DEMEXPLORER: AN ONLINE INTEROPERABLE DEM DATA RETRIEVAL AND ANALYSIS SYSTEM
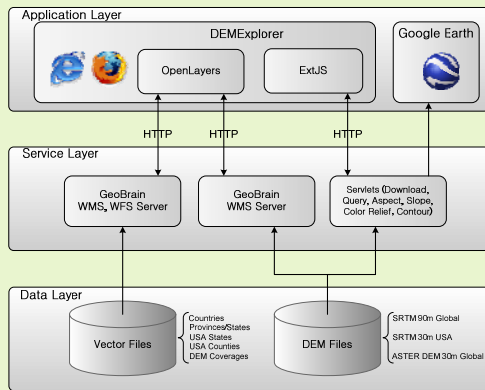
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Abstract

Digital elevation model (DEM) data is widely used in Earth science research. DEM data products, such as GTOPO30, SRTM, and ASTER DEM, are downloadable freely in files with predefined spatial coverage from websites of many organizations. But the area of interest for most researches and applications does not exactly match the spatial coverage of an DEM file. Users have to do spatial mosaicking or subsetting before they can use the DEM data. It is best if users can obtain DEM data for the area of interest directly. DEM Explorer, a GeoBrain powered web application, is implemented to share and explore the common DEM data in an interoperable and straightforward way. This application offers user with DEM customization, extraction, visualization and analysis. User could query the elevation of specified coordinate and customize and download the DEM data for the area of interest. Moreover, the contour, slope and aspect, and color relief of the DEM could be generated and downloaded for further analysis.
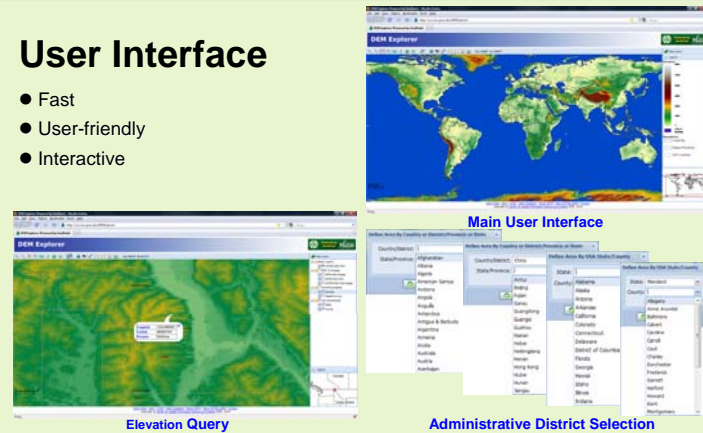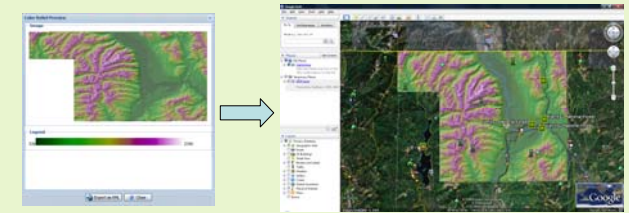
System Architecture

Architecture

- Service Oriented Architecture
- AJAX Enabled Web Application
- Accessible from any common browser
- OGC standards (WCS, WFS, WMS, GML) compliant
- Provide customizations and download of multiple DEMs
- Help user obtain DEM effectively and efficiently
- Drive increased flexibility of DEM related application
- Work best for DEM data exploration and delivery

User Interface

- Fast
- User-friendly
- Interactive

Main User Interface

Elevation Query

Administrative District Selection

DEM Customization

- Define an area of interest (AOI) in multiple ways
- Generate AOI DEM data quickly and easily
- Output DEM in GeoTIFF or ArcASCII
- Support Lat/Lon and UTM coordinates formats
- Offer compressed file for download

AOI Definition

Output Setting

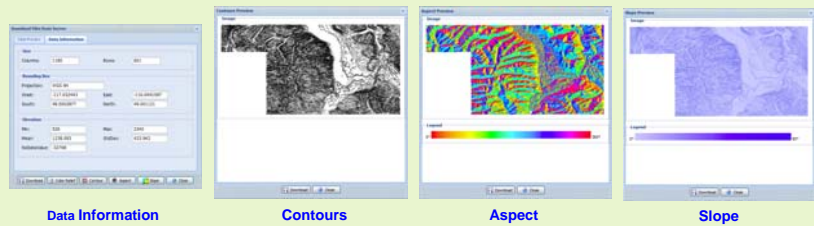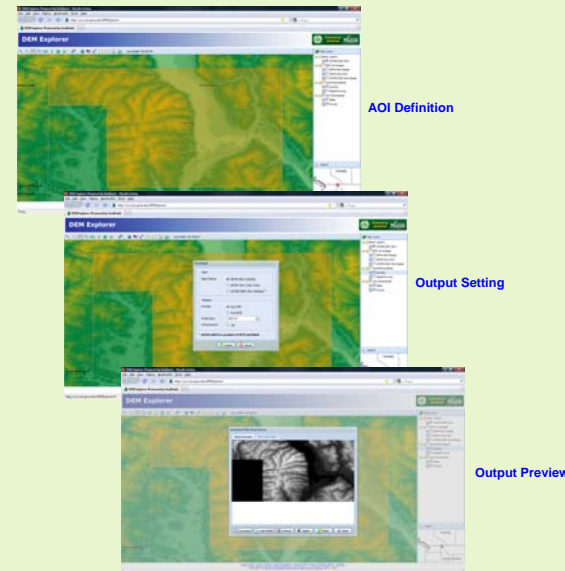**Output Preview**

DEM Visualization

Combined Hillshade and Color Relief Map

Display in Google Earth

- Visualize topographic features in combined hill-shade and color relief map
- Export the combined map for future use
- Create KML file for display and validation in Google Earth

Data Information

Contours

Aspect

Slope

DEM Analysis

- Calculate and display the elevation statistics
- Generate contours by specified interval in ESRI Shapefile
- Calculate aspect angles and create corresponding thematic map
- Calculate slope and create corresponding thematic map
- More DEM analysis functions are being added

DEMs

GTOPO30, SRTM, and ASTER DEM (only visualization and derived products for download)

Links

DEMExplorer: *http://ws.csiss.gmu.edu/DEMExplorer*

Demo: *http://ws.csiss.gmu.edu/DEMExplorer/demo.html*

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