2009 ESRI User Conference
Technical Workshops
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Please!
Turn OFF cell phones
and paging devices

Using ArcGIS Extensions to Analyze and Visualize data

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Topics

- Objectives
- Synergy
- Analysis & Visualization
- ArcGIS Analysis environments
  - Geoprocessing tools
  - Extensions
  - ArcMap
- The analysis Process
- Visualization
  - ArcMap
  - ArcGlobe
  - ArcScene
  - 3D symbols

Workshop objectives

- Outline the synergy between ArcGIS and its extensions
- Illustrate tools for analysis and visualization
  - Assist in evolving workflows and methodologies

Synergy

ArcGIS & Extensions - Synergy of GIS tools

- Analyze & Visualize

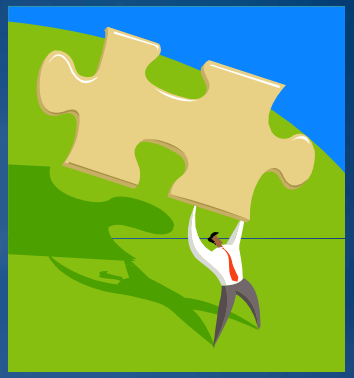
Synergy

- From the Greek *syn-ergo* - meaning to work together
  - A combined or cooperative action or force
  - Synergies facilitate the ability to:
    - Exploit
    - Maximize
    - Leverage
    - Harness
    - Realize and
    - Create

Analysis & Visualization

Analysis

- Highlight patterns and relationships in geographic data
  - Gain insight into places of interest
  - Focus actions to choose a best option
- Investigate role of parts in making up the whole

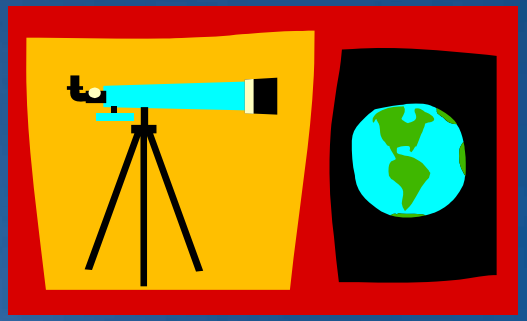


Visualization

- Tools & Techniques for:
  - Geospatial data analysis via interactive display
  - Communication of information for data exploration and decision-making

