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Using GLIDER for Data Intensive Science

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Satellite remote sensing plays an increasingly important role in monitoring the earth's atmosphere and climate. As more advanced sensors are developed, the increased quality and volume of data provides new opportunities for knowledge discovery, but the sheer volume and complexity of the data can also be daunting. Extracting thematic information from satellite data allows monitoring of conditions at local, regional and global scales. Thematic extraction is a non-trivial task that usually requires preprocessing of data by applying operations for radiometric and geometric correction. The success of thematic extraction can be increased by simultaneously using information from multiple co-incident satellite platforms and sensors. However, specialized software tools and algorithms are required to spatially and temporally fuse data from disparate satellite sensors in order to support thematic extraction and other advanced analyses. Analysts also need the ability to interactively visualize satellite imagery and apply visual enhancement operations to identify subtle information that might be otherwise missed. Advanced algorithms are needed to allow users to analyze imagery and extract thematic information while minimizing data loss due to geographic projections. The Globally Leveraged Integrated Data Explorer for Research (GLIDER) is a flexible, easy to use tool for visualization, analysis and mining of satellite imagery. Users can visualize and analyze satellite imagery in its native sensor view without applying geographic projections that can result in loss of information. Data from multiple sensors with different spectral and spatial properties can be fused together and analyzed using a comprehensive suite of image processing, pattern recognition and data mining algorithms. Analysis results and imagery can be displayed simultaneously and compared using a 3-D globe display that supports image overlays and web map service (WMS) layers. Examples will be shown to illustrate how GLIDER provides visualization and analysis tools to facilitate knowledge discovery from satellite imagery.