World Data System

Trustworthy Data Services for Global Science

Rorie Edmunds
WDS Acting Executive Director
A Brief History

• International Council for Science (ICSU) established in 1931 with a mission to Strengthen international science for the benefit of society

• To manage the data legacy of the International Geophysical Year in 1957–1958, ICSU coordinated the establishment of two bodies:

  World Data Centres – long-term preservation and dissemination of the datasets

  Federation of Astronomical and Geophysical Analysis Services – data analysis and provision of data products necessary for science beyond IGY
A Brief History

- Fourth International Polar Year was co-sponsored in 2007–2008 by ICSU and the WMO. It included for the first time Social and Health Sciences

- The IPY planners envisioned an Integrated Data and Information System building on existing capacities. But the WDCs and FAGs were
  - Not an integrated system
  - Had gaps in their disciplinary and geographical coverage
  - Loss of datasets from the long tail of science
A Brief History

- In October 2008, ICSU’s 29th General Assembly decided:
  - ICSU will continue to assert a strategic leadership role in relation to scientific data and information
  - To establish a new World Data System
  - ‘ICSU’s long-term vision is of a world where excellence in science is effectively translated into policy making and socio-economic development. In such a world, universal and equitable access to scientific data and information is a reality’
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- Scientific Committee
- Constitution and Bylaws
- Strategic Plan
- Data Sharing Principles
- Regular and Network Member Certifications
- International Programme & Technology Offices
- Working Groups
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Scientific Committee 2018–21

Sandra Harrison (Chair, UK)
Alexander de Sherbinin (Vice-chair, USA)
Ingrid Dillo (Vice-chair, Netherlands)
Aude Chambodut (France)
Elaine Faustman (USA)
Isabelle Gärtner-Roer (Switzerland)
Toshihiko Iyemori (Japan)
Marc Nyssen (Belgium)
David Patterson (Australia)
Ioana Popescu (Netherlands)
Alfredo Tolmasquim (Brazil)
Alice Frémand (France, ECR Network)

Ex officio:
Heide Hackmann (ISC)
Yasuhiro Murayama (NICT)
Benoît Pirenne (ONC)
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Goals

• Enable universal and equitable (full and open) access to quality-assured scientific data, data services, products and information

• Ensure long-term data stewardship

• Foster compliance to agreed-upon data standards and conventions

• Provide mechanisms to facilitate and improve access to data and data products
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Strategic Targets

1. Improve the trust in and quality of open Scientific Data Services

2. Nurture active disciplinary and multidisciplinary scientific data services communities

3. Make trusted data services an integral part of international collaborative scientific research
Data Sharing Principles

• Data, metadata, products, and information should be fully and openly shared, subject to national or international jurisdictional laws and policies, including respecting appropriate extant restrictions, and in accordance with international standards of ethical research conduct.

• Data, metadata, products, and information produced for research, education, and public-domain use will be made available with minimum time delay and free of charge, or for no more than the cost of dissemination, which may be waived for lower-income user communities to support equity in access.

• All who produce, share, and use data and metadata are stewards of those data, and have responsibility for ensuring that the authenticity, quality, and integrity of the data are preserved, and respect for the data source is maintained by ensuring privacy where appropriate, and encouraging appropriate citation of the dataset and original work and acknowledgement of the data repository.

• Data should be labelled ‘sensitive’ or ‘restricted’ only with appropriate justification and following clearly defined protocols, and should in any event be made available for use on the least restrictive basis possible.
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WDS Members – Trustworthy Scientific Data Services

- Capture and storage
- Curation
- Long-term preservation
- Discovery, access, retrieval
- Aggregation, analysis and/or visualization
- Associated legal frameworks
## WDS Now

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<th>Data stewards and/or data analysis services: certified Trustworthy Data Repositories</th>
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WDS Regular and Network Members (01/2019)

Regular Members
Network Members*

* Note that Network Members often act as international organizations. Only the location of the Member’s secretariat is shown here, and WDS coverage extends to regions not marked.
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Regular Members: CoreTrustSeal Trustworthy Data Repository Certification

- Expression of Interest
- CoreTrustSeal Certification
- Agree to WDS Bylaws
- Regular membership approved by WDS-SC
- Sign Letter of Agreement
- Renewal every three years
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• WDS & Data Seal of Approval
• Core Level Certification of 16 Requirements:
  • Context
  • Organizational infrastructure (6)
  • Digital object management (8)
  • Technology (2)
  • Applicant feedback
• 45 Seals Awarded
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Membership

