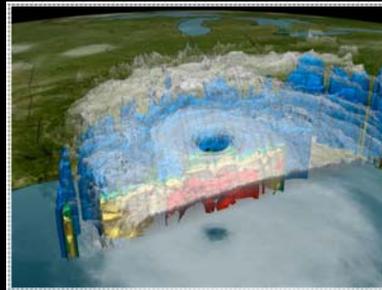
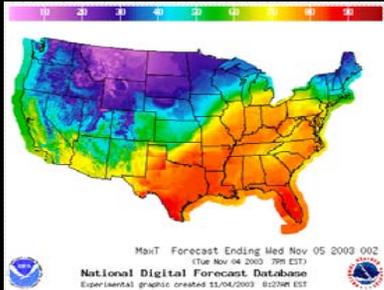
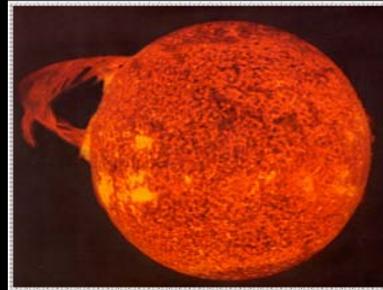
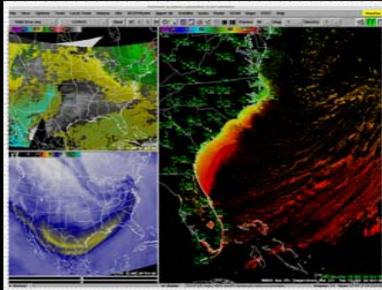


National Weather Service The WMO Information System (WIS)



Walter Smith, Team Lead Data Management

NWS WIS Project Representative

June 25, 2013





Agenda

- **World Meteorological Organization (WMO)**
- **WMO Information System (WIS)**
- **WIS Structure**
- **Discovery, Access & Retrieval (DAR)**
- **The Role of Metadata and Standards in the WIS**
- **Evolution of Global Observing Systems (WIGOS)**
- **Questions and Answers**



World Meteorological Organization (WMO)



- A specialized agency of the United Nations
- The UN system's authoritative voice on the state and behavior of the Earth's atmosphere, its interaction with the oceans and the climate it produces and the resulting distribution of water resources
- 191 International Member States and Territories
- NWS Director is the U.S. representative to the WMO



WIS Directed by WMO Congress

Congress XV Directives (2007)

Congress agreed that the WIS implementation plan has two parts developed in parallel:

PART A:

The continued consolidation and further improvements of the GTS for time-critical and operation-critical data, including its extension to meet operational requirements of WMO Programmes in addition to the World Weather Watch (including improved management of services);

PART B:

An extension of the information services through flexible data discovery, access and retrieval services (DAR) to authorized users, as well as flexible timely delivery services.



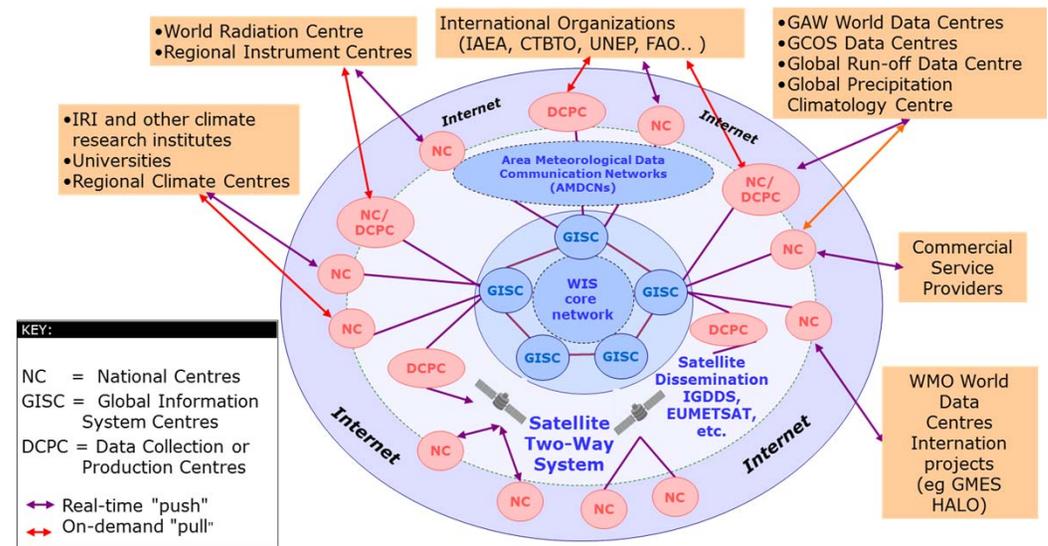
Congress XVI Directives (2011)

