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Group on Earth Observations (GEO) Climate and Data Sharing/Management Principles

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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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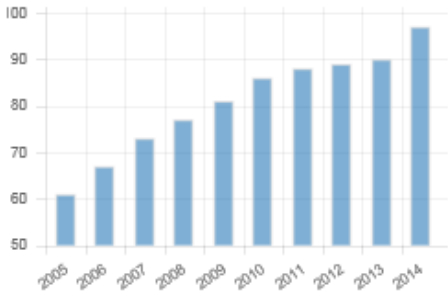
Members

GEO Member Map for the year 2014

Number of Members (2014)

Total:	97
Africa:	24
Americas:	15
Asia/Oceania:	17
C.I.S.:	7
Europe:	34

Number of Members by year



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88 Participating Organizations

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

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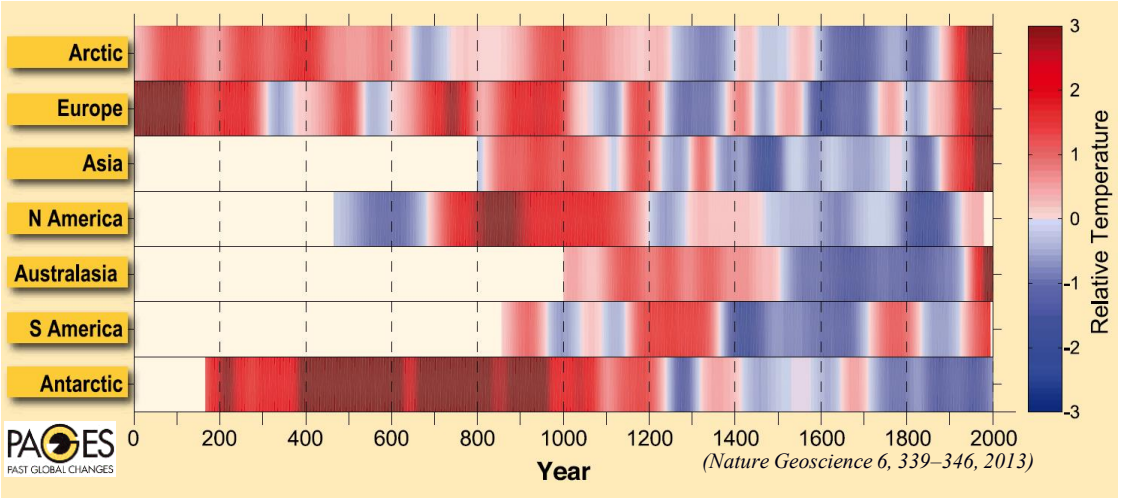
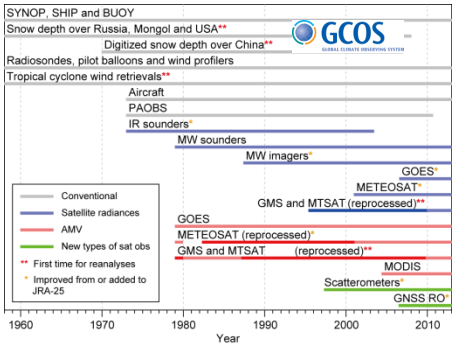
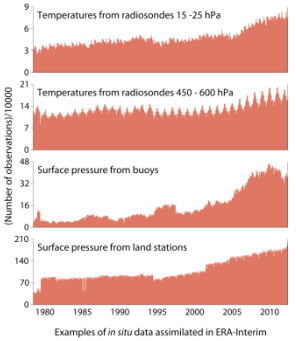
Climate Change Detection & Adaptation

(EC, Japan, USA, ECMWF, ESA, GCOS, IGBP, WCRP, WMO)

- Reanalysis projects covering 50 yrs or more
- 2000-yr reconstruction
- Seasonal/polar prediction
- GCOS Surface Network (new instruments)
- CEOS response to GCOS update on obs needs (ECVs; UNFCCC)