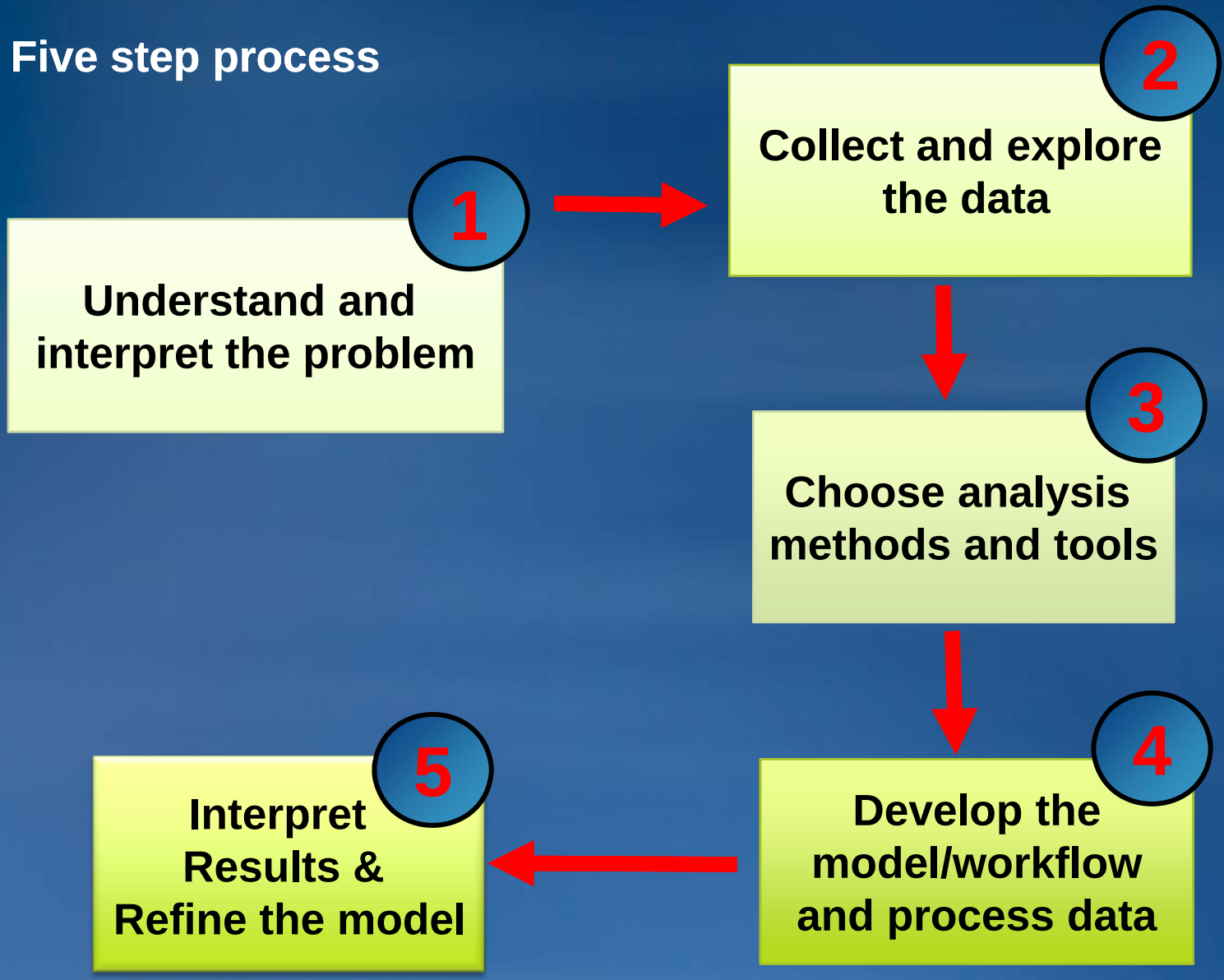
Analysis & Visualization

- Visualization – logical outcome of Analysis
- Go hand in Hand
- One compliments the other
- Form an iterative loop



Performing analysis

- Five step process



Analytical process

Choose analysis methods and tools

Select analysis tasks
- Point pattern analysis
- Single layer operations
- Multiple layer operations
- Raster analysis

Choose analysis operations
- Attribute queries
- Spatial queries
- Generate new data based on attributes, spatial relationships, or both

Create spatial models
- Workflows & methodology to solve real world problems

ArcGIS Analysis & Visualization tools

Geoprocessing toolboxes

- Model Builder
- Analysis toolbox
- Spatial statistics toolbox
- NetCDF Toolbox

Analysis

ArcGIS Extensions

- Toolbars & Toolboxes
- ArcGlobe & ArcScene
- Animation

Analysis & Visualization

ArcMap

- Charts & Graphs