- **WIS has moved from a development stage into an operational stage**
- **Congress XVI agreed that WIS activities in 2012-2015 should be focused on:**
 - ✔ **Complete WIS implementation across all WIS Centres**
 - ✔ **Capacity building to ensure support of all WMO Members**
 - ✔ **Leverage WIS advantages for all WMO programmes**
 - ✔ **Take advantage of WIS in all WMO data Management**



WMO Information System (WIS)

A global information system for the management of weather, water and climate data to allow for global benefits in the areas of safety, risk reduction, health, energy, agriculture, ecosystems and biodiversity





WMO Information System (WIS)

- **Technology Advances**
 - ☑ Internet - Fast exchange and retrieval of information
 - ☑ Satellites - Management of large volumes of information
 - ☑ International Standards
 - ☑ Uses Service Oriented Architecture (SOA)
- **Ensure interoperability of Information Systems between WMO Programs and those outside of the WMO community**
- **A program to aid WMO to avoid data incompatibilities & problems in sharing valuable data across various programs**



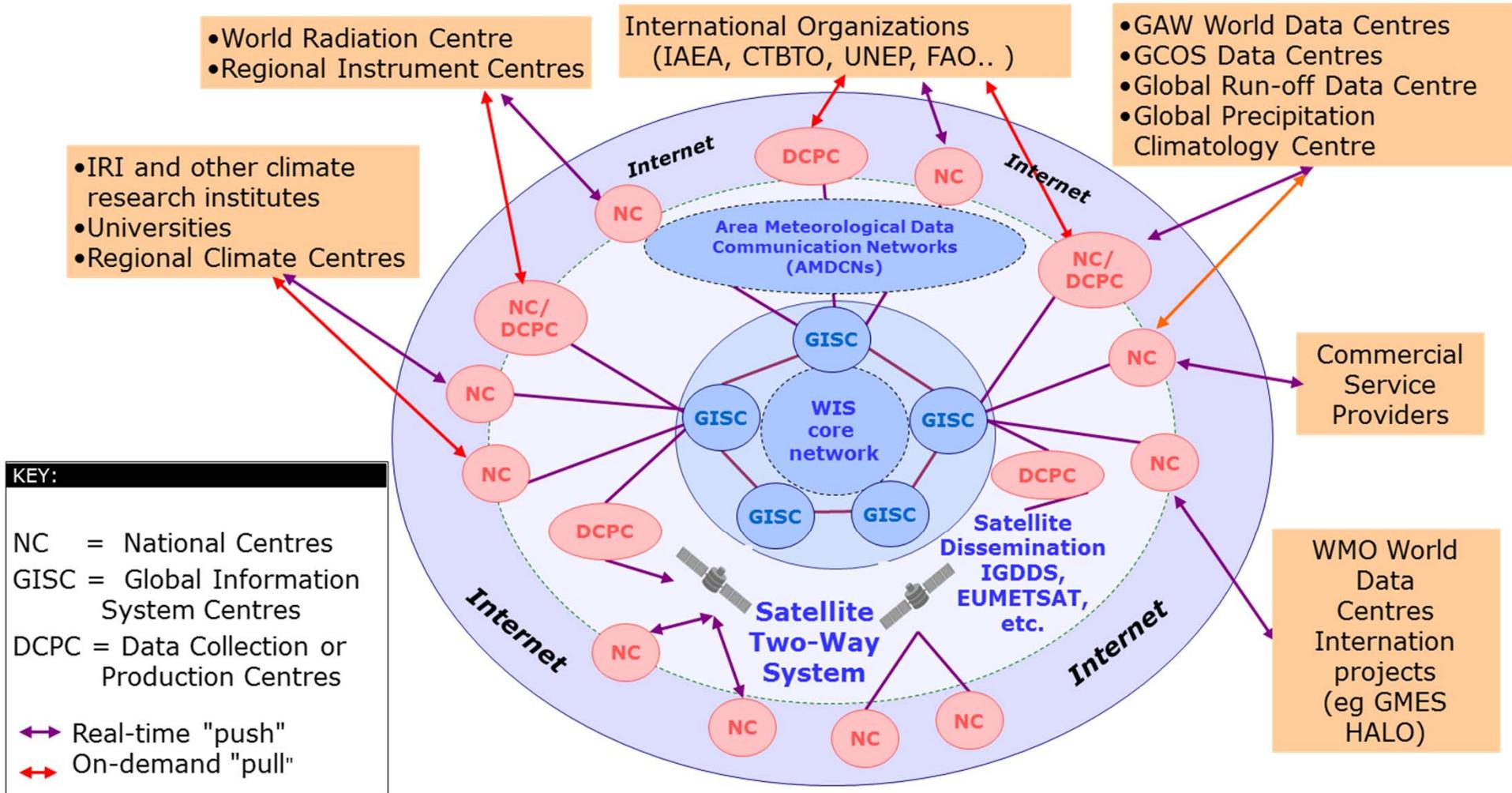
WIS Structure

- National Centres (NC)
- Data Collection or Production Centres (DCPC)
- Global Information System Centres (GISC)
- Data communication network

The names of these virtual centers describe their functionality, not the actual organizational entities. There may be organizations, such as NMHSs, which combine all three virtual centers within one facility.