ERA CLIM

ice sheets cci esa

GOSIC Global Observing Systems Information Center

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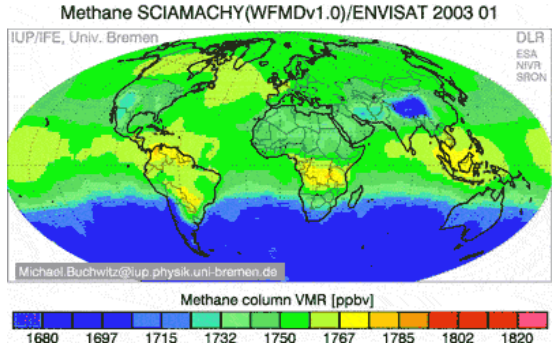
GEO Climate Targets

Task CL-01 Climate Information for Adaptation

- Improved scientific understanding, modelling and prediction of climate
- Availability of [illegible] needed by WCRP, IPCC, UNFCCC
- Accessibility of [illegible] observational data needed for climate monitoring and services in support of adaptation to climate variability and change
- Global carbon observing and analysis system

GCOS GLOBAL CLIMATE OBSERVING SYSTEM



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Climate

Task CL-01 Climate Information for Adaptation

4 Components

C1. Extension & Improvement of the Climate Record

C2. Accelerated Implementation of the Global Climate Observing System

GCOS GLOBAL CLIMATE OBSERVING SYSTEM

C3. Weather, Climate and Earth-System Prediction Systems

C4. Easy Access to, and Use of, Climate Information

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GEO Climate Task CL-01

Component 2: Accelerated Implementation of the Global Climate Observing System

PRIORITY ACTIONS:

Support implementation of specific Actions of GCOS-IP to make available ECV datasets.

Provide support to GCOS component systems: GOS, GAW, GOOS, GTOS, global hydrological networks & satellite systems.

Establish actions securing provision of ECV data from satellite systems.

Build upon international initiatives such as the ESA Climate Change Initiative.

Support the GCOS programme in its assessment of progress and adequacy, and its development of a new IP, including review & refinement of list of ECVs (2014-2015).

Member or PO	Implementing Entity	Contact Name
GCOS	**GCOS**	**C. Richter**
CEOS	NOAA	J. Bates
ESA	ESA	P. Lecomte
EC	EC FP7	J-L. Brenguier
EC	EC-JRC	M. Dowell
Nigeria	Dep. Geogr.	F. Adesina
Norway	NR	R. Solberg
ECMWF	ECMWF	J.-N. Thepaut
EUMETSAT	EUMETSAT	J. Schulz
Germany	DWD	S. Rösner
Japan	JAMSTEC	A. Yamada
Japan	NICT	S. Uratsuka
Nigeria	NASRDA	M. Aderoju
Norway	IMR	H. Wehde

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GCOS & GEO Linkages

GCOS mission (http://gcos.wmo.int)

[…] GCOS is intended to meet the full range of national and international requirements for climate and climate-related observations. As a system of climate-relevant observing systems, it constitutes, in aggregate, the climate observing component of the Global Earth Observation System of Systems (**GEOSS**).

- GCOS, it's Sponsors and the Contributing Observing Systems are all POs in GEO – GCOS, GOOS, GTOS, FAO, ICSU, IOC, UNEP, UNESCO and WMO
- GOSIC is a registered component of GEOSS & functions as a community portal for the global observing systems community
- Challenge: Need for consistent messages regarding role that GCOS intends to play in the GEO Work Plan

→ GCOS is considered the Climate Observation component of GEO

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The GEO Strategic Plan 2016-2025: Implementing GEOSS

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Three Action Areas with Strategic Objectives

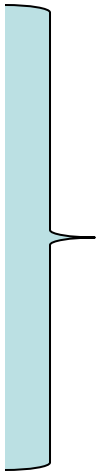
Strategic Objective 1:
GEO will ADVOCATE the value of Earth observations as a vital means of achieving national and international objectives for a resilient society, and sustainably growing economies and a healthy environment worldwide.

Strategic Objective 2:
GEO will ENGAGE with stakeholder communities to address global and regional challenges by deepening the understanding of Earth system processes and improving the links between scientific understanding and policy-making.

Strategic Objective 3:
GEO will DELIVER data, information and knowledge enabling stakeholders to: improve their decision-making processes; promote the exchange of best practices; enable the uptake of new technologies; and create new economic opportunities, while reducing costs to public sector budgets through innovation and collaboration.