- Animation

Analysis & Visualization

Analysis tools

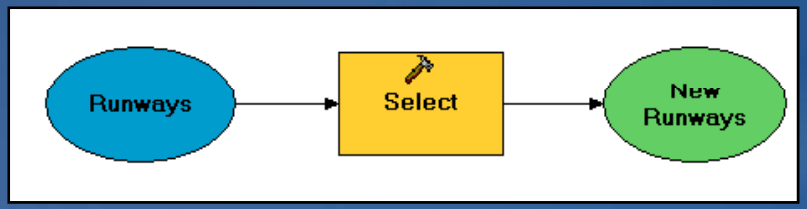
ArcGIS Geoprocessing tools

Analysis

Geoprocessing toolboxes

- Analysis tools
- Spatial statistics tools
- NetCDF Tools

Model Builder



Analysis Tools
- Extract
  - Clip
  - Select
  - Split
  - Table Select
- Overlay
  - Erase
  - Identity
  - Intersect
  - Spatial Join
  - Symmetrical Difference
  - Union
  - Update
- Proximity
  - Buffer
  - Create Thiessen Polygons
  - Multiple Ring Buffer
  - Near
  - Point Distance
- Statistics
  - Frequency
  - Summary Statistics

Multidimension Tools
- Feature to NetCDF
- Make NetCDF Feature Layer
- Make NetCDF Raster Layer
- Make NetCDF Table View
- Raster to NetCDF
- Select by Dimension
- Table to NetCDF

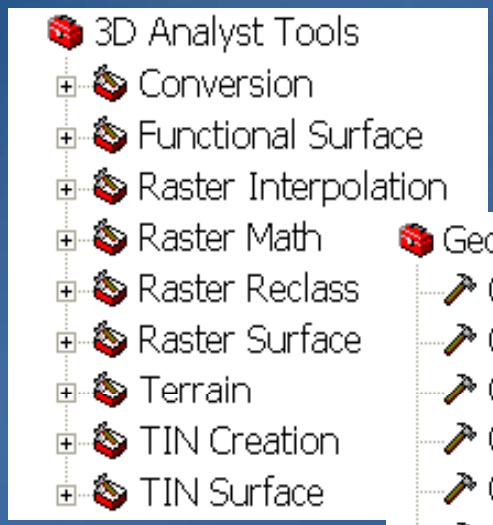
Spatial Statistics Tools
- Analyzing Patterns
- Mapping Clusters
- Measuring Geographic Distributions
- Utilities

