## The ITINERIS Catalogue: Unifying Environmental Resources Across Research Infrastructures

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Understanding environmental challenges requires navigating a complex network of interconnected systems, where Research Infrastructures (RIs) play a key role in integrating observations, data, and services to develop actionable strategies for understanding and predicting the Earth’s system. In this multifaceted environmental research domain, it is crucial to harmonize multi-source datasets (characterized by diverse variables, technologies, and spatio-temporal scales) and to provide interoperable services and tools. Within this framework, the *ITINERIS HUB* acts as a unified access point to the knowledge, data, analytical tools, and services provided by multiple Italian environmental RIs.

The *ITINERIS HUB* offers the metadata-driven *ITINERIS Catalogue* that goes beyond a simple archive. The *ITINERIS Catalogue* is inherently multidisciplinary and cross-RI, bridging gaps across domains and communities. It organizes, describes, and makes discoverable a wide range of resources, including datasets, services, research products, training resources, virtual research environments (VRE), and information on resource providers. Its key innovation lies in the adoption of standardized resource profiles, which ensure automated metadata harvesting, alignment with recognized metadata standards, and multidomain. This approach translates into tangible benefits for diverse stakeholders. Policymakers can access data and tools that support evidence-based strategies for sustainable development. Agencies and local authorities can benefit from resources enabling environmental monitoring and assessment of ecosystem health and pollution levels. Scientists and practitioners can leverage data and models to develop early warning systems for natural hazards and climate-related risks. Researchers, educators, and industry can exploit advanced modelling and visualization tools to explore scenarios, improve predictions, and design innovative solutions.

Thanks to the native support for resource cataloguing through profiles in D4Science Infrastructure’s Catalogue, this approach guarantees sustainable integration and transparent, simplified access to environmental resources. By fostering Open Science and the FAIR principles (Findable, Accessible, Interoperable, Reusable), the *ITINERIS Catalogue* promotes standardized sharing and reuse of resources across communities.

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