What´s new in GEO Post-2015

- A GEO Strategic Plan, not only a GEOSS Implementation Plan
- GEO Implementation Mechanisms:
  - GEO Flagships
  - GEO Global Initiatives
  - Community Activities
  - GEO Foundational Tasks
- Revised Set of SBAs / Societal challenges (*preliminary list, user oriented*)
  - Urban resilience
  - Water security
  - Energy and resource development
  - Food security
  - Resilience to natural hazards
  - Environmental security
  - Developing sustainable economy



***"Climate"* a cross-cutting topic**

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GEOSS Data Sharing Principles

Data Sharing Working Group:

1. **Full** and **open exchange** of data, metadata and products
2. Available with **minimum time delay** and **minimum cost**
3. **Free of charge** or no more than cost of reproduction

Drafting "**GEOSS Data Sharing Principles Post-2015**"

- To better reflect the rising Open Data trend observed worldwide
- To reinforce GEO's impact on promoting availability of free, full and open data;

Revised the background White Paper on "***Legal Mechanisms to Share Data as part of GEOSS Data-CORE***"

- Definition of legal interoperability
- Forms of legal protection of Earth observation data
- Legal mechanisms to make data available without restrictions
- Analysis of regulatory frameworks
- Analysis of suitable, standard or custom licenses and waiver

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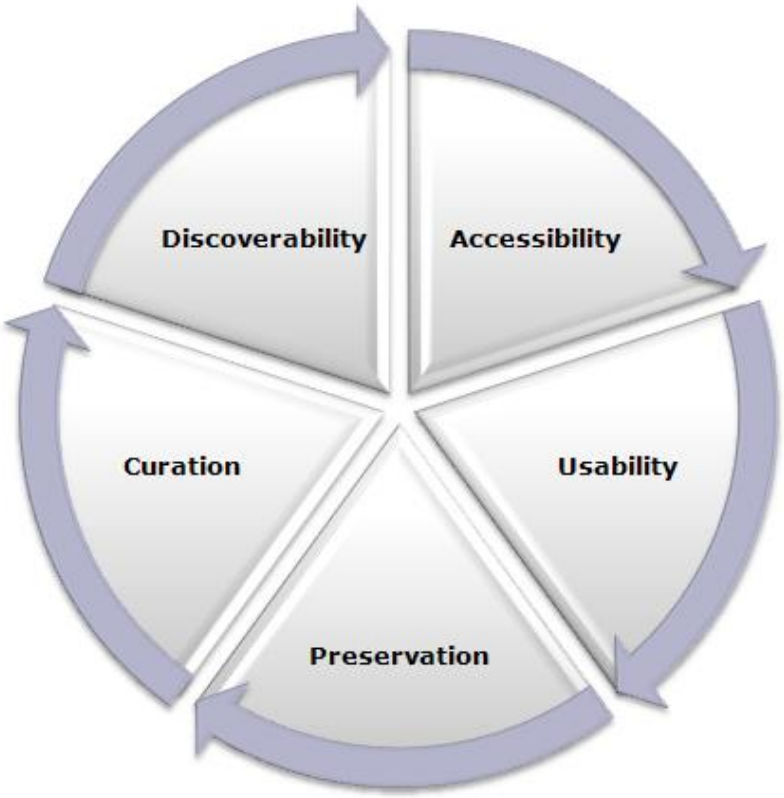
GEOSS Data Management Principles

Each EO is unique because the observation occupies a specific location and time in an environment that is continuously changing. No two Earth environmental observations are the same, making each EO an irreplaceable asset to understand the past, describe the present, and forecast the future of the global integrated Earth system.



The value of each EO is maximized through data life-cycle management, including five foundational elements

GEOSS Portal

More than **35** brokered data providers – capacities, systems, Communities

About **14 Million** potentially Discoverable and Accessible resources (mix of data collections, datasets and individual images)