• Network
  • IODE

• Regular
  • Flanders Marine Institute, Data Centre
  • World Data Service for Oceanography
  • WDC - Oceanography, Tianjin
  • WDC - Oceanography, Obninsk
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- Incorporated Research Institutions for Seismology, Data Services
- WDC - Geoinformatics and Sustainable Development
- ISRIC – WDC Soils
- WDC for Climate
- WDC - Meteorology, Asheville
- Centre de Donnees astronomiques de Strasbourg
- World Glacier Monitoring Service, Zurich
- Australian Antarctic Data Centre
- Chinese Astronomical Data Center
- WDC - Renewable Resources and Environment
- International Earth Rotation and Reference Systems
- Fish Database of Taiwan
- World Data Service for Geophysics
- PANGAEA - Data Publisher for Earth & Environmental Science
- WDC - Solar-Terrestrial Physics, Moscow
- WDC - Sunspot Index and Long-term Solar Observations
- WDC - Remote Sensing of the Atmosphere
- WDC - Geomagnetism, Copenhagen
- International Service of Geomagnetic Indices
- WDC - Geomagnetism, Edinburgh
- WDC for Solid Earth Physics, Moscow
- WDC - Meteorology, Obninsk
- WDC - Solar Activity / BASS2000
- WDC - Geomagnetism, Kyoto
- Interdisciplinary Earth Data Alliance
- WDC - Space Weather, Australia
- NSIDC DAAC
- Oak Ridge National Laboratory Distributed Active Archive Center
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- World Stress Map Project
- WDC - CU
- WDC - Ionosphere and Space Weather
- Ukrainian Geospatial Data Center
- Data Centre for Geography, Moscow
- WDC - Earth Resources Observation and Science
- The Language Archive
- World Data Service for Paleoclimatology
- DataFirst
- WFCC - MIRCEN World Data Centre for Microorganisms
- Goddard Earth Sciences Data and Information Services Center
- Crustal Dynamics Data Information System
- Chinese Space Science Data Center
- Cold and Arid Regions Science Data Center at Lanzhou
- Global Hydrology Resource Center
- Italian Centre for Astronomical Archive
- Inter-university Consortium for Political and Social Research
- Atmospheric Science Data Center (Distributed Active Archive Center)
- WDC - Geomagnetism, Mumbai
- Canadian Astronomy Data Centre
- Alaska Satellite Facility
- Ocean Networks Canada
- Environment Climate Data Sweden
- Socioeconomic Data and Applications Center
- UNAVCO, Inc.
- Land Processes Distributed Active Archive Center
- Permanent Service for Mean Sea Level
- DANS
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- Research Institute for Sustainable Humanosphere, Kyoto University
- The Cambridge Crystallographic Data Centre
- Global Biodiversity Information Facility
- WDC for Geophysics, Beijing
- Global Change Research Data Publishing and Repository
- Canadian Cryospheric Information Network/Polar Data Catalogue
- Swedish National Data Service
- Centre for Astronomical Data of the Institute of Astronomy of the Russian Academy of Sciences
- Ocean Biology Data Active Archive Center
- Neotoma Paleoecological Database
- ImmPort Repository
- Worldwide Protein Data Bank
- Australian Data Archive
- National Geoscience Data Centre
- Digital Repository of Ireland
- International VLBI Service for Geodesy and Astrometry
- International Laser Ranging Service
- International GNSS Service
- International Virtual Observatory Alliance
- NASA ESDIS Project
- International Space Environment Service
- CLARIN ERIC
- International DORIS Service
- INTERMAGNET
- NERC Environmental Data Centres
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International Technology Office (WDS-ITO)

• Established April 2018 and hosted at University of Victoria by Canadian consortium of WDS Regular Members:
  • Ocean Networks Canada
  • Canadian Astronomy Data Centre
  • Canadian Cryospheric Information Network/Polar Data Catalogue
• ITO Associate Director, Karen Payne, appointed November 2018
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• ITO Remit
  • Manage the contribution of WDS to operational systems that form part of Global Research Data Infrastructure (GRDI)
  • Coordinate the development and integration of components of GRDI with other major players with operational roles
  • Coordinate WDS contribution to technical working groups with partners
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Working Groups & Projects

- Scholarly Link Exchange (SCHOLIX): High-level interoperability framework for exchanging information about the links between scholarly literature and data
  - Data–Literature Interlinking Service
  - Metadata Schema
  - API – Scholexplorer: aggregation and query service fed by the Scholix open information ecosystem
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• Assessment of Data Fitness for Use: Assess data quality – conformance of data properties to data usability (e.g., level of annotation, curation, peer review, citability or machine readability of datasets)
  • Repository managers or external entity evaluate data holdings by answering questions for a sample of datasets
  • Supplement the CoreTrustSeal Repository Certification process
  • Geared towards scientific research and needs further generalizing to a wider audience
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• Non-standard Outputs: Increasing recognition data sharing and transparency requires sharing non-standard outputs (e.g., laboratory/field protocols for measurements, codes for analytical tools/models,...)

  • Generally not included in certified data repositories and the long-term funding model for services used is dependent on continuing scientific funding for a person/organization

  • WDS is looking at defining trust criteria beyond data repositories and services, and how to automate its assessment

  • A survey of Members showed the majority thought WDS should be providing thought leadership
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• Others
  • Knowledge Network & Metadata Catalogue
  • Data at Risk
  • Training (inc. ECRs) & Membership Maturity
The Future...?

- On 4 July 2018, ICSU and ISSC merged as the 'International Science Council', a global non-governmental organization representative of both the Natural and Social Sciences
  - 141 Member Organizations (National scientific bodies)
  - 39 Member Unions and Associations
  - 30 Affiliated Members
The Future...?

ISC Strategic Challenge Domains:

• The 2030 Agenda for Sustainable Development
• The Digital Revolution
• Science in Policy and Public Discourse
• The Evolution of Science and Science Systems
What inputs/guidance/support can WDS provide to the Decade of the Ocean?

Thank you!

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