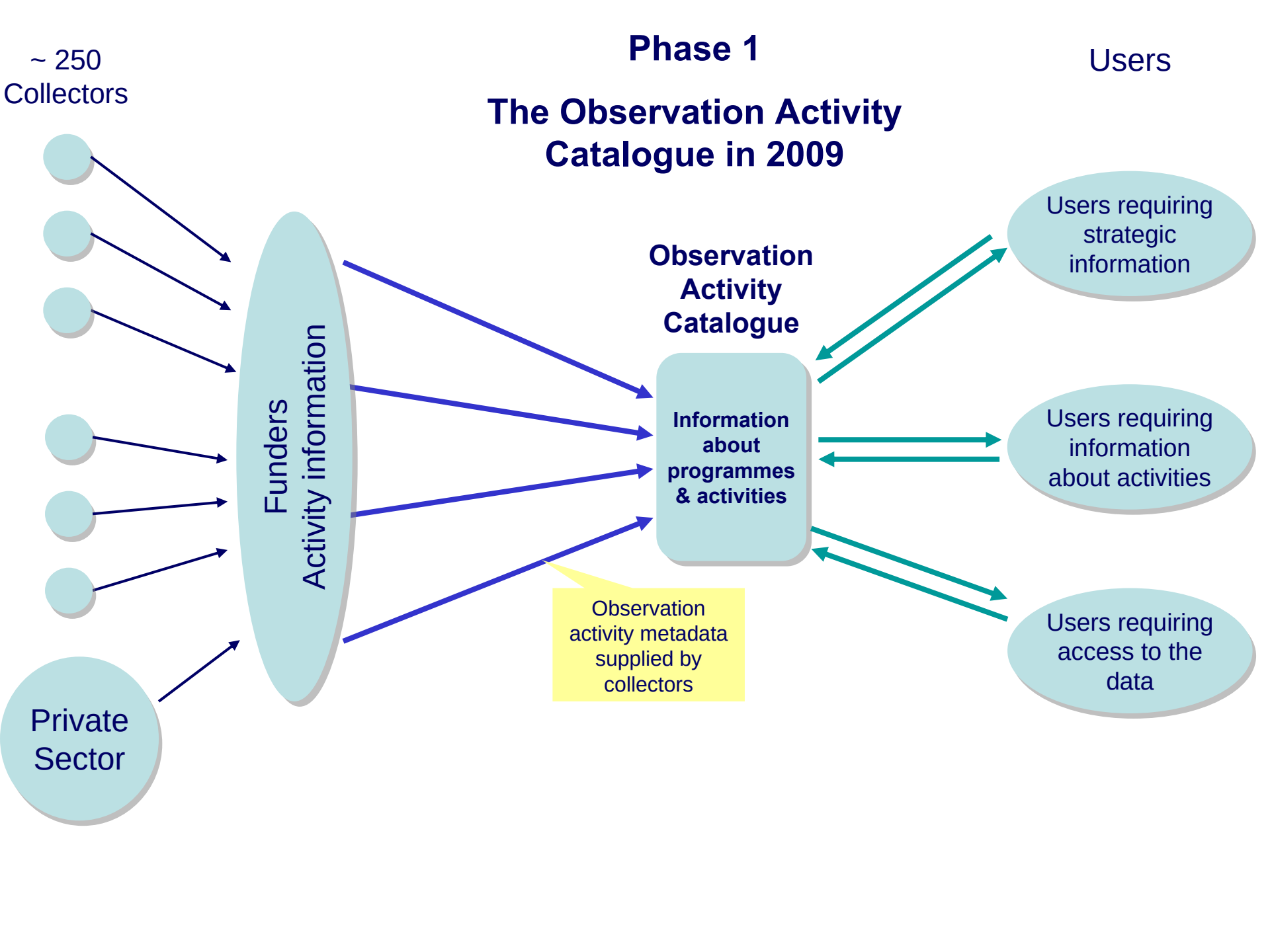
- **Data Policy implemented through contract and citation (carrots and sticks)**
  - Contract clause, similar to MEDIN, required to be included in all future environmental data gathering contracts. Existing contracts encouraged to adopt new clause.
  - Data citation system implemented to bring reward to researchers who share good quality data
  - Both require/ stimulate a change in attitude to data

