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Breaking the Silos in Environmental Science One Infrastructure at a Time

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Despite major investments in Open Science infrastructures, environmental research remains fragmented across domains, systems, and borders. We have no shortage of data. What we lack are better ways to turn it into science. ENVRI-Hub NEXT project tackles this by breaking silos and building real bridges—one infrastructure at a time.

The ENVRI-Hub NEXT advances the ENVRI-Hub, a platform that integrates European environmental Research Infrastructures (RIs) across atmosphere, marine, terrestrial, and biodiversity domains. It provides harmonized discovery, access, and use of multidisciplinary data, services, and training resources. But ENVRI-Hub is not just another portal. It is a functioning federation, connecting European research infrastructures with global policy objectives, including the Green Deal and the SDGs.

This hub moves beyond isolated silos and embraces true interoperability—not only at the metadata level, but at the service, computation, and knowledge layers. Researchers can compute Essential Environmental Variables, run cross-domain analyses, and access services mapped directly to policy-relevant frameworks—supporting science that matters, and science that leads to action.

In this practice presentation, we will present:

• How ENVRI-Hub structures cross-domain data services to support environmental research from the local to the global scale.

• How the Hub advances FAIR principles across diverse infrastructures, while maintaining domain-specific richness.

• How ENVRI-Hub connects scientific infrastructures with global policy agendas, creating an infrastructure that informs governance, not just research.

We will also reflect critically on key challenges:

• Why many current Open Science infrastructures underperform in interdisciplinary data access, and how ENVRI-Hub addresses this gap.

• Why sustainable governance models matter more than just technical integration.

• How future infrastructures must embed transnational and interdisciplinary workflows by design—not as an afterthought.

ENVRI-Hub is a case study in building infrastructure that is scientifically relevant, policy-relevant, and user-driven. It shows that environmental research infrastructures can work across domains and borders without sacrificing scientific depth or usability. It also shows that federation across RIs is not only possible—it's necessary if we are serious about supporting the global research community to address climate change, biodiversity loss, and sustainable resource management.

The work presented will be particularly relevant to developers and managers of research infrastructures, policymakers and funders designing Open Science and data-sharing strategies, researchers and research communities seeking better ways to access and use interdisciplinary environmental data.

In a landscape crowded with infrastructures that promise connection but deliver isolation, ENVRI-Hub NEXT proves that true federation is not only possible —it is essential if environmental science is to meet the global challenges it faces.

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