Types of Centres: GISCs, DCPCs, and NCs





Discovery, Access & Retrieval (DAR)

- Allows users to identify the desired data or product
- Users subscribe to receive the data or products on a recurring basis
- Authenticates the user access to data based on user's role
- WIS centre sets up delivery through online and offline options
- Comprehensive DAR catalog shared among WIS users



WIS Metadata

- Metadata is document, file or record that sits with each dataset (or on a catalogue) and provides background information about that record that is “computer readable”
- Enables international use of data about WMO data – Metadata Core Profile
- Provides standardized additional information about the data resource
- Organisations providing information must enable its discovery, evaluation and use

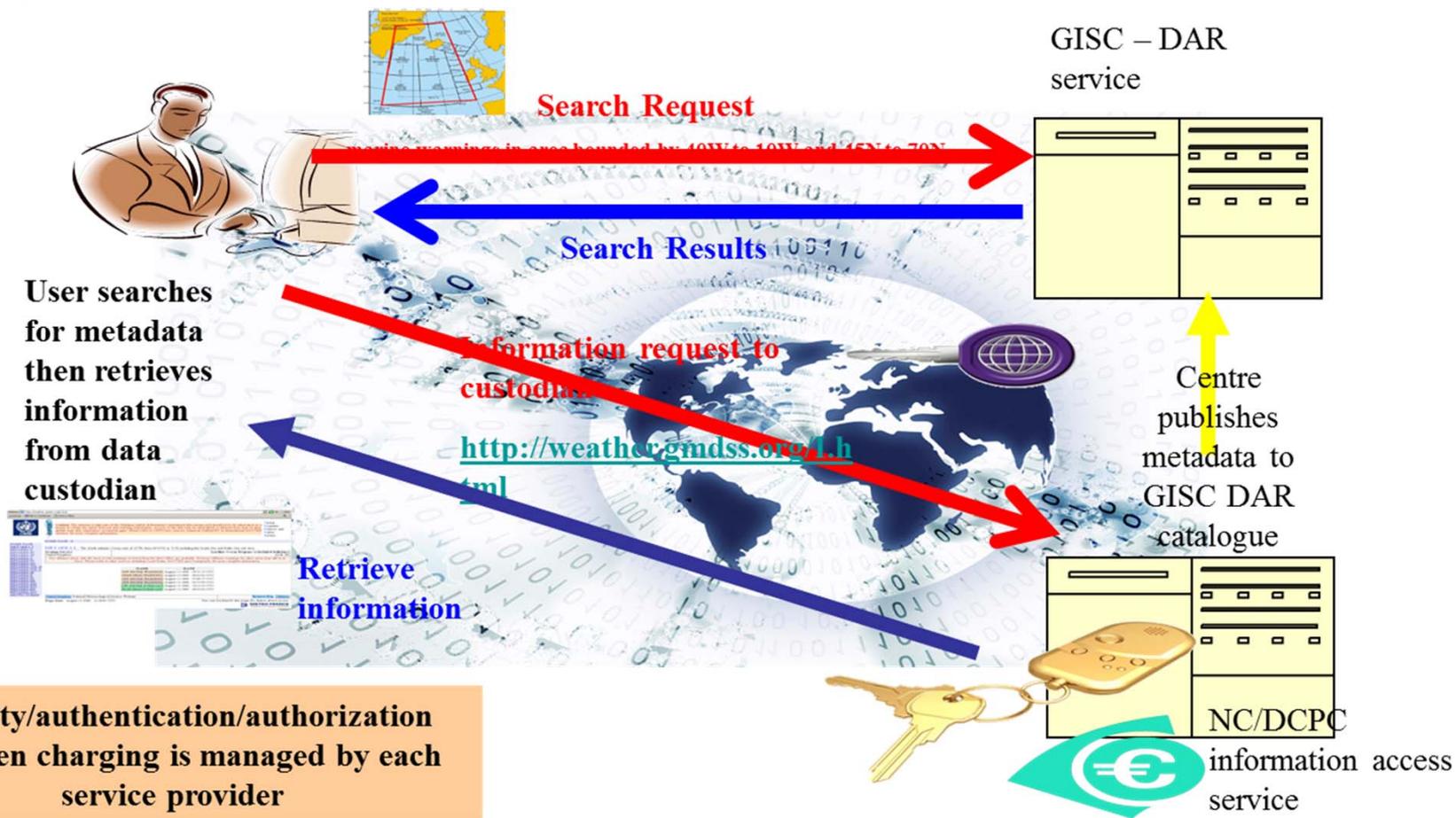


Using Metadata Standards

- Describes an object so that it can be located
- Helps organize electronic records
- Shared with others globally without sharing the actual resource
- Ensures a minimum amount of consistent information is given about each dataset
- Includes metadata documents and the procedures that were used to create and update the dataset
- Metadata serves data discovery at multiple levels