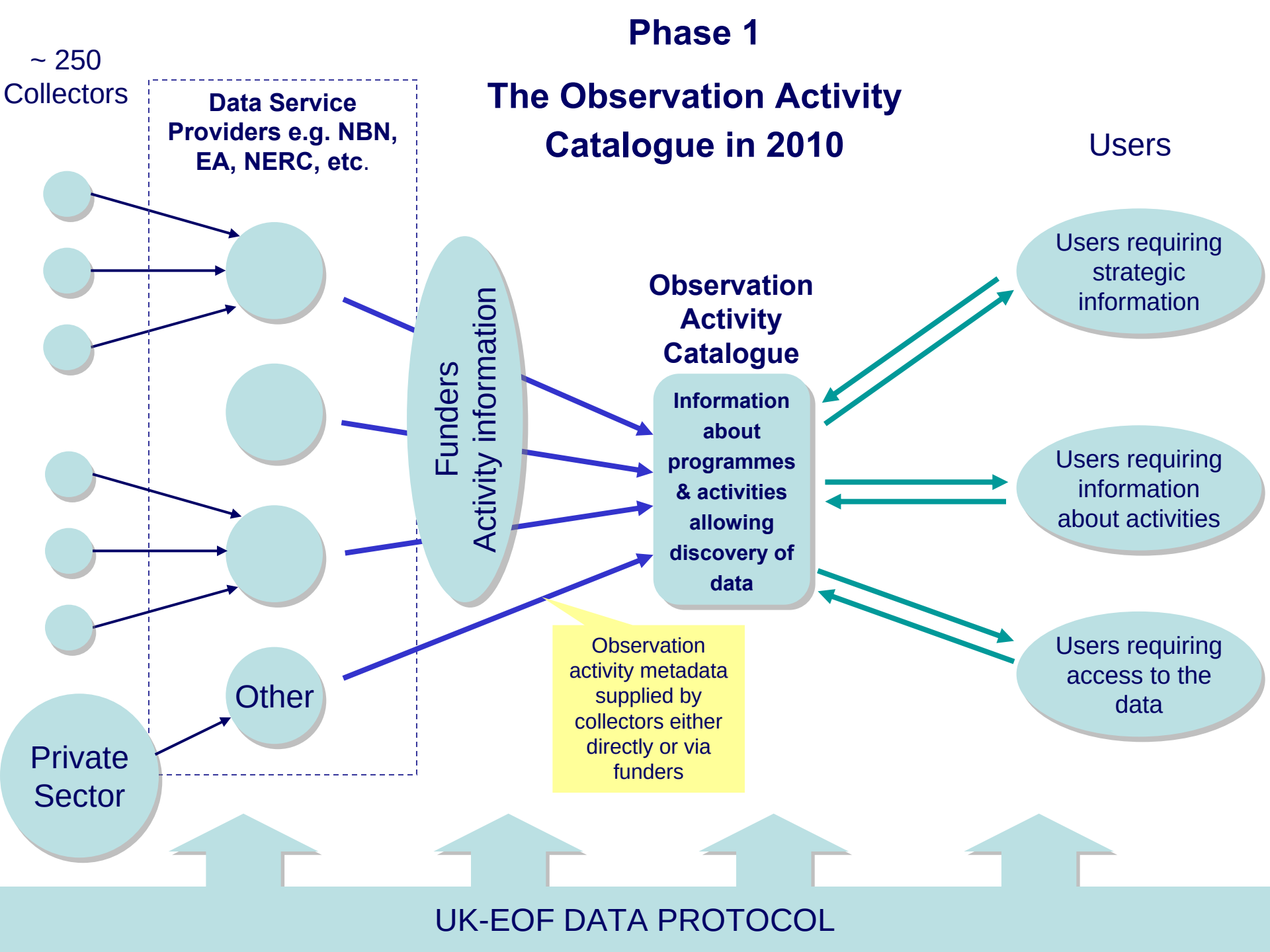

The observing process
Requirement
Policy, coordination, command and control
Definition and planning
Implementation
Operations - data gathering
Operations - data handling
Requirements analysis
Trade-offs analysis
Feasibility studies
Pilot projects
Inter-calibration
Major capital items and
One-off start-up costs
Buy/make platforms
(eg ships, aircraft, satellites)
equipment, labs
Training
Guidance documents
Detailed procedures
Taking measurements
Laboratory analysis
Maintaining assets
Quality control
Quality assurance
Archiving, curation
Dissemination
Primary use
Research and development on new observing and data handling technology
Secondary use:
Assessments
Reporting
Applications
Research
Services
Excluded from the definition of the observing process


SCOPE
1a Discovery Catalogue
(Interim June 2009. First full catalogue June 2010)
1b Quality & Access Standards – Best Practice for data collection, vocab control etc.
Phase 1
To April 2010
1c Data Policy – transparent and published, check list established
1d Defining storage and national environment data infrastructure (costed Sept 2009)
1e Business Case
IMPLEMENT & ENFORCE
Data Policy – Implemented through contract and citation process
Phase 2
April 2010 to April 2013
Implement infrastructure using UK-SDI and ongoing development of the Catalogue
Phase 3
From 2013
STEADY STATE

Outcomes of the UK-EOF: Knowledge/information

Share knowledge and information on observation plans and programmes so that we will know what environmental parameters are being monitored by or for the UK, by whom, how, why and at what cost. Improve understanding of what we can do with the information and how to access the data.


~ 250 Collectors
Phase 1
The Observation Activity Catalogue in 2009
Users
Funders Activity information
Private Sector
Observation Activity Catalogue
Information about programmes & activities
Observation activity metadata supplied by collectors
Users requiring strategic information
Users requiring information about activities
Users requiring access to the data


Phase 1
The Observation Activity Catalogue in 2010
~ 250 Collectors
Data Service Providers e.g. NBN, EA, NERC, etc.
Users
Funders Activity information
Observation Activity Catalogue
Information about programmes & activities allowing discovery of data
Users requiring strategic information
Users requiring information about activities
Users requiring access to the data
Other
Private Sector
Observation activity metadata supplied by collectors either directly or via funders
UK-EOF DATA PROTOCOL

9 issues: How can observations help us understand …….