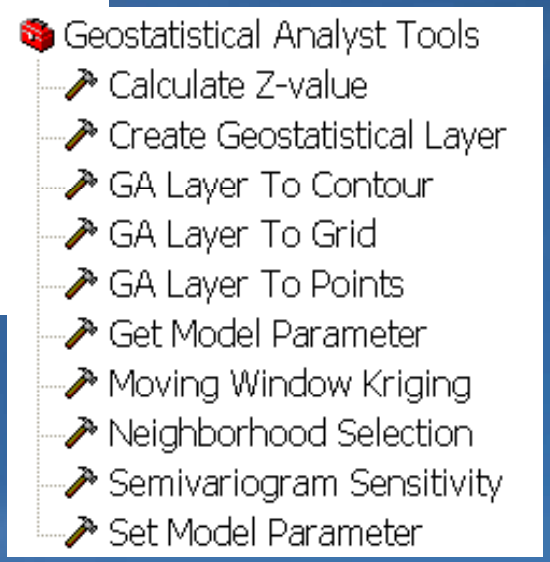
ArcGIS extensions

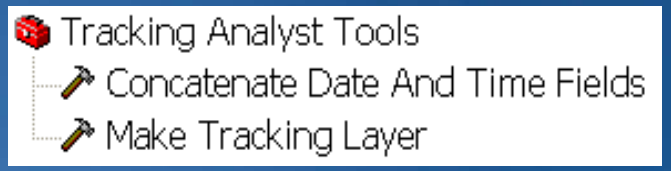
ArcGIS Extensions

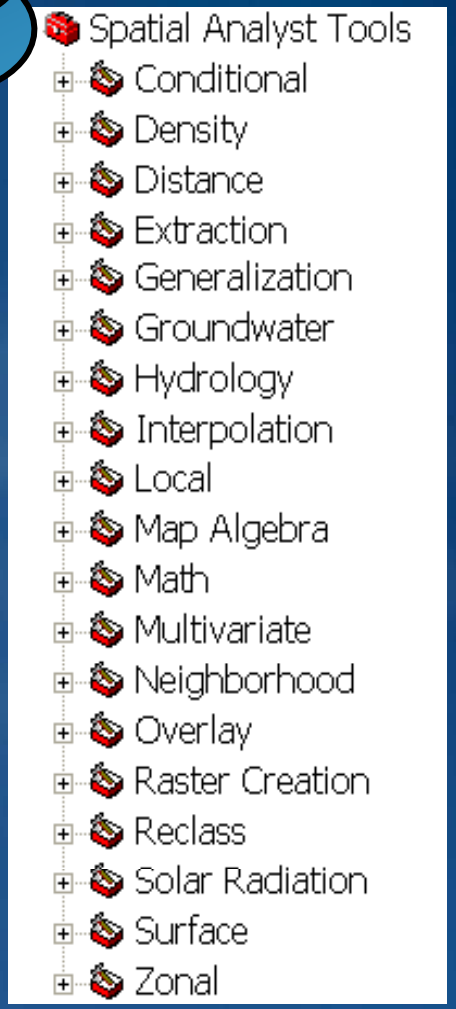
- **Analysis extensions**
- **Productivity extensions**
- **Solution based extensions**

Analysis & Visualization









ArcGIS extensions

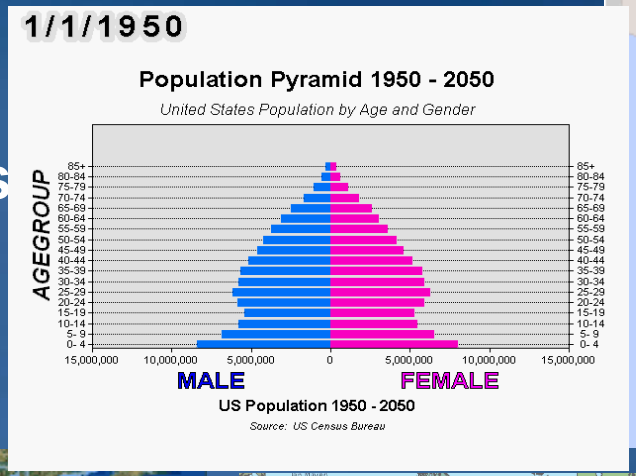
ArcGIS 3D Analyst - Three-dimensional (3D) visualization	• 3D analysis, and surface generation
ArcGIS Spatial Analyst - Spatial modeling and analysis	• Create, query, map, and analyze cell-based/raster data
ArcGIS Geostatistical Analyst - Advanced surface modeling	• Deterministic and geostatistical interpolation methods
ArcGIS Network Analyst - Transportation modeling	• Create network datasets, network analysis
ArcGIS Tracking Analyst - Map movement or change of objects	• Track and symbolize temporal data, display real-time data
ArcGIS Business Analyst - Business data and analysis tools	• Site evaluation, customer profiling and trade area market analysis

