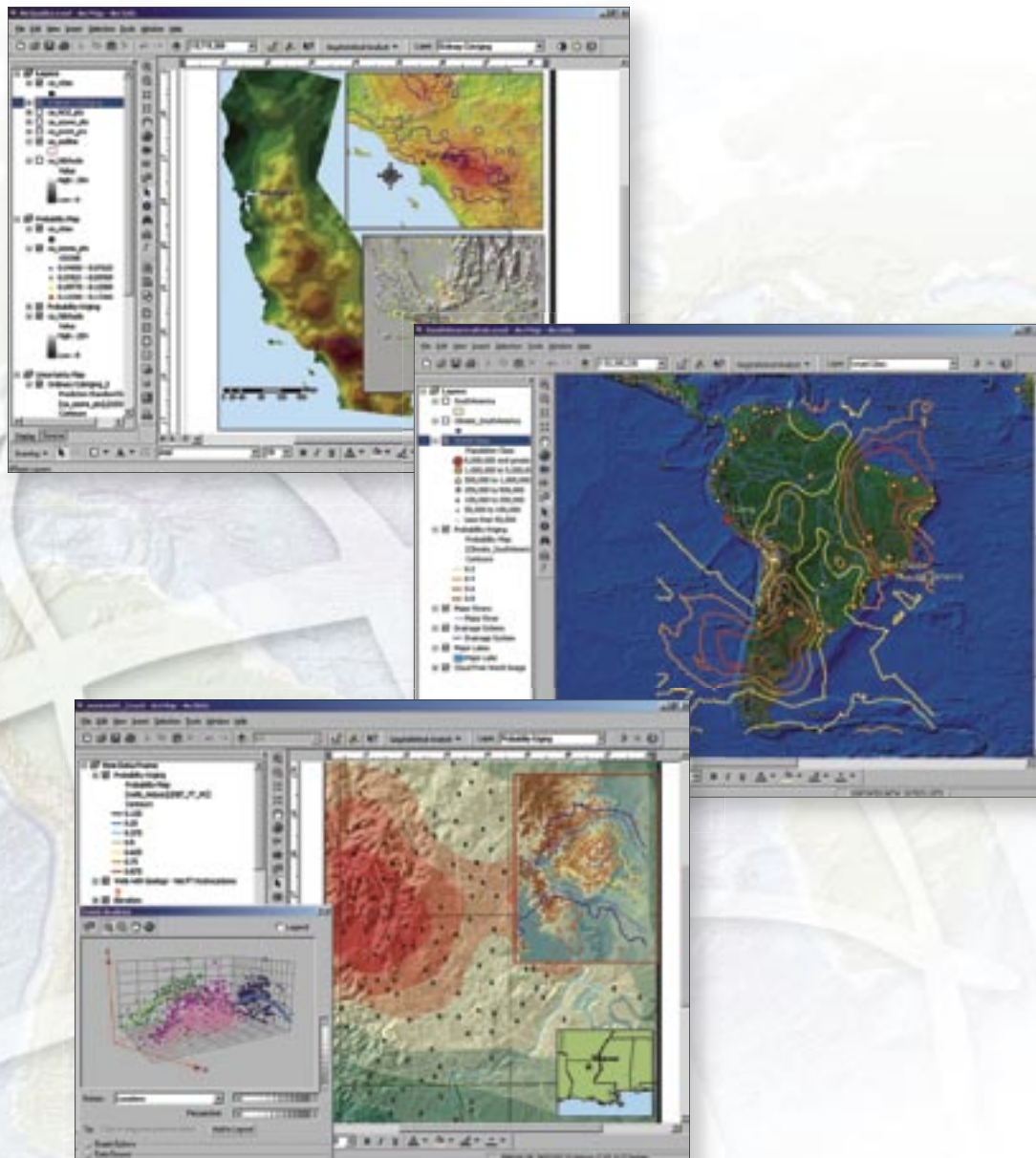


ArcGIS® Geostatistical Analyst

Statistical Tools and Models for Data Exploration,
Modeling, and Probabilistic Mapping



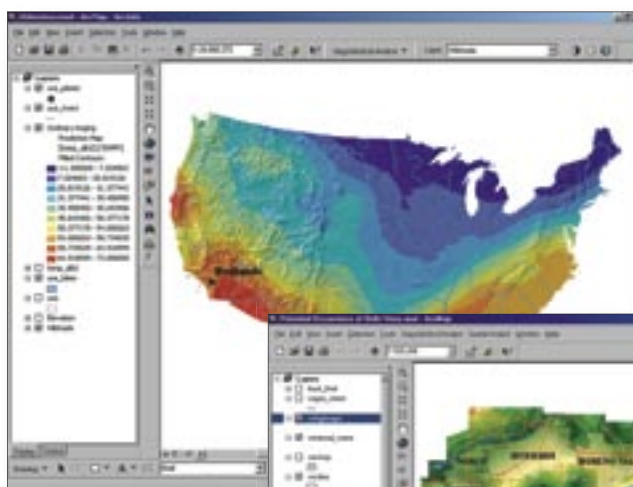
ArcGIS® Geostatistical Analyst: Statistical Tools and Models for Data Exploration, Modeling, and Probabilistic Mapping

ArcGIS® Geostatistical Analyst is an extension to the ArcGIS Desktop products (ArcView®, ArcEditor™, ArcInfo®) that provides a powerful suite of tools for spatial data exploration and surface generation using sophisticated statistical methods. ArcGIS Geostatistical Analyst allows you to create a surface from data measurements occurring over an area where collecting information for every possible location would be impossible. In addition, ArcGIS Geostatistical Analyst gives you the power to fully understand the qualitative and quantitative aspects of your data. By providing you with the freedom to predict and model spatial phenomena based on statistics and incorporating powerful exploration tools, ArcGIS Geostatistical Analyst effectively bridges the gap between geostatistics and geographic information system (GIS) analysis.

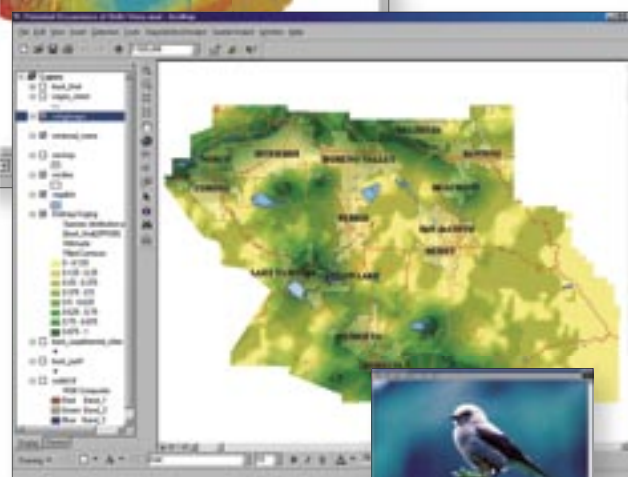
ArcGIS Geostatistical Analyst Can Help Solve Complex Real-World Problems in Many Industries.

ArcGIS Geostatistical Analyst provides a cost-effective, logical solution for analyzing a variety of datasets that would otherwise cost an enormous amount of time and money to accomplish. From identifying variation in natural phenomena to assessing possible environmental risks, ArcGIS Geostatistical Analyst gives anyone with spatial data measurements the freedom to investigate, visualize, and create surfaces for advanced spatial analysis. Some of the fields that benefit from ArcGIS Geostatistical Analyst include

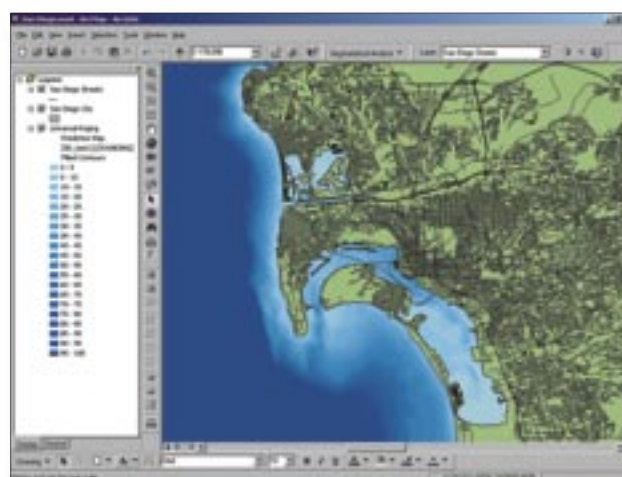
- Agriculture production
- Archaeology
- Environmental protection
- Exploration geology
- Forestry
- Health care
- Hydrology
- Meteorology
- Mining
- Real estate



Identify weather patterns.
Credit: MSHCP



Assess potential migration patterns.
Credit: USDA



Examine water depths.
Credit: NOAA

"The inclusion of more spatial interpolative methods in ArcGIS is a huge feature. Now, to do powerful interpolations of data trends, ArcGIS users no longer have to deal with the preprocessing of data for export to another application."

Daniel M. Petrecca
Senior Staff Hydrogeologist/GIS Specialist
Langan Engineering and Environmental Services, Inc.

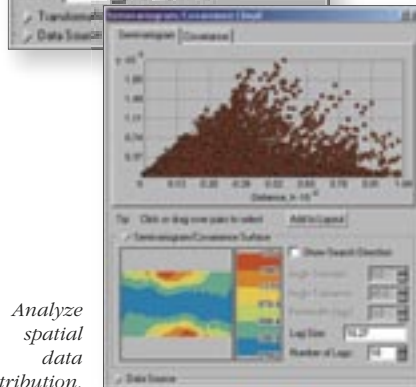
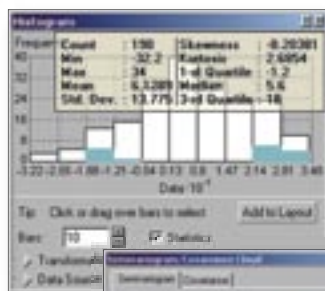
Exploratory Spatial Data Analysis

ArcGIS Geostatistical Analyst provides exploratory spatial data analysis (ESDA) tools that help you better visualize and analyze your data using statistical methods. The ESDA environment consists of a series of tools, each allowing a view into the data. Each view is interconnected with all other views as well as with the ArcGIS ArcMap™ application. In addition, each view can be manipulated and explored, allowing different insights into the

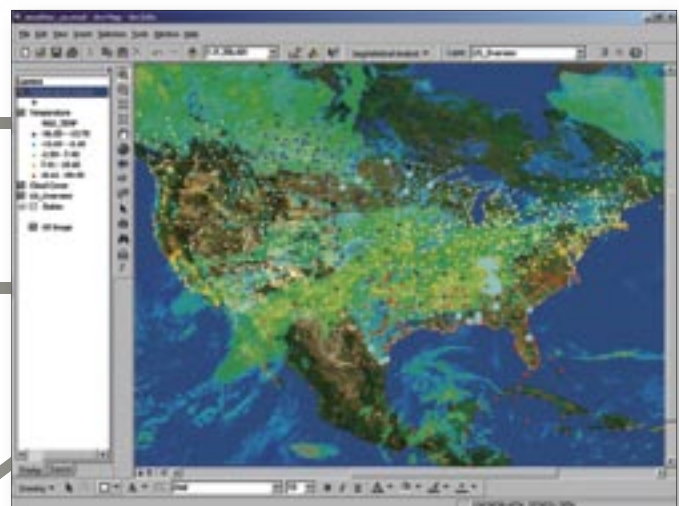
data such as the distribution of the data, global and local outliers, global trends, spatial autocorrelation, and covariation among multiple datasets.

ESDA enables you to gain a deeper understanding of the phenomena you are investigating so you can make better decisions on issues related to your data.

Examine distribution statistics.

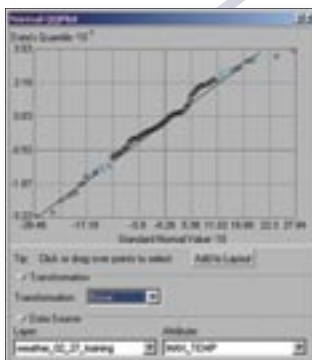


Analyze spatial data distribution.

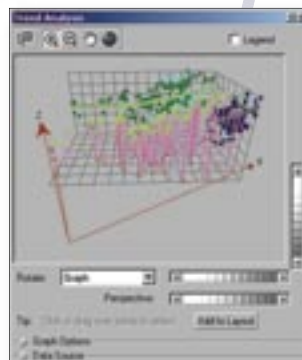


Credit: DTN

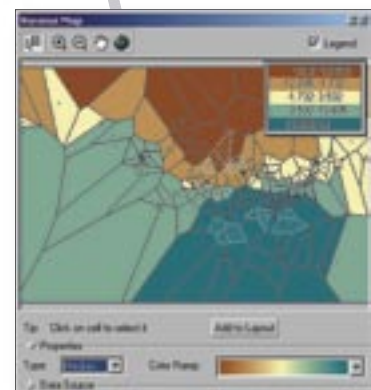
Maximum Temperature Measurements



Compare data distributions.



Identify global trends.

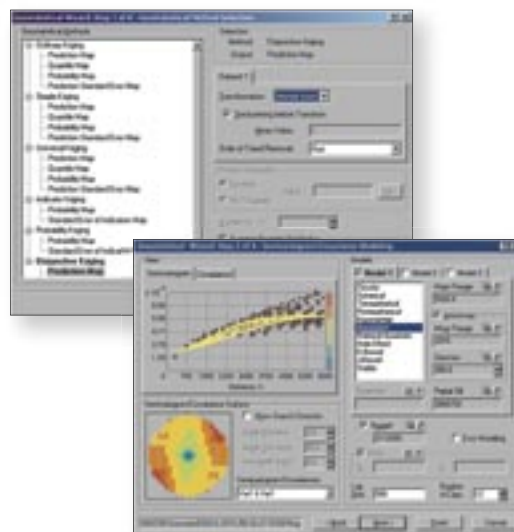


Examine local data variability.

All of the ESDA graphs are dynamically linked to each other and the map.

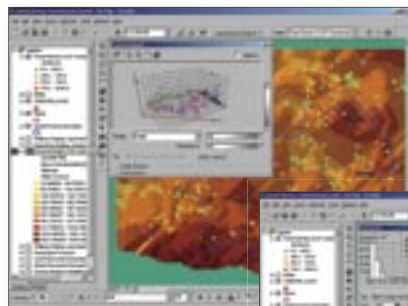
Advanced Surface Creation with a Wizard Interface

ArcGIS Geostatistical Analyst provides you with a variety of interpolation methods for the creation of an optimal interpolated surface from your data. A friendly wizard helps you through the interpolation process. There are two main groupings of interpolation techniques: deterministic and geostatistical. Deterministic interpolation techniques are used for creating surfaces from measured points based on either the extent of similarity (e.g., inverse distance weighted) or the degree of smoothing (e.g., radial basis functions). Geostatistical interpolation techniques are based on statistics and are used for more advanced prediction surface modeling, which also includes error or uncertainty of predictions.

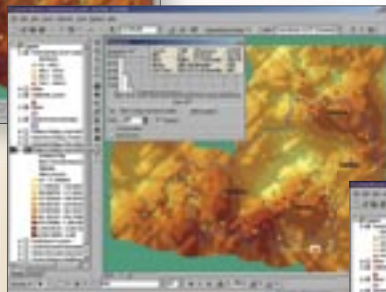


Geostatistical

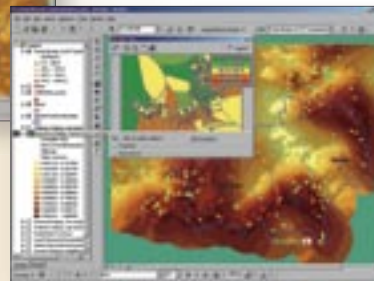
Universal Kriging



Ordinary Kriging



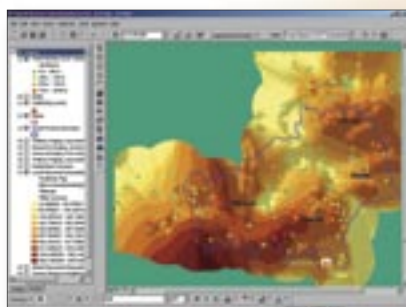
Disjunctive Kriging



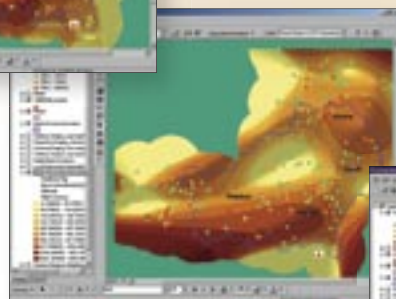
Credit: BELRAD

Deterministic

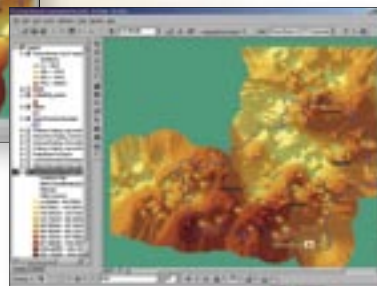
**Likelihood of
Environmental
Contamination**



Local Polynomial



Global Polynomial

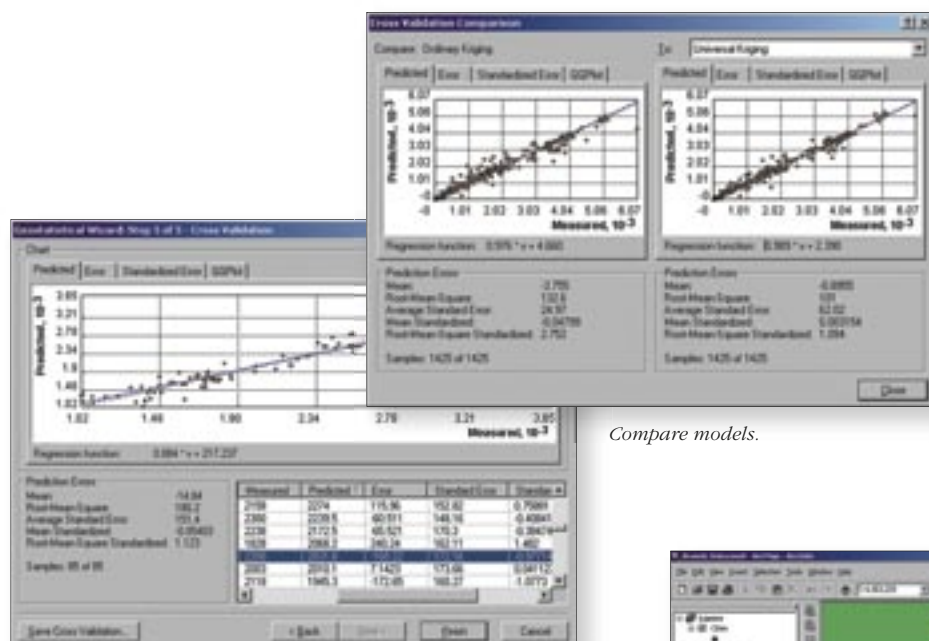


Inverse Distance Weighted

"Using ArcGIS Geostatistical Analyst, I can refine the kriging equations and examine the effects of different parameters on the output surfaces. The ability to directly compare various output surfaces using semivariance/covariance graphs, predicted vs. measured, and Q-Q is invaluable. The many tools in ArcGIS Geostatistical Analyst allow me to determine which surface is the best interpolation of the data."

Terri Arnold
Cartographer, GIS Specialist

Diagnostics and Comparison of Prediction Models

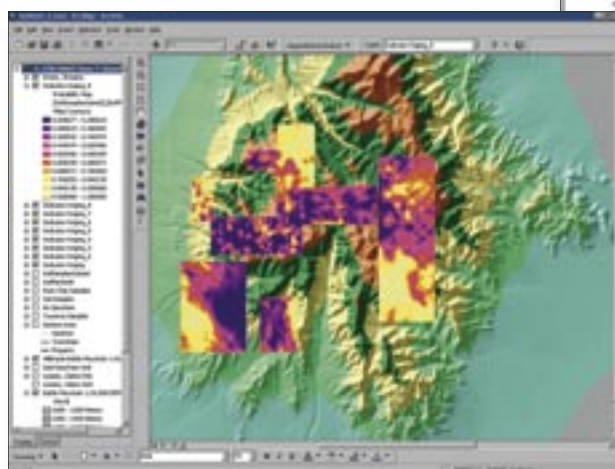


Validate your predictions.

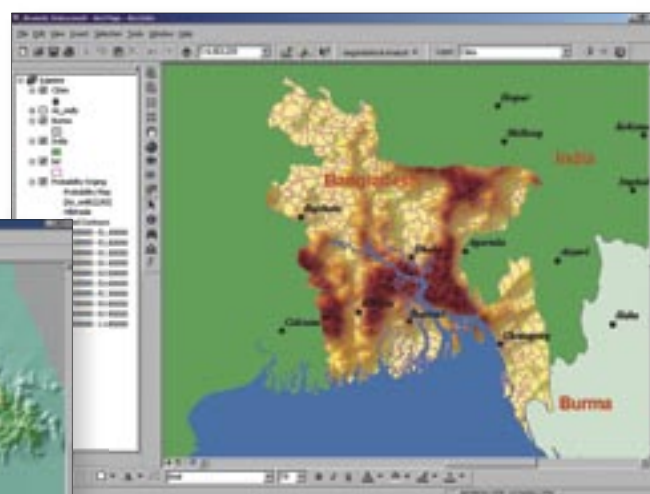
Compare models.

In addition to maps of prediction uncertainties, ArcGIS Geostatistical Analyst provides validation and cross-validation tools that allow you to evaluate the model and predictions. The tools quantify the accuracy of the model; you can either accept the model and its parameters or you can change the model and refine the parameters to create a better surface.

You can also compare models after the surface is created to ensure the optimal model was chosen.



Locate mineral deposits.



Investigate the severity of aquifer contamination.

Credit: BGS

For more information,
visit ESRI's Web site at
www.esri.com/geostatisticalanalyst.

Credits

BELRAD	Radioceasium forest berry contamination data was provided by the Institute of Radiation Safety (BELRAD), Minsk, Belarus.
BGS	The Bangladesh water contamination data was provided by the British Geological Survey and the Department of Public Health Engineering (Bangladesh), undertaking a project funded by the UK Department for International Development (DFID).
CEPA	Air quality data was provided by the California Environmental Protection Agency Air Resources Board.
DTN	Weather data was provided by DTN Weather Services LLC.
ISEU	Radioceasium soil contamination data was provided by the International Sakharov Environmental University, Minsk, Belarus.
MSHCP	Bird location data was provided by the Western Riverside County MSHCP.
NOAA	Bathymetric data was provided by the National Oceanic and Atmospheric Administration.
U of I	Agriculture data was provided by the University of Illinois.
USDA	Carpathian Mountains data was provided by the USDA Forest Service, Riverside, California.



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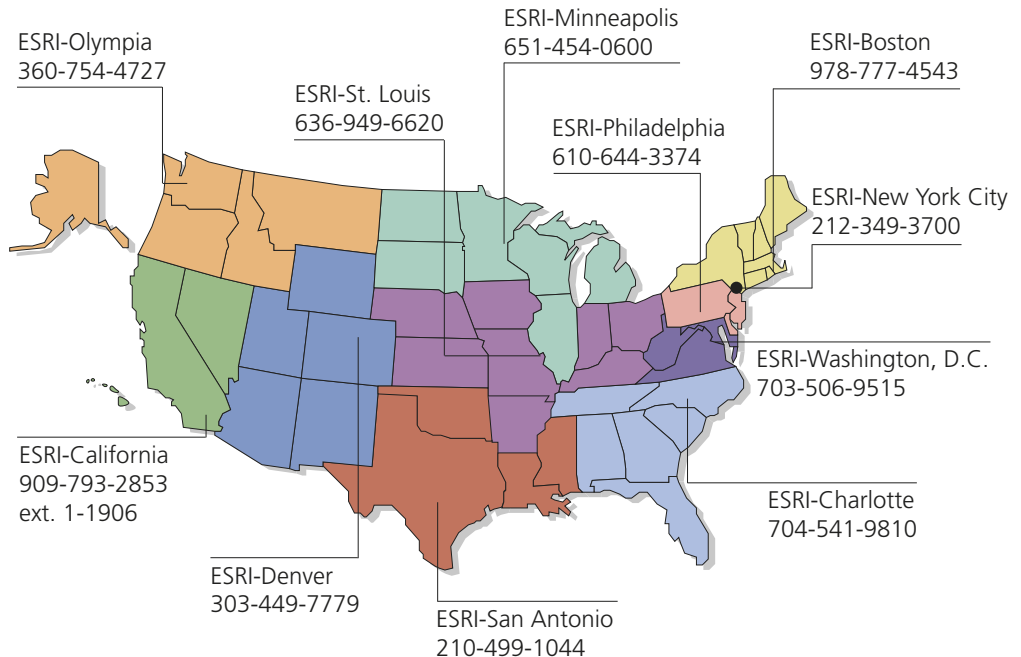
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ArcGIS Geostatistical Analyst

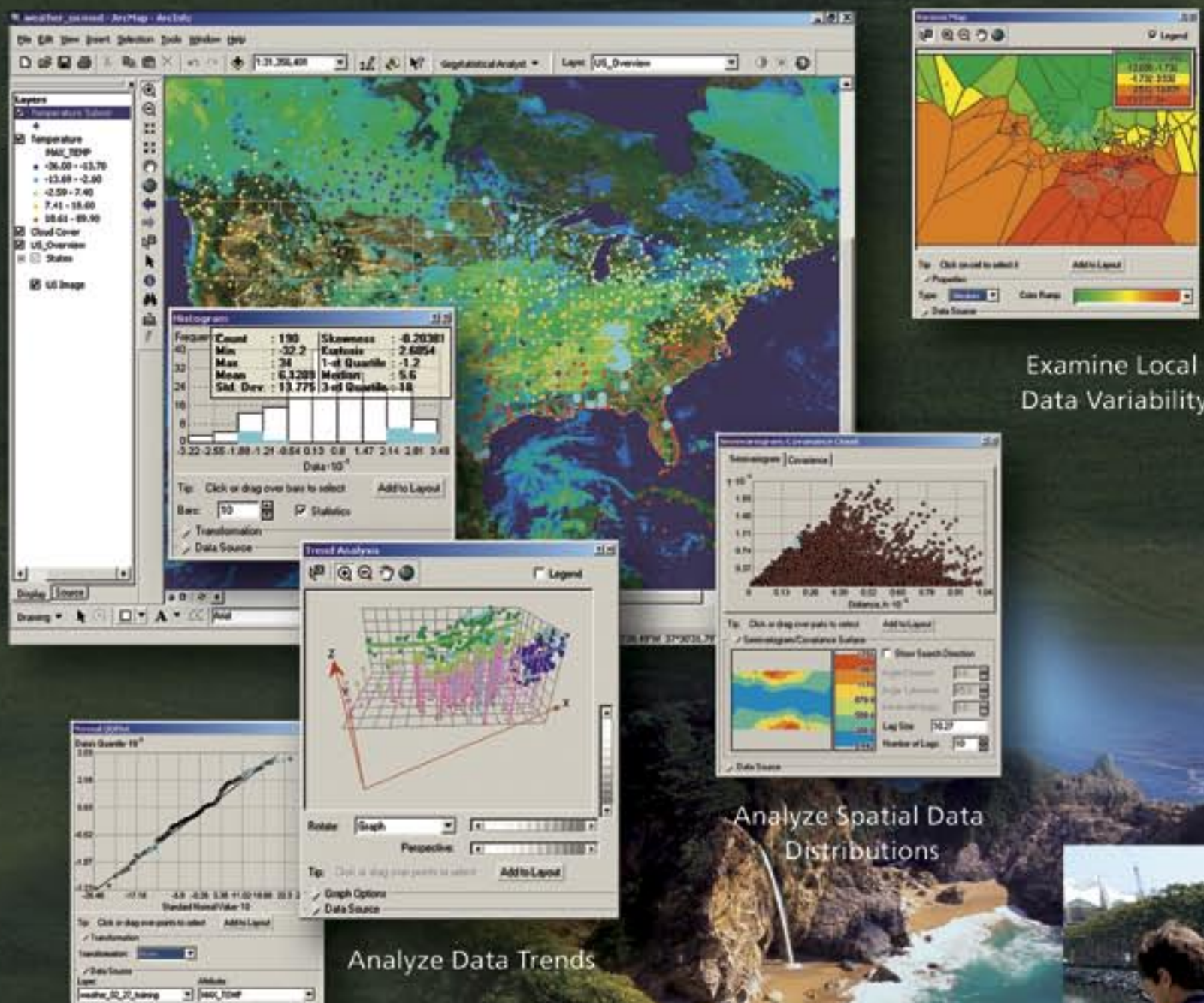
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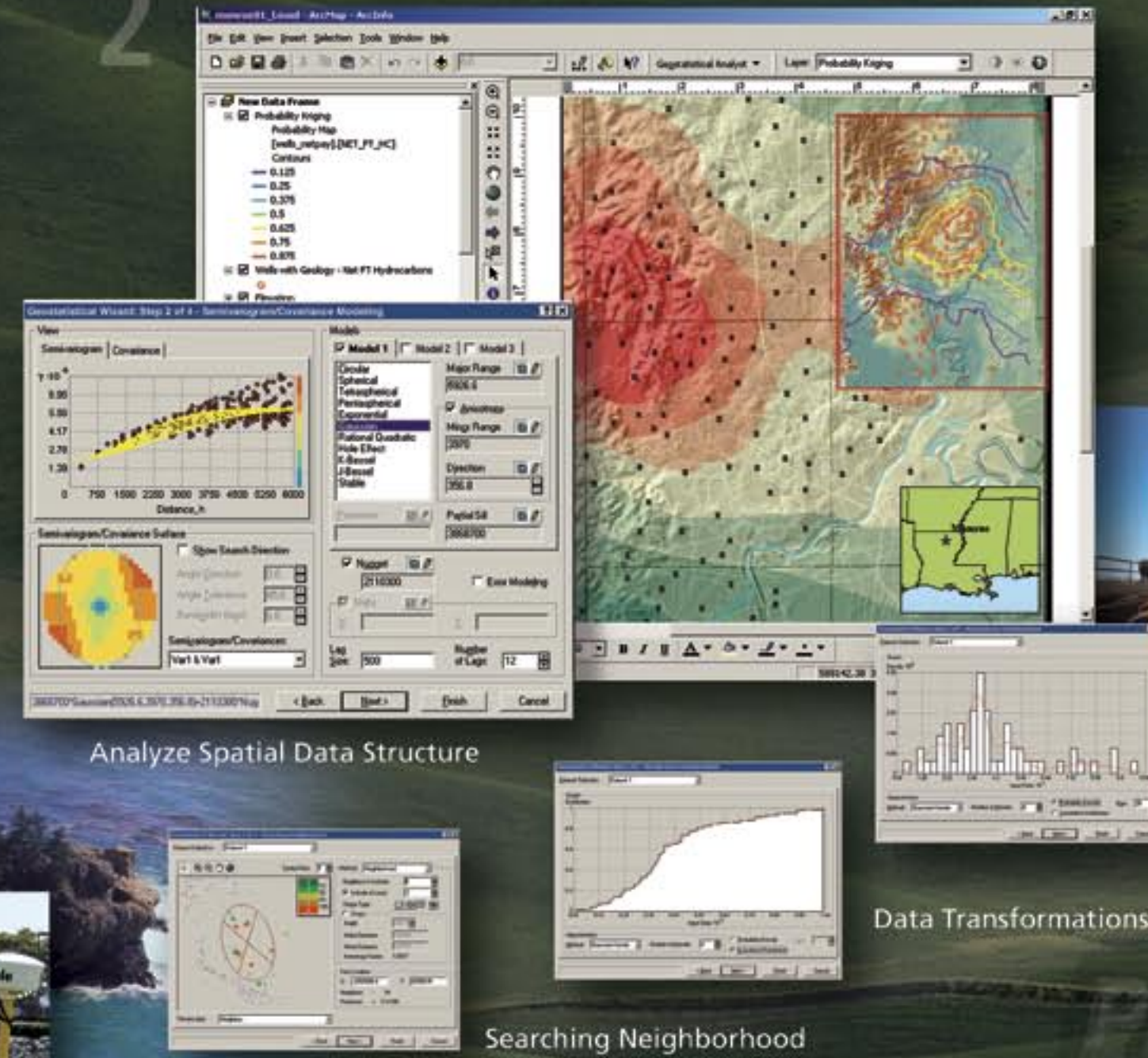
Advanced Surface Creation
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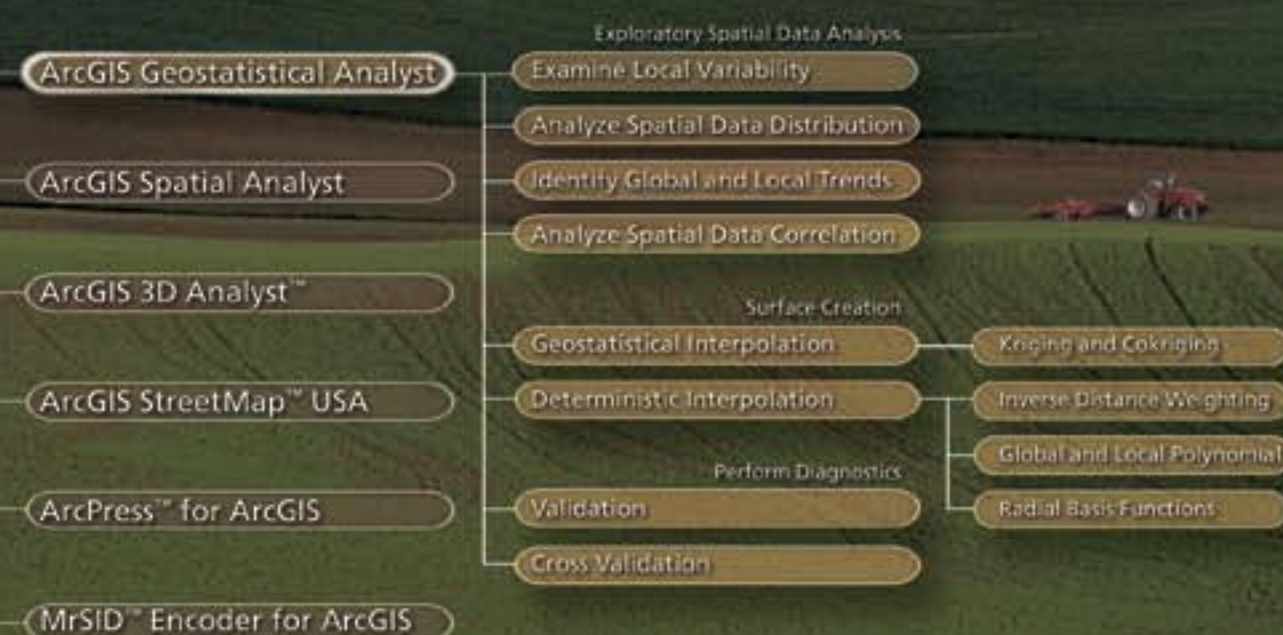