2 Million

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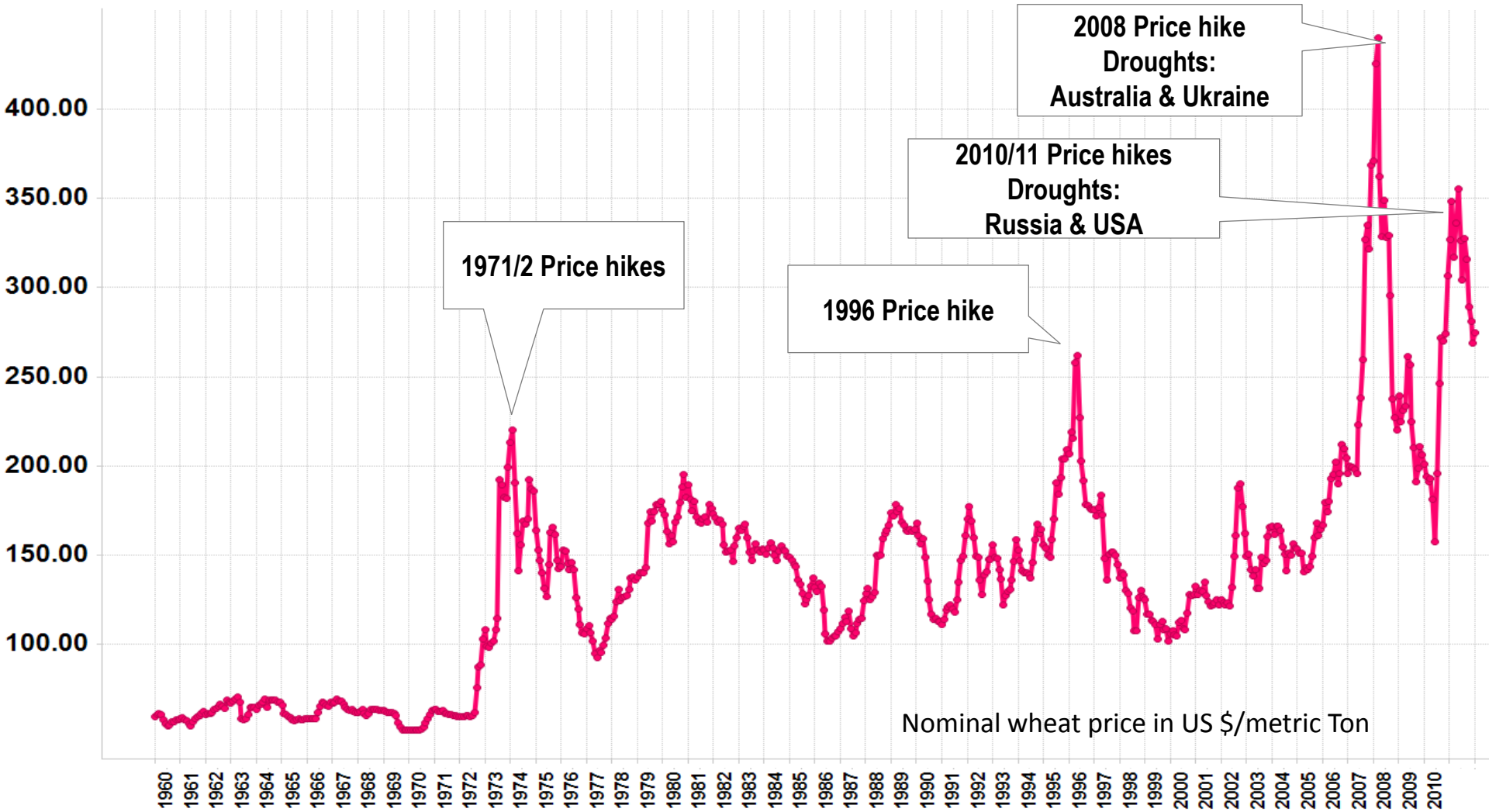
Monthly Wheat Prices 1960-2011 ($/Metric Ton)