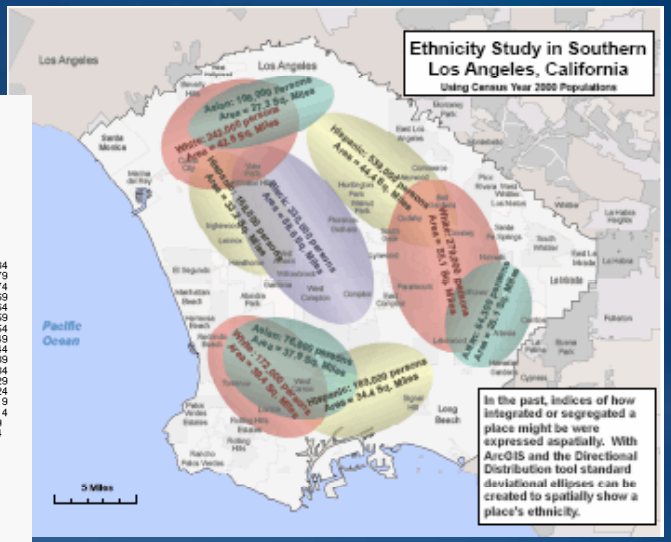
ArcGIS - ArcMap

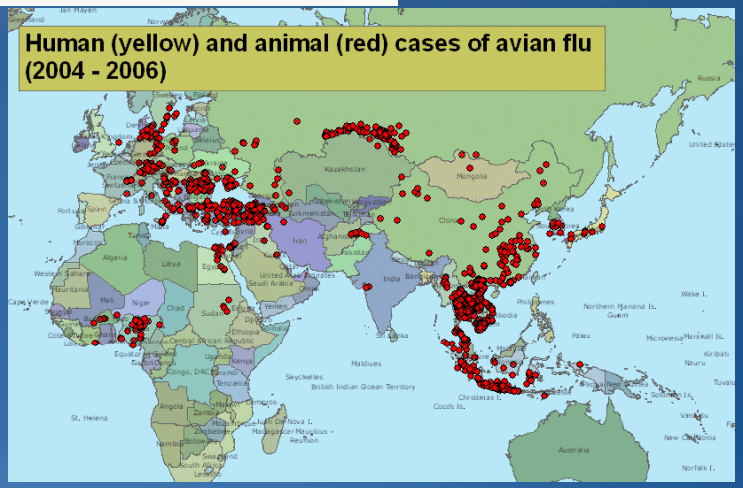
ArcMap

- Maps
- Charts
- Animation
- Tracking Layers
- Network layers

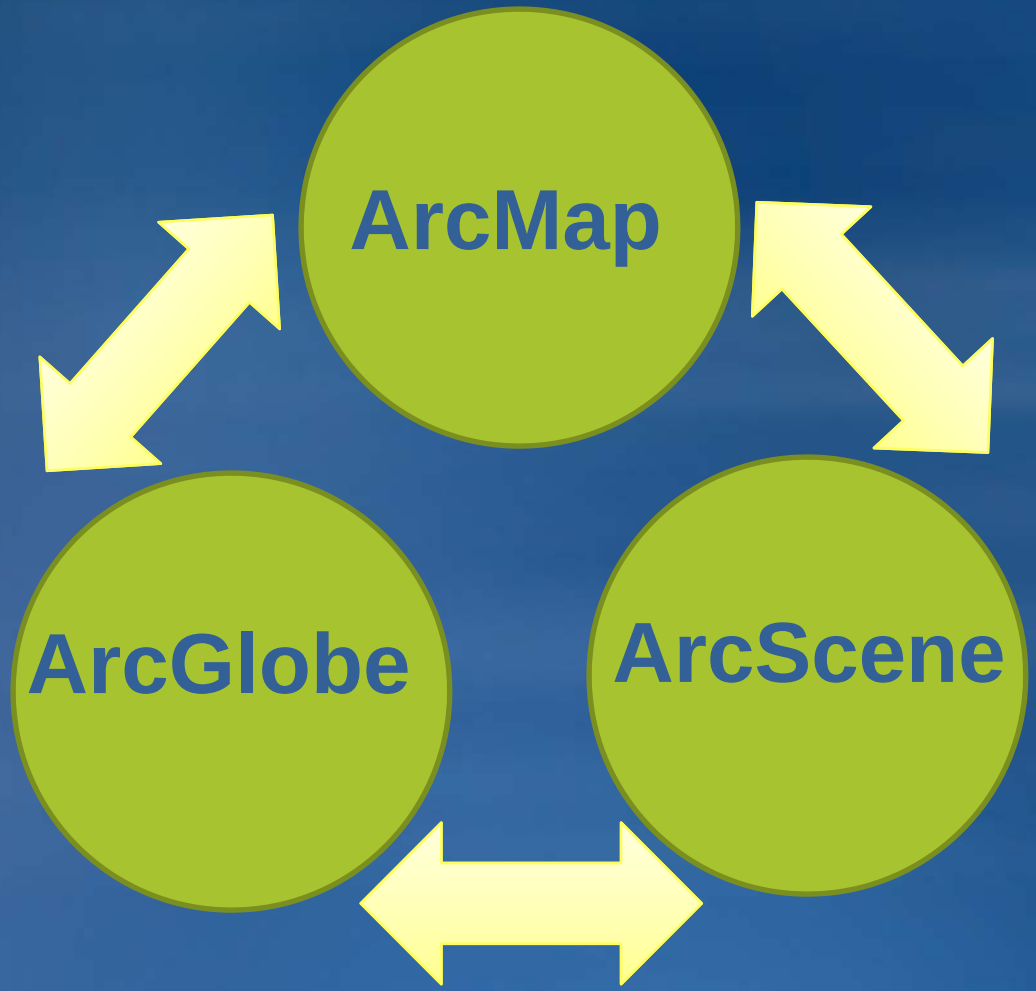
Analysis & Visualization





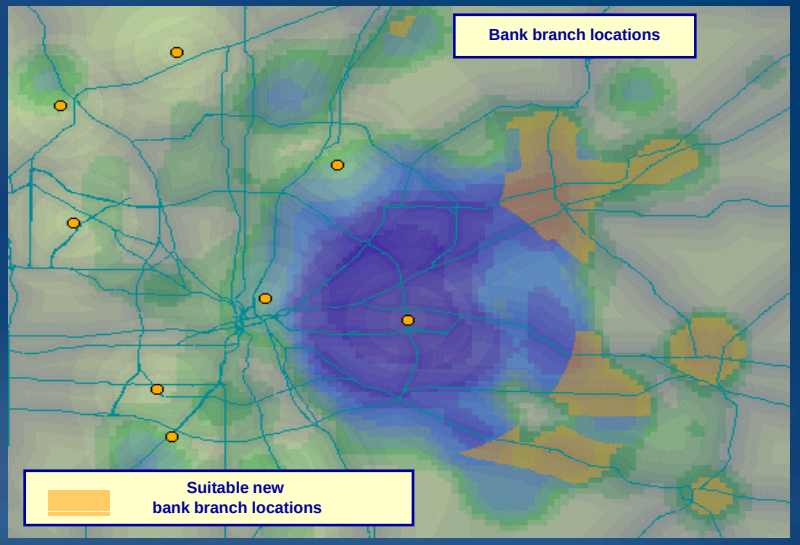


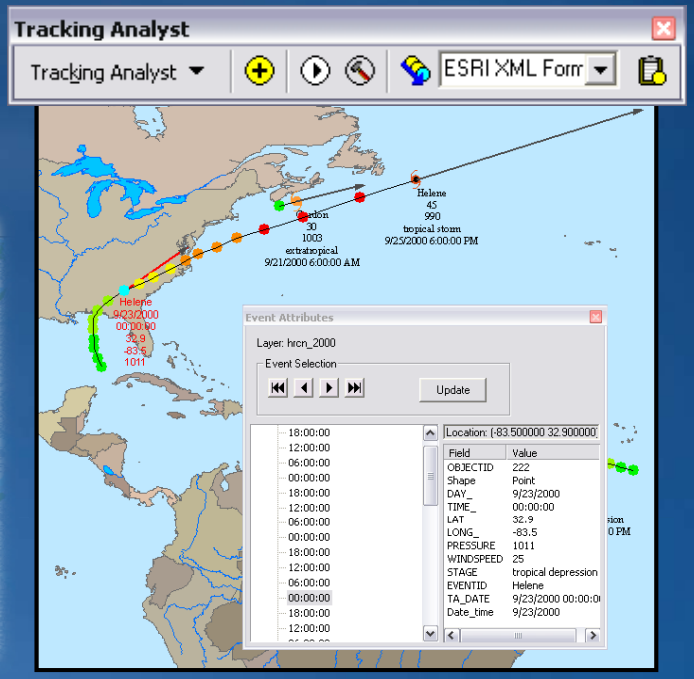
