

## Creating a global network to link multi-omics and biogeochemical observations through long-term observatories

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For over a decade, multi-omics technologies have rapidly matured into affordable and powerful tools to assess biodiversity in virtually every ecosystem. These technologies can provide deeply informative and highly reusable data, providing insight into the distribution, metabolic capacities, and activity of organisms. Naturally, the value of multi-omic data is maximised when combined with contextualising environmental data. The union of multi-omic and biogeochemical data is one example of this synthesis which can greatly enhance global understanding of the role of living systems in planetary element cycling, especially for microbial life. The time has come to integrate these technologies into global, long-term observatory programmes in ecology and Earth observation. This talk will describe the efforts of the recently established Global Omics Observation Network (GLOMICON) in coordinating international, long-term omics observation efforts in the context of existing Earth system observatories, many of which already monitor key biogeochemical phenomena. It will also explore how GLOMICON seeks to federate efforts through interfaces with organisations such as the Genomic Standards Consortium (GSC), the Genomic Observatory Network, the Group on Earth Observation Biodiversity Observation Network (GEO BON), and the Global Ocean Observing System (GOOS). Using the GOOS Biological and Biogeochemical Essential Ocean Variables (EOVs) as a concrete example, we will present how omics and biogeochemistry are quickly converging to provide multiple stakeholders with deeper understanding of the biosphere. We will conclude with guidance on how researchers and other stakeholders can contribute to building this interface over the next few years.