Source: World Bank



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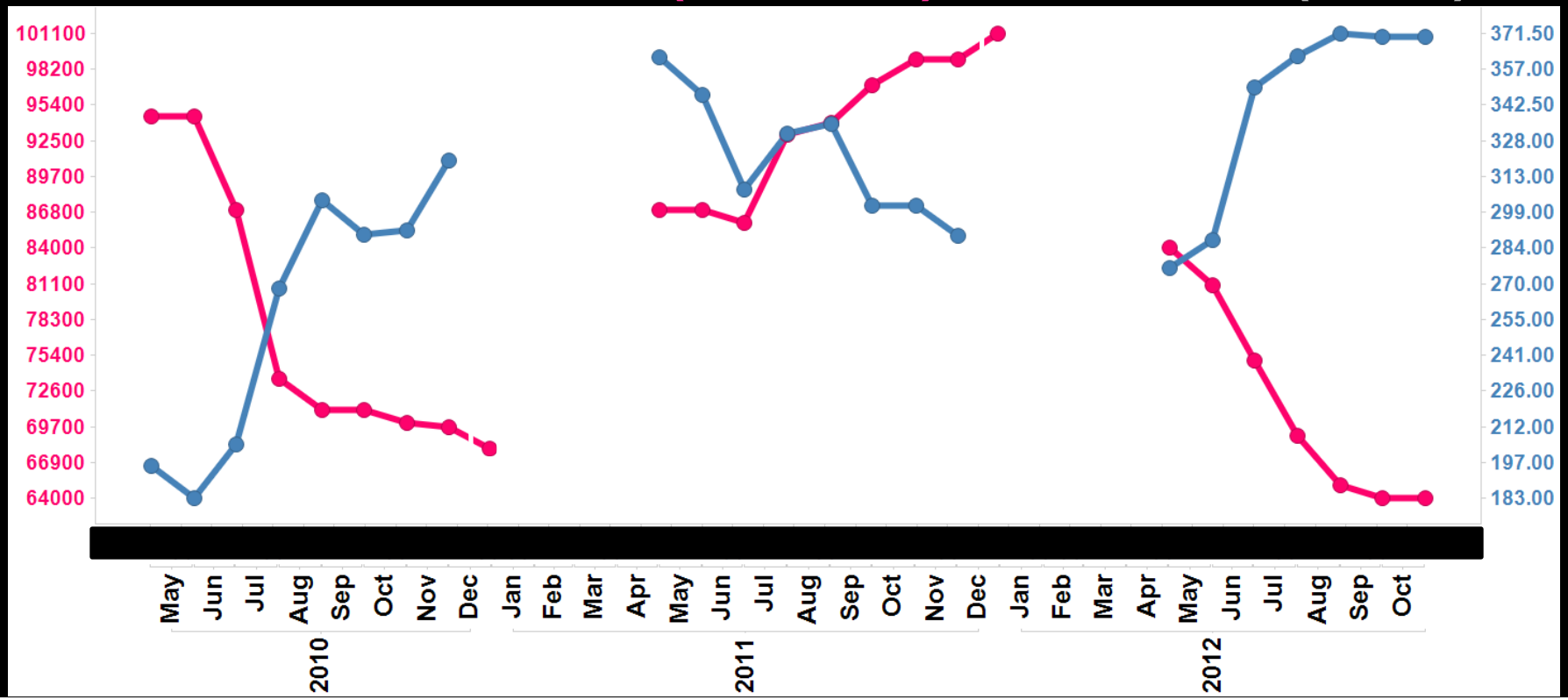
Making the case for improved crop forecasts

Aggregation of Wheat Production Forecasts from Main Wheat Export Countries vs. International Market Price 2010-2012



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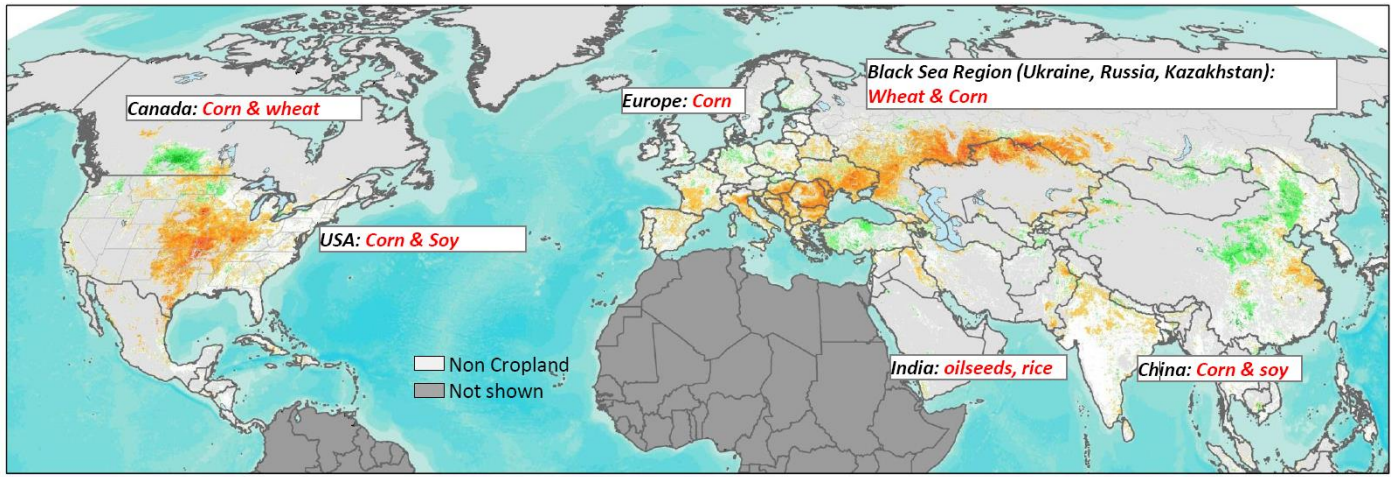
Crop Information for Decision-Making