Major Components and Services of WIS DAR



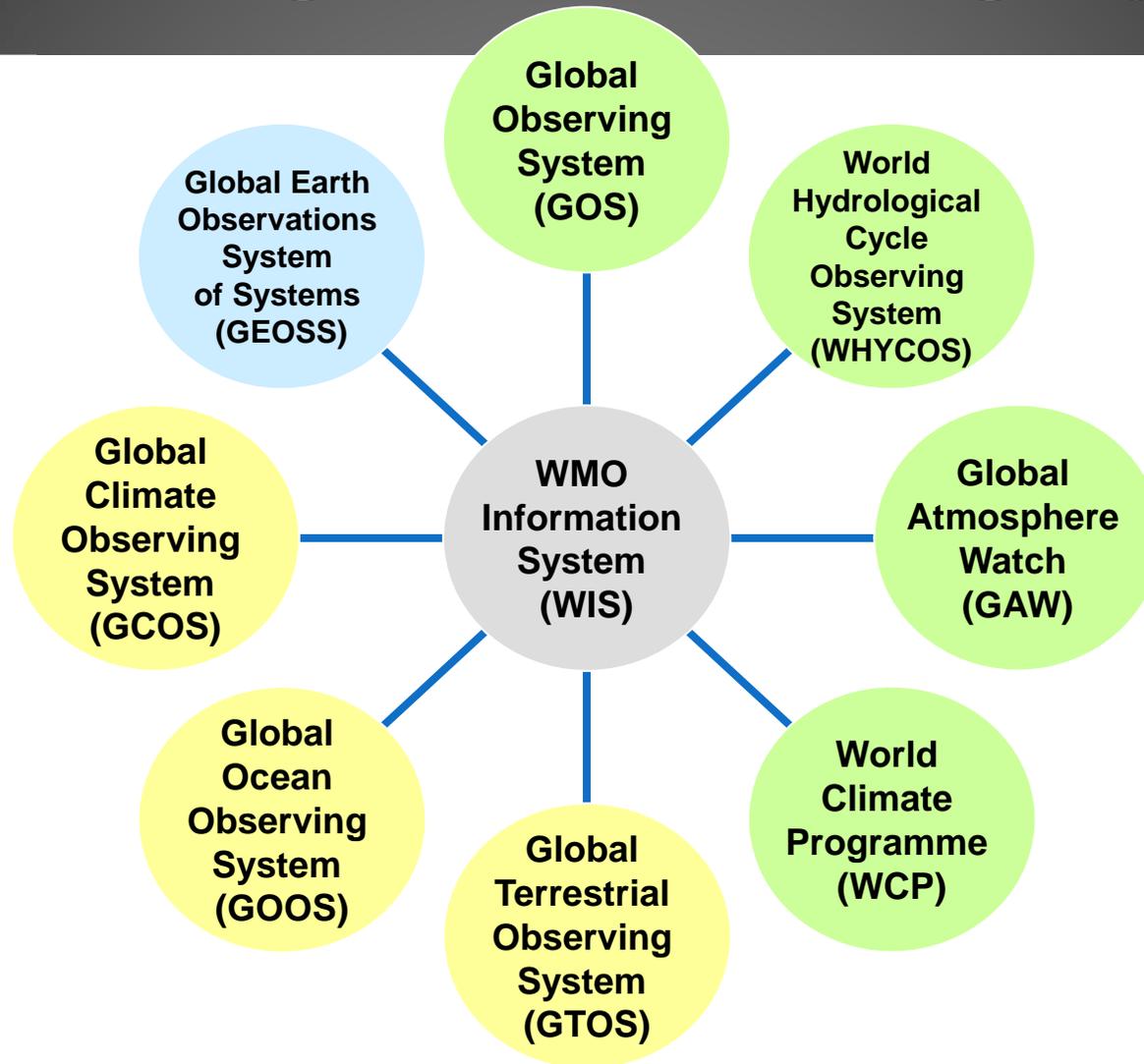


Congress XVI Directives (2011)

- Total of 15 GISCS, 122 DCPCs and 223NCs started in the initial designation of WIS centres
- Endorsed GISCS
 - ✓ Germany - operational
 - ✓ Japan - operational
 - ✓ United Kingdom
 - ✓ United States
 - ✓ France
 - ✓ China
 - ✓ Moscow
 - ✓ Brazil