- Pressure on the environment in the light of **population growth** and associated pollution.
- Reconciliation of **economic growth with sustainable use of natural resources**.
- Future States of the Earth and particularly the **Carbon Cycle**
- The effects of environmental change on **agriculture, food security and water supply**.
- Consequences of environmental change for **human health, wealth and well being**
- **Extreme Events** and Disasters
- Impacts of environmental change on **biological diversity, ecosystems and ecosystem services**
- Climate variability & **Climate Change**: Challenges in Earth System Science
- Stimulation of **Scientific & Technological Advance and Innovation**

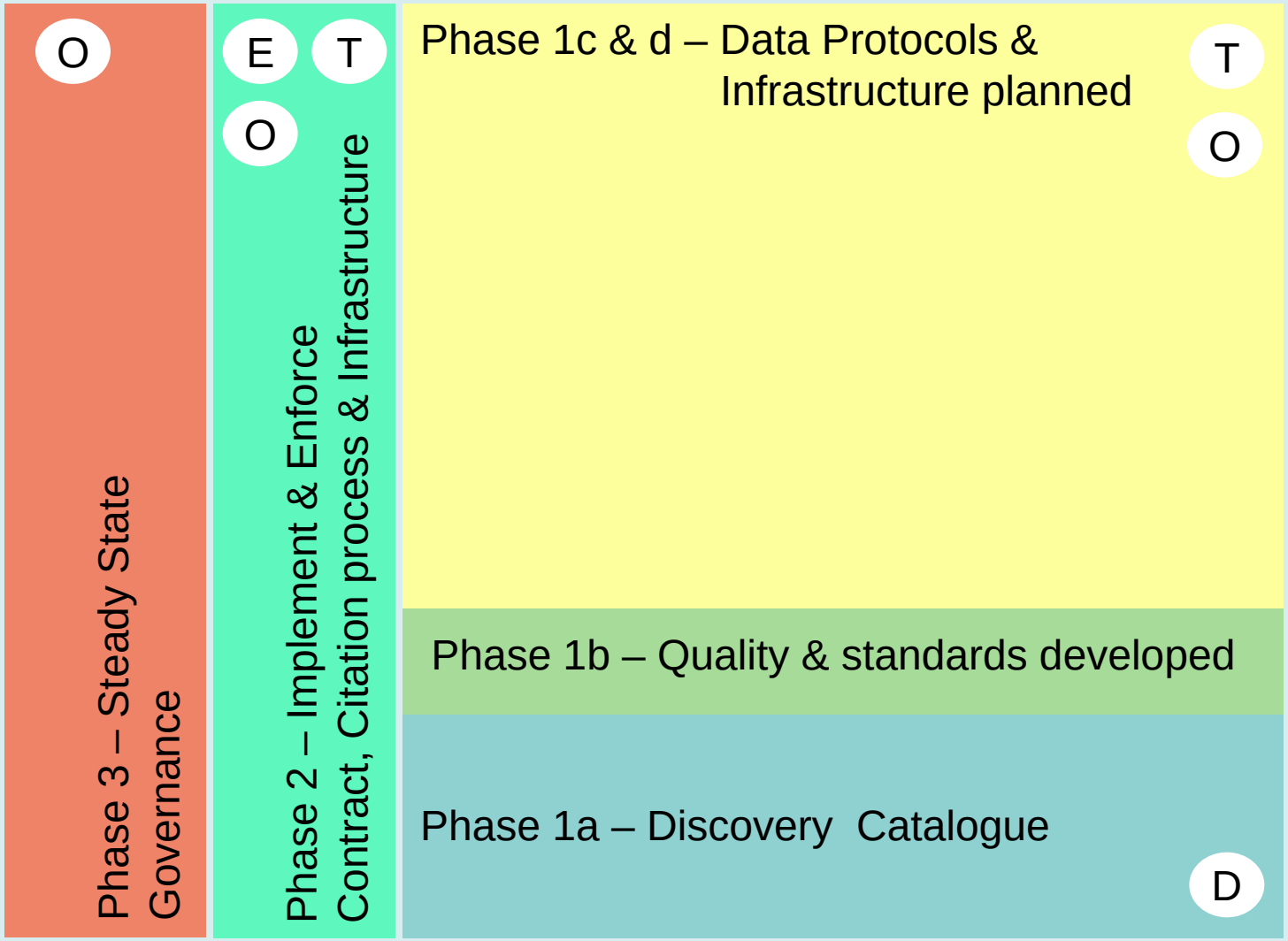
Environmental Observations Activity Catalogue

A tool for discovering information about programmes and activities collecting environmental observations in or on behalf of the UK. It will also point to how to access the data generated and its suitability for re-use.

Summer 2009 – Information we have now

Summer 2010 – More detailed information and pointing to data

UK-EOF DATA INITIATIVE –
Enabling value from environmental data



Key: **D = Discovery** **O = Organisation**
T = Technology **E = Economic**