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

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

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Summary Points

GEO is focusing on:

- Leveraging existing systems
- Advocacy for national investments in both space and *in situ* networks
- Targeted gaps in observing systems
- International advocacy for broad open data sharing

Opportunities:

- GEO can reinforce GCOS goals, objectives and leadership to a broader community
- GEO intended to reach policy, ministerial levels
- GEO is a vocal advocate for broad, open, data-sharing policies and practices

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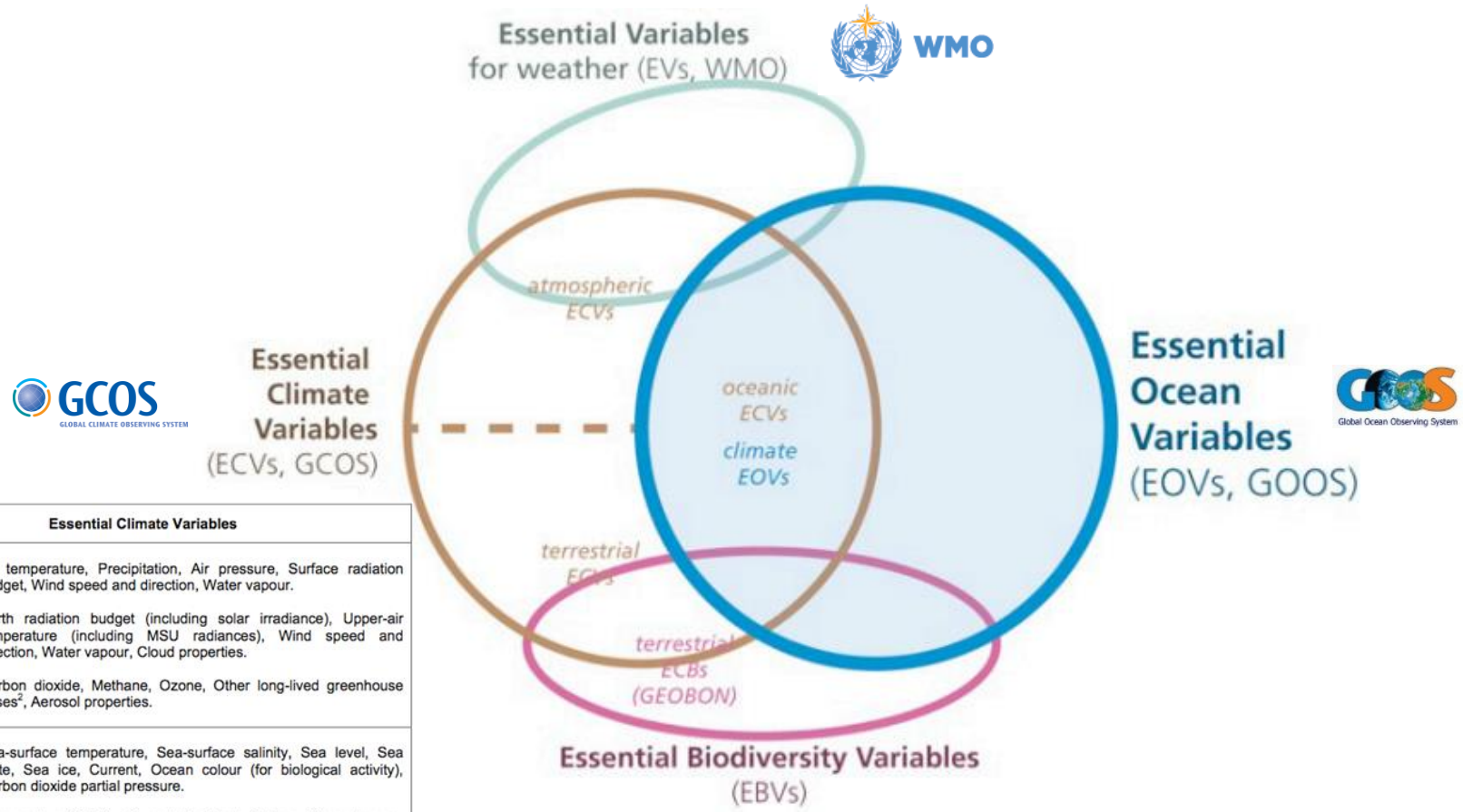
Towards Multiple Essential Variables