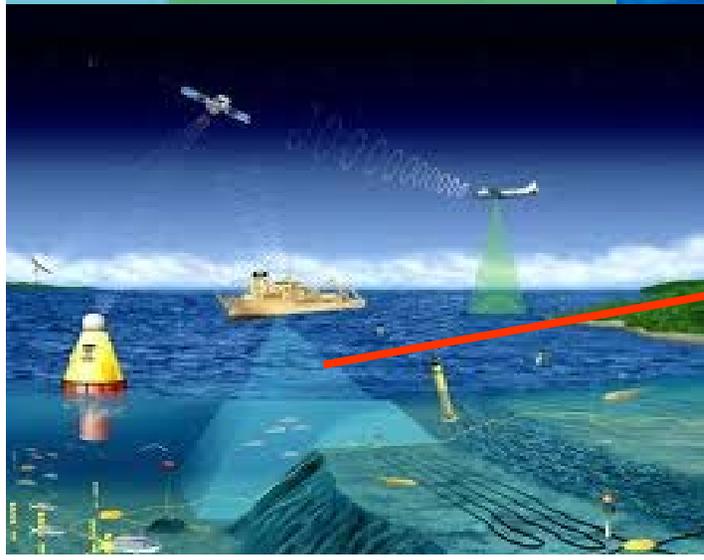
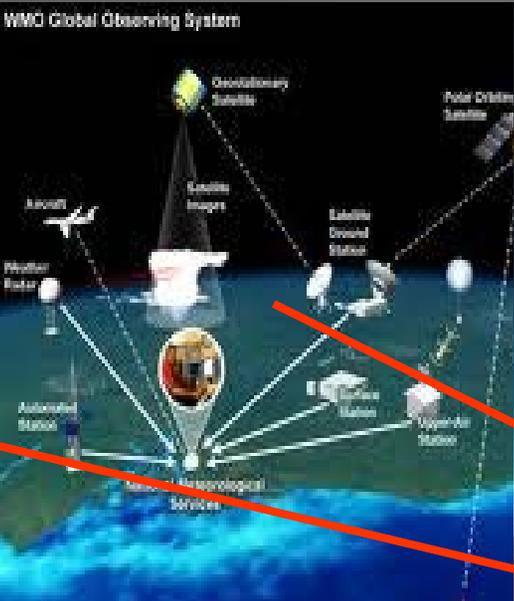
WIS and Selected WMO Observing and Data Exchange Systems





“Complex and multiple Observing systems need be well coordinated and integrated”

WMO and partner organizations





Thank you for your attention

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Backup Slides





Benefits of WIS

In addition to improving efficiency, WIS:

- Enhances collection of critical data
- Enhances availability of time-critical data and products at all national centres
- Catalogs all WMO data and products
- Opens up GTS to other types of data
- Exploits technology innovation



National Centre (NC)

- Collect national observations
- “Push” data intended for global dissemination to the associated GISC
- “Push” data intended for regional or specialised distribution to the associated DCPC
- Collect, generate and disseminate products for national use.
- Participate in monitoring the performance of the system
- Authorize their national users to access WIS, as appropriate



Data Collection or Production Centre (DCPC)

- Receive information intended for dissemination to NCs within its area of responsibility (i.e. regional collection)
- Collect programme-specific data and products
- Produce regional or specialized data and products
- “Push” information intended for global exchange to their associated GISC
- Disseminate information intended for regional exchange
- Support access to their products via request/reply (“Pull”) mechanism
- Maintain data and product catalogues in a WMO-agreed standard format and facilitate access to this catalogue



Global Information System Centre (GISC)

- Receive observational data and products that are intended for global exchange from NCs and DCPCs within their area of responsibility
- Exchange/Synchronize information intended for global dissemination with other GISCs
- Disseminate, within its area of responsibility, the entire set of data and products agreed by WMO for routine global exchange
- Hold the entire set of data and products agreed by WMO for routine global exchange for at least 24 hours (CACHE) and make it available via WMO request/reply ("Pull") mechanisms
- Maintain, in accordance to the WMO standards, a catalogue of all data and products for global exchange and provide access to this catalogue to locate the relevant centre intended for global exchange.
- Coordinate the communication network within their area of responsibility