Visualization

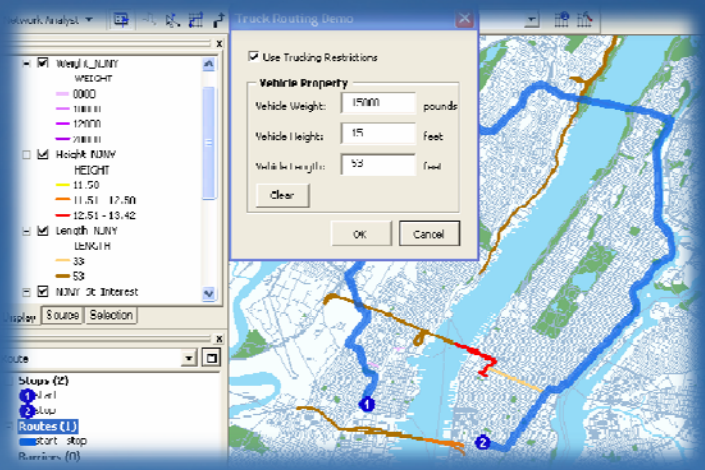


ArcMap

- **Visualize:**
  - **Map layers**
  - **Charts & Graphs**
  - **Animations**
  - **Raster Layers**
  - **Tracking analyst layers**
  - **Network Solver results**
- **Tools & Techniques**
  - **Layer drawing order**
  - **Layer transparency**

