The IsoMAP Stack: The Open Source, Grid-Enabled Technologies Behind the IsoMAP Project

C.C. Miller, Lan Zhao, Ayye Kalangi, Hyunjong Lee, Gabriel Bowers, Jason West, Tongfei Zhang, Zhongfang Liu

The IsoMAP project is intended to fundamentally change our knowledge of the water cycle and ecological and biogeochemical processes through TeraGrid-powered analysis of network-based isotopic data. By collecting multi-scale, multi-format geospatial datasets and utilizing various data-based statistical analyses and models, IsoMAP will result in a cyberinfrastructure that empowers and streamlines spatially-implicit stable isotope research and makes powerful tools and programming available to users over the web. In addition to the scientific agenda that guides IsoMAP development, we believe the infrastructure itself—a collection of technologies and methods contributed by domain scientists, statisticians, computer and library scientists—provides a valuable model and toolkit for further cyberinfrastructure development in support of water cycle science.

This is IsoMAP's infrastructure: the open source technologies, frameworks, protocols and standards that are allowing us to build into the portal (1) data source exploration and selection procedures and controls, (2) statistical analysis and model development; (3) predictive simulation of isotope dimensions using models developed in (1) and (2) analysis and interpretation of simulated spatial isotope distributions; and (4) a fully interactive web GUI with model development, execution, sharing and search, and instant, live rendering of spatial output.

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