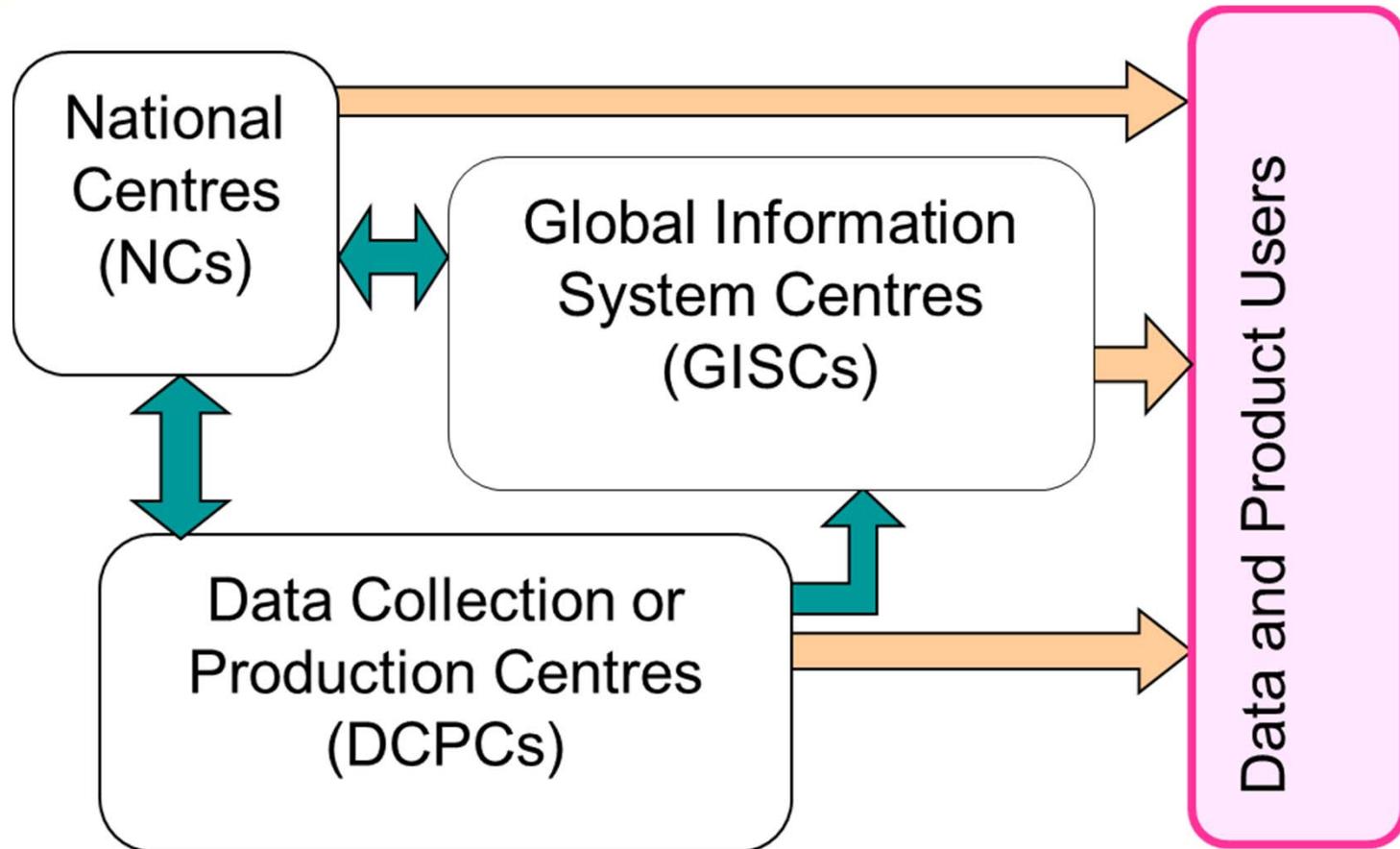
Data communication network

The data communication network should:

- be based on an agreed technology available to the participating centres
- be capable of handling the data volumes
- include satellite communication channels, terrestrial links and managed data network services, and use of Internet
- handle the agreed transmission protocols
- build on the GTS, including its satellite-based elements and the IMTN, for real-time data exchange