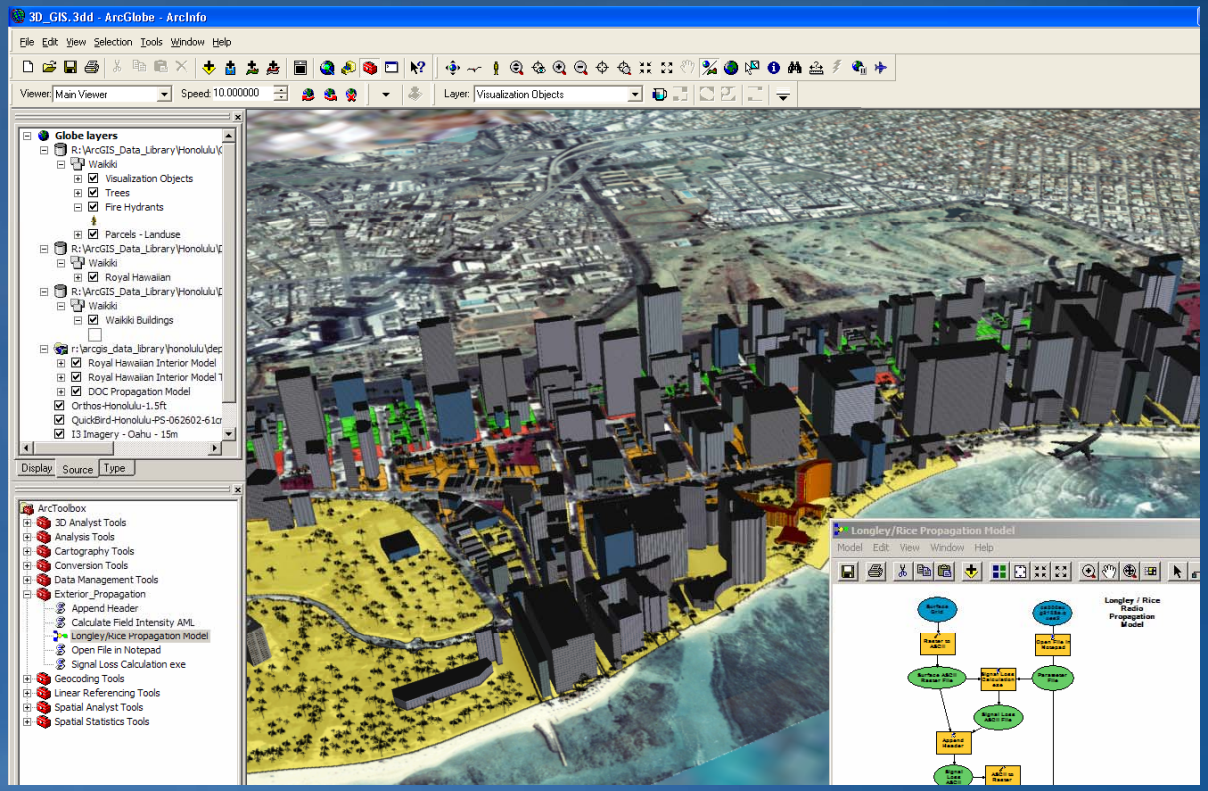






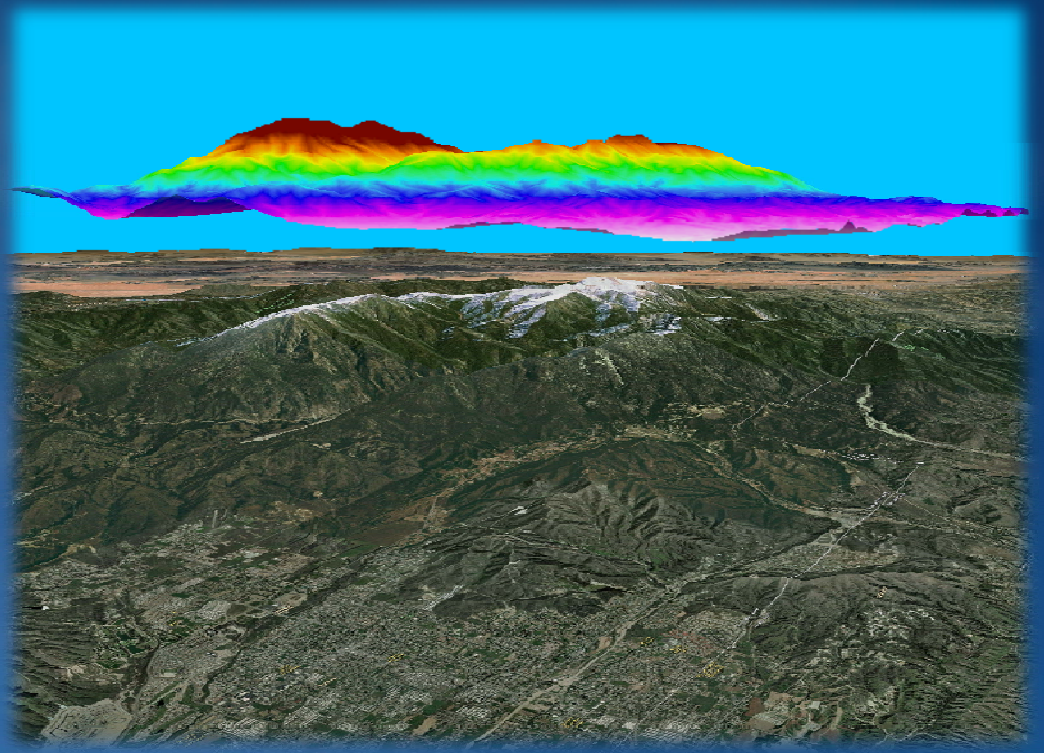
ArcGlobe

- Interactive 3D visualization of large amounts of geographic data
- 3D analysis of spatial data
- Seamless transitions between:
  - Global, local and street-level scales
- Uses standard ArcGIS data sources and layers
- 3D symbology