Domain	Essential Climate Variables	
Atmospheric (over land, sea and ice)	**Surface:**	Air temperature, Precipitation, Air pressure, Surface radiation budget, Wind speed and direction, Water vapour.
	Upper-air:	Earth radiation budget (including solar irradiance), Upper-air temperature (including MSU radiances), Wind speed and direction, Water vapour, Cloud properties.
	Composition:	Carbon dioxide, Methane, Ozone, Other long-lived greenhouse gases[2], Aerosol properties.
Oceanic	**Surface:**	Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Current, Ocean colour (for biological activity), Carbon dioxide partial pressure.
	Sub-surface:	Temperature, Salinity, Current, Nutrients, Carbon, Ocean tracers, Phytoplankton.
Terrestrial[3]	River discharge, Water use, Ground water, Lake levels, Snow cover, Glaciers and ice caps, Permafrost and seasonally-frozen ground, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (fAPAR), Leaf area index (LAI), Biomass, Fire disturbance.	

Source: Framework for Ocean Observing

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Question:

Could other communities have the same kind of well-established framework as GCOS provides regarding the ECVs?

Challenge:

Multiple requirements emerging from different essential variables (ECVs, EOVs, EBVs)

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www.earthobservations.org

Thank you

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aobregon@geosec.org

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GEO added value for Climate community

- Framework for collaboration with other institutions outside current networks (e.g. Cold Regions)
- Framework for collaboration with other communities (e.g. SBAs)
- Advancing data-sharing
- Discovery and access to data you need (GEOSS Portal, APIs, Community Portals) & making your data more visible and used
- Visibility of activities and organisations towards government representatives
- R&D budgets earmarked for GEO activities (e.g. EC)