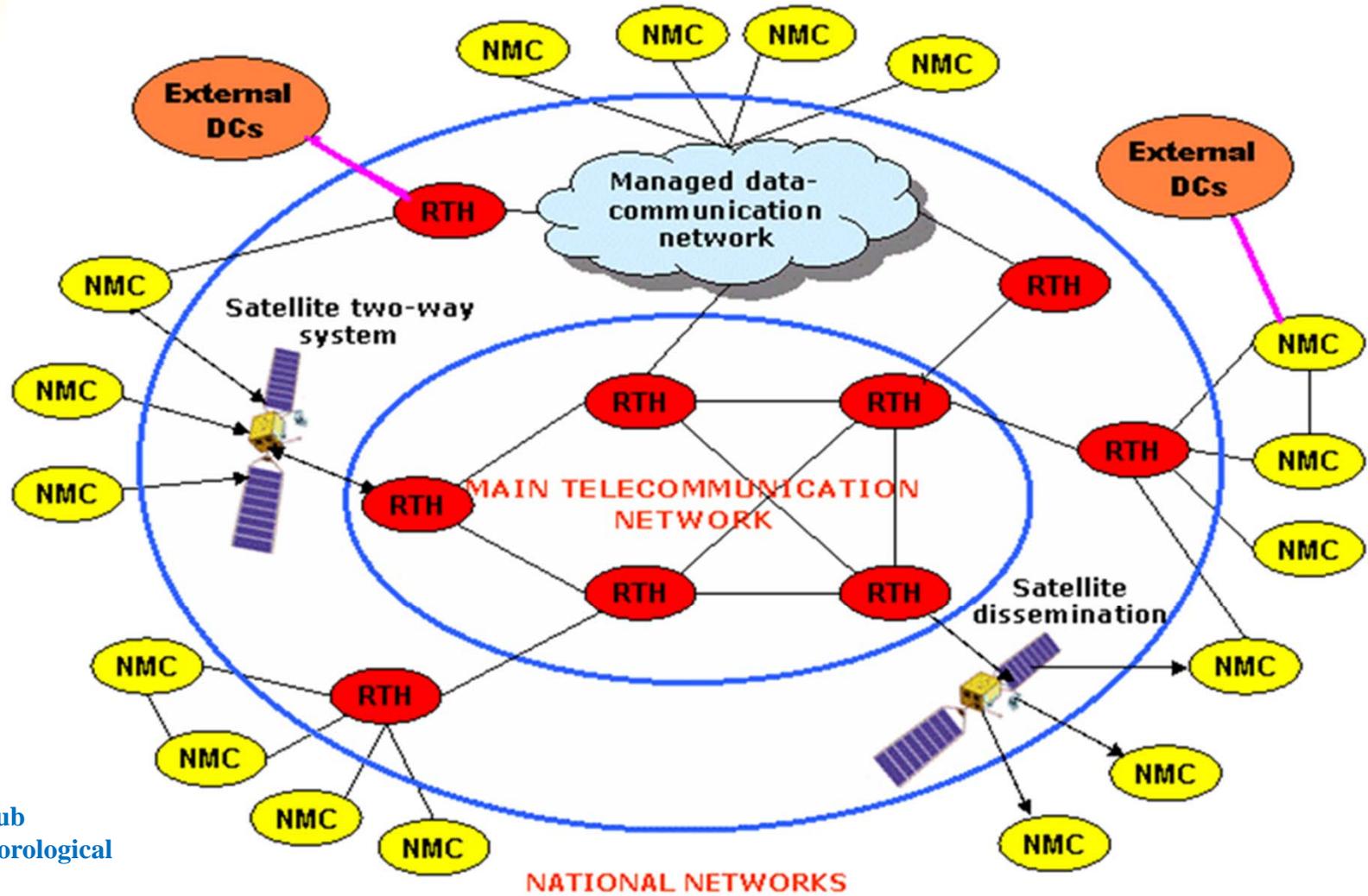
Interoperability and WIS Networking





Major Components and Services of WIS

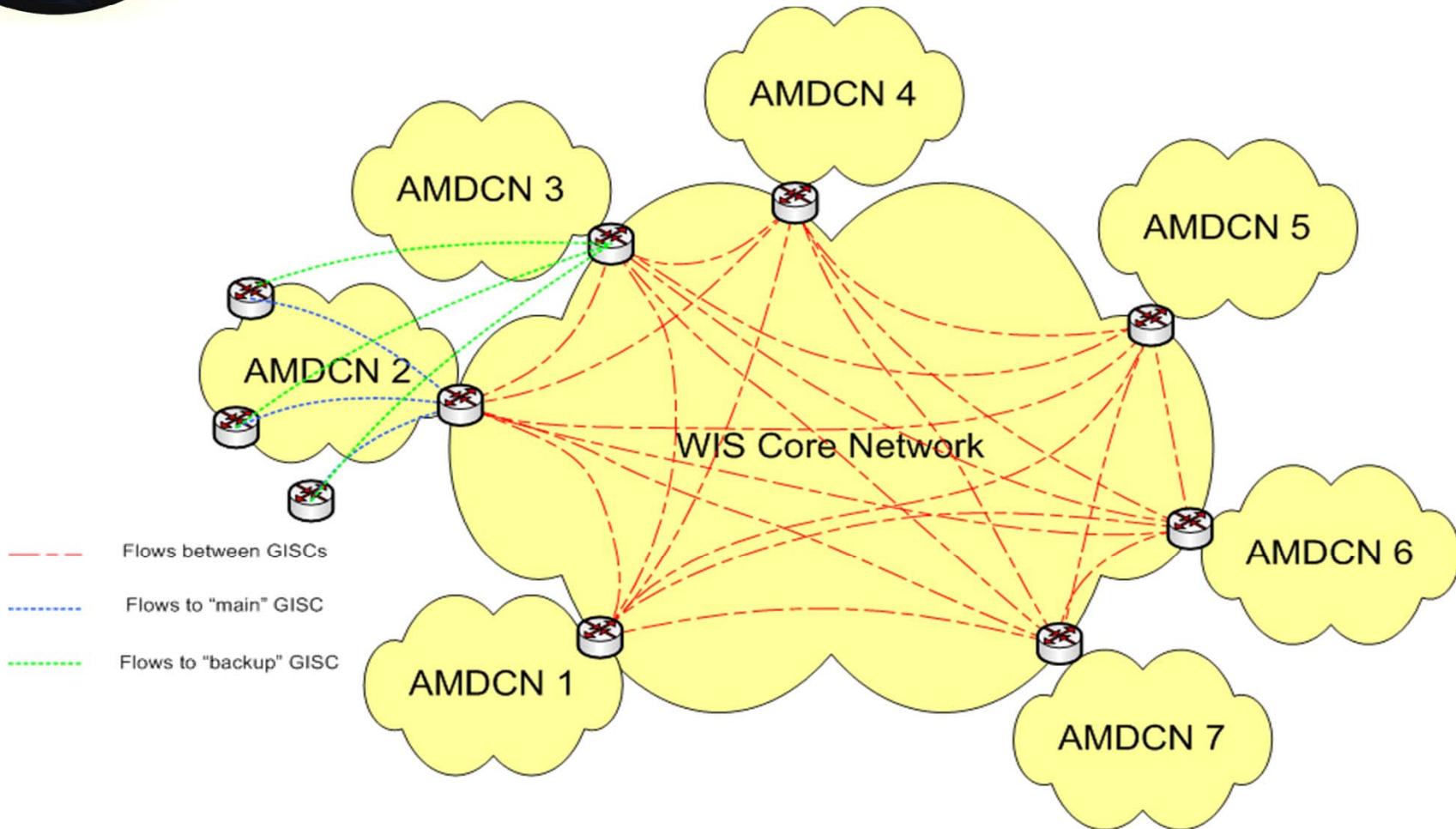
Part A: GTS



RTH – Regional
Telecommunication Hub
NMC – National Meteorological
Centre
DCs – Data Collectors/



WIS Network Topology





DAR Control Processes

The DAR has many control processes in place to ensure functionality:

Examples include:

The Data Receiver checks the current DAR Metadata Catalogue to confirm that the file has an associated metadata record

DAR Metadata Catalogue is current with all updates

Confirm that metadata for a data or product file at the DCPC or GISC already exists in the DAR Metadata Catalogue before the data or product is available to Data Sender (NC or DCPC)



Example Metadata Element: "Country Name"

Data Element Concept

Name: Country Identifiers
Context:
Definition:
Unique ID: 5769
Conceptual Domain: →
Maintenance Org.:
Steward:
Classification:
Registration Authority:
Others

- Algeria
- Belgium
- China
- Denmark
- Egypt
- France
- ...
- Zimbabwe

Data Elements

