

Data Environment for Rapid Exploration and Characterization of Organized Systems (DEREChOS)

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<u>Objective</u>

- Advance automated event detection with SciDB to:
 - Extend to all Hierarchical Data Format Earth Observing System data models, i.e., grid, swath, and point data
 - Synthesize data from different sources onto a common array representation
 - Provide regridding to convert among data models with uncertainty estimate
 - Improve the interpretability of high-dimension data by applying nonlinear dimensionality reduction (NDR)
 - Track episodes of phenomena through geo-space and time as a continuous object-event
- Demonstrate DEREChOS with hydrometeorological and hydrological science data analysis



Accomplishments

- Demonstrated DEREChOS to restructure datasets with different grid characteristics
 - Created intersection of TRMM (4km resolution) and National Mosaic and Multi-sensor Quantitative Precipitation Estimate (NMQ) (1km resolution) datasets
 - Winter blizzard events Dec. 2009 to Feb. 2010
- Re-implemented Moving Object Database with Spatiotemporal Adaptive-Resolution Encoding (STARE)
 - Enables event-based queries
 - Improves performance of analysis by allowing all data for same spatiotemporal subspace to reside on same node
 - Includes fully developed Hierarchical Triangular Mesh (HTM) for spatial indexing down to ~1m linear resolution
 - Developed hierarchical temporal indexing
- Implemented Event-based Virtual Collection (EVC) Portal
 - Interactive means to visualize and explore events with Google maps as backdrop
- · Developed re-gridding infrastructure using flux conservative method enabling cross-dataset analysis

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TRL_{in} = 3 TRL_{out} = 4
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