Current Assets

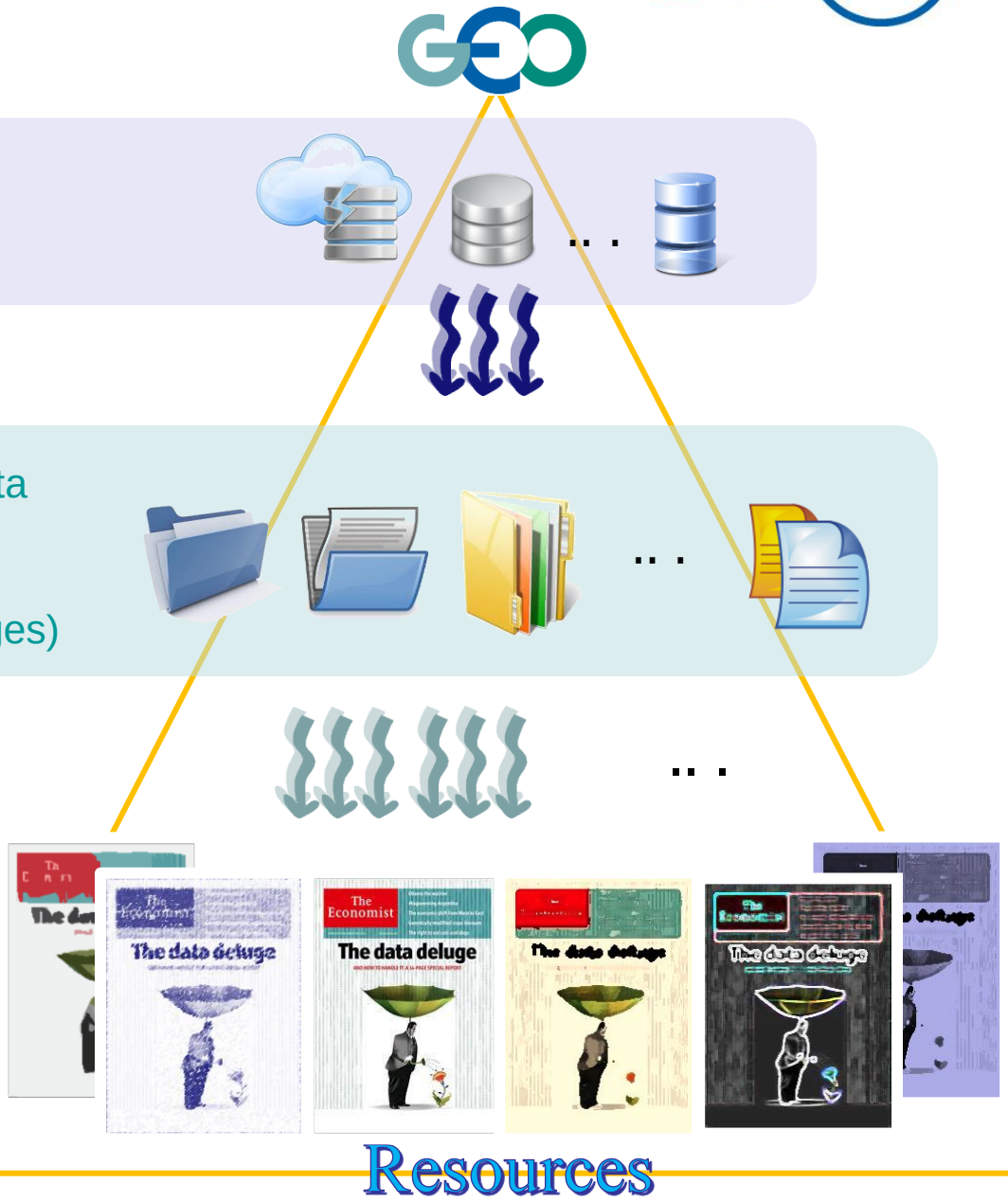
More than 35 brokered data providers – capacities, systems, Communities

Publish

About 14 Million (2 Million GEOSS Data Core) potentially Discoverable and Accessible resources (mix of data collections, datasets and individual images)

Contain [source: data providers]

More than 75 Million (more than 50 Million GEOSS Data Core) potentially Discoverable and Accessible resources (e.g. satellite scene, raingauge record)



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Data Management Principles

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Discoverability

1. Data and all associated metadata will be discoverable through catalogues and search engines, and data access and use conditions, including licenses, will be clearly indicated.

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Accessibility

2. Data will be openly accessible with minimum delay and cost.
3. Data will be accessible via online services, including, at minimum, direct download but preferably user-customizable services for visualization and computation.

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Usability

4. Data should be structured using encodings that are widely accepted in the target user community and aligned with organizational needs and observing methods, with preference given to non-proprietary international standards.
5. Data will be comprehensively documented, including all elements necessary to access, use, understand, and process, preferably via formal structured metadata based on international standards.
6. Data will include provenance metadata indicating the origin and processing history of raw observations and derived products, to ensure full traceability of the product chain.
7. Data will be quality-controlled and the results of quality control shall be indicated in metadata; data made available in advance of quality control will be flagged in metadata as unchecked.

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Preservation

9. Data will be protected from loss and preserved for future use; preservation planning will be for the long term and include guidelines for loss prevention, retention schedules, and disposal or transfer procedures.
10. Data and associated metadata held in data management systems will be periodically verified to ensure integrity, authenticity and readability.

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Curation

11. Data will be managed to perform corrections and updates in accordance with reviews, and to enable reprocessing as appropriate; where applicable this shall follow established and agreed procedures.
12. Data will be assigned appropriate persistent, resolvable identifiers to enable documents to cite the data on which they are based and to enable data providers to receive acknowledgement of use of their data.