

From Solid Earth Observations to Global Action: the Role of Federated Research Infrastructures

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EarthScope Consortium



EPOS



AuScope



Earth Sciences New Zealand

A Global Partnership of Research Infrastructures

A Shared vision

Uphold the principles of open science: open, accessible, interoperable data

Boost Visibility and Use of Data in Global Research Ecosystems

Elevate local data to global levels, while involving local communities, ensuring they benefit from relevant scientific outcomes



Practical Drivers

Efficiency: Avoid duplication, foster harmonisation, enable innovation.

Advocacy: speak with a unified voice to enhance, influence and reinforce sustainability.

Know-how: build on the experience and points of strength of each RI & exchange best practice

Shared Objectives

Promote Open Science and FAIR principles at the global level to enable equitable and inclusive research

Activate a global network of collaborations to capitalize on joint investments and expertise

Federate research platforms to maximize the benefits of integrating multidisciplinary data to realise excellent science and innovation for responding to global societal needs



Why Solid Earth Science Needs Global RIs?

1 Multidisciplinary

Data Science has the potential to **drive innovation** related to **key societal challenges** such as **hazard assessment** and the **sustainable stewardship of georesources**.

- **Petabytes of data are available across borders, disciplines, and timescales** to unlock these advancements.
- **The challenge is to move from disconnected, heterogeneous data to open, integrated, multidisciplinary research.**
- **Research Infrastructures** across the continents provide:
 - High-quality, standardized, open data.
 - Equitable access and collaboration opportunities.
 - Foundations for multidisciplinary science.

2 Global Scope

Natural processes do not respect national or geographical boundaries. To accelerate scientific discovery and enable excellent science:

- Solid Earth science data must be **universally and openly accessible to scientists regardless of location.**
- **Open methodologies and tools** should also be made available to entire research community around the world.

Way Forward: A Global Federation of RIs

- Linking regional platforms into a cohesive, interoperable system.
- Universal access to multidisciplinary data and services.
- Accelerated scientific discovery and innovation.
- Requires harmonized standards, vocabularies, and protocols.

Building a global reference RIs for Solid Earth Sciences

Use the experience gained by RI harmonisation across countries, languages, cultures, scientific domains.

- Across different countries (*EPOS*).
- Engaging indigenous communities (*AuScope, Earth Sciences NZ*).
- Across different thematic communities/backgrounds (*EPOS, AuScope, EarthScope*).

Harmonizing and integrating multidisciplinary data and scientific products, but also methodologies and approaches across the continents. Ensure open and FAIR access to these research assets in lower-resourced regions/countries.

Investing in global RI collaboration is not optional – it's a strategic necessity for a sustainable, secure, and equitable future.

Overcoming Barriers to Global Federation

Interoperability: Align standards and vocabularies across regions and subdomains with varying technical maturity.

Legal Hurdles: Harmonize data governance and enable cross-border collaboration despite fragmented national regulations.

Sustainability: Ensure long-term funding, infrastructure access, data preservation, and capacity-building globally.

Equity & Inclusion: Support research autonomy, Indigenous rights, and community-led data stewardship in lower-resourced regions.

Calling for a Global Roadmap for RIs

Global RIs are vital tools for achieving the **UN Sustainable Development Goals** and enhancing disaster resilience e.g. UN Sendai Framework. Foster **science diplomacy** by maintaining international dialogue even amid geopolitical tensions.

Policy support is essential: Align roadmaps, reduce regulatory barriers, fund infrastructure and mobility, and support global standards.

A key pillar of the fifth freedom is the empowerment of our research infrastructures. By facilitating access to laboratories, digital platforms, and cutting-edge equipment (...), we equip our research community to take on complex, multidisciplinary challenges vital to our collective future.

[Enrico Letta - Much More than a Market - Speed, Security, Solidarity. Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens, April 2024]