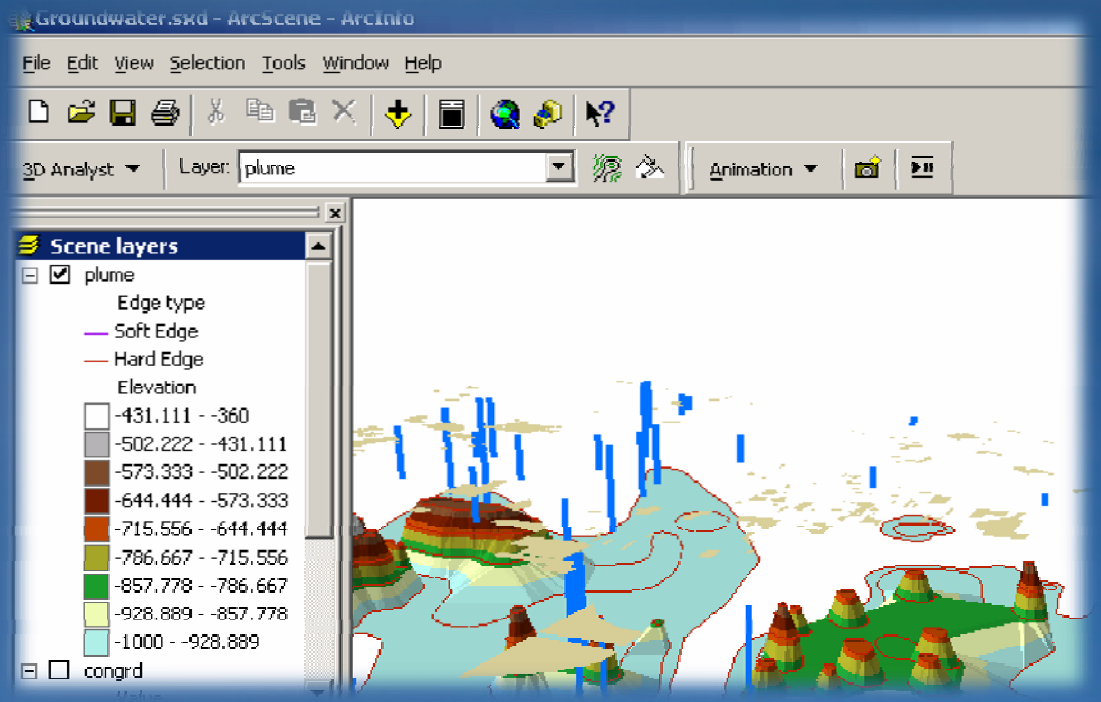
Data display in ArcGlobe

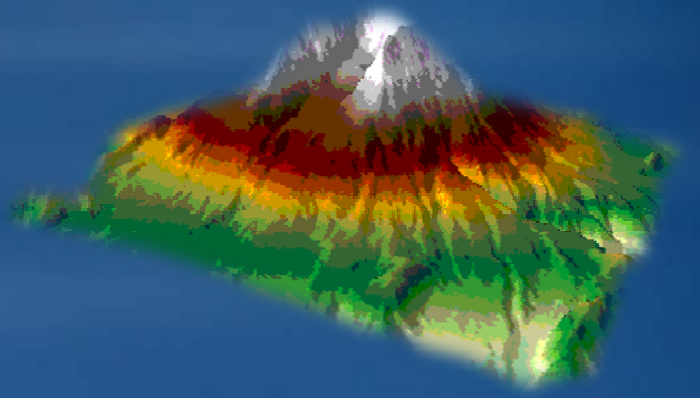
- **Layer categories:**
- **Floating**
  - **Above or below globe surface**
- **Draped**
  - **On the globe surface**
- **Elevation**
  - **Defining globe surface**

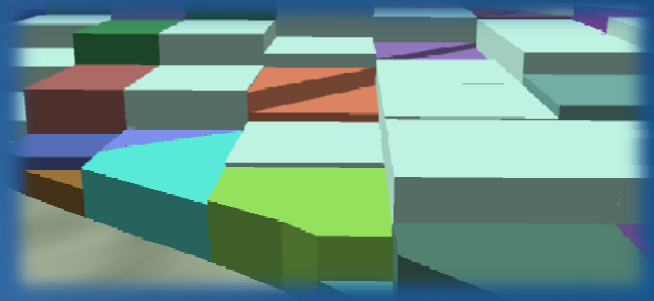


ArcScene

- Realistic 3D scenes
- Navigate and interact with GIS data
  - View surface from multiple viewpoints
  - Create realistic perspective imaging
  - Analyze atmospheric, surface, and subsurface pollution
  - Visualize income distribution

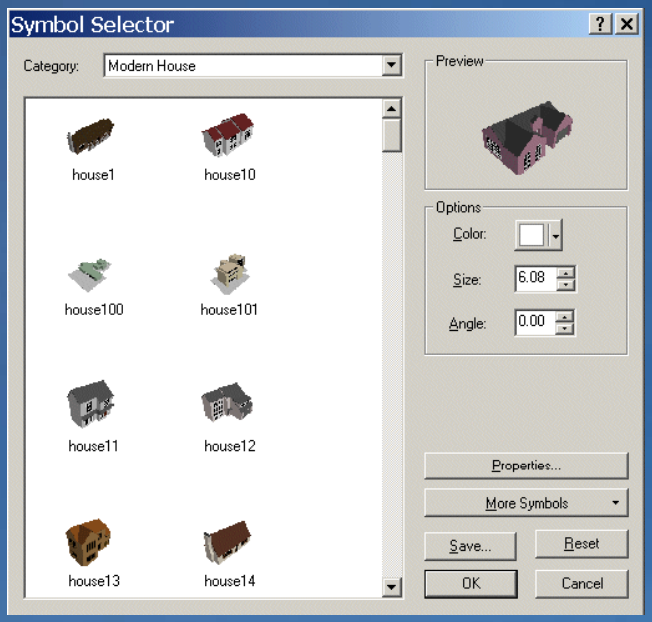


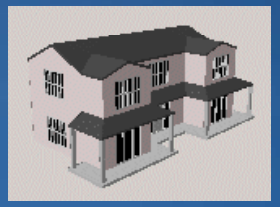


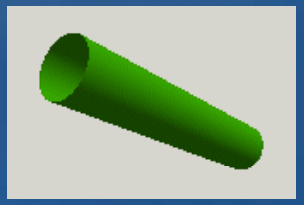


3D symbols

- Advanced communication through visualization
- Improved abstraction and realism
- Interesting and meaningful displays
- 3D styles
  - 3D marker symbols
  - 3D line symbols
  - 3D fill symbols







Conclusions

- ArcGIS offers various analysis tools and techniques
  - Located in ArcGIS core & ArcGIS extensions
  - Core and extension tools compliment each other
  - Extensions greatly, extend functionality and capabilities
- Analysis preformed mostly with tools
- But visualization is also a form of Analysis
- Analysis results strongly supported by Visualization

Analysis & Visualization = Synergy