	ISO 3166 English Name	ISO 3166 French Name	ISO 3166 2-Alpha Code	ISO 3166 3-Alpha Code	ISO 3166 3-Numeric Code
<i>Name:</i> <i>Context:</i> <i>Definition:</i> <i>Unique ID: 4572</i> <i>Value Domain:</i> <i>Maintenance Org.:</i> <i>Steward:</i> <i>Classification:</i> <i>Registration Authority:</i> <i>Others</i>	Algeria	L`Algérie	DZ	DZA	012
	Belgium	Belgique	BE	BEL	056
	China	Chine	CN	CHN	156
	Denmark	Danemark	DK	DNK	208
	Egypt	Egypte	EG	EGY	818
	France	La France	FR	FRA	250

	Zimbabwe	Zimbabwe	ZW	ZWE	716



WIS Reference Documents

- **Technical Regulations of WMO - WMO No. 49**
- **Manual on GTS – WMO No. 386**
- **Manual on WIS – WMO No. 1060**
- **Guide to WIS - WMO No. 1061**
- **WMO Core Metadata Profile Guidance**
- **OAI-PMH Guidelines for WIS catalog synch**



WIS Reference Documents

- **WIS Project & Implementation Plan (v1.1)**
- **WIS Functional Architecture (v1.0)**
- **WIS Compliance Specifications GISC, DCPC, NC (v1.1)**
- **Designation Procedures for GISCs and DCPCs**

[http://www.wmo.int/pages/prog/www/
WIS/ref_docs_en.html](http://www.wmo.int/pages/prog/www/WIS/ref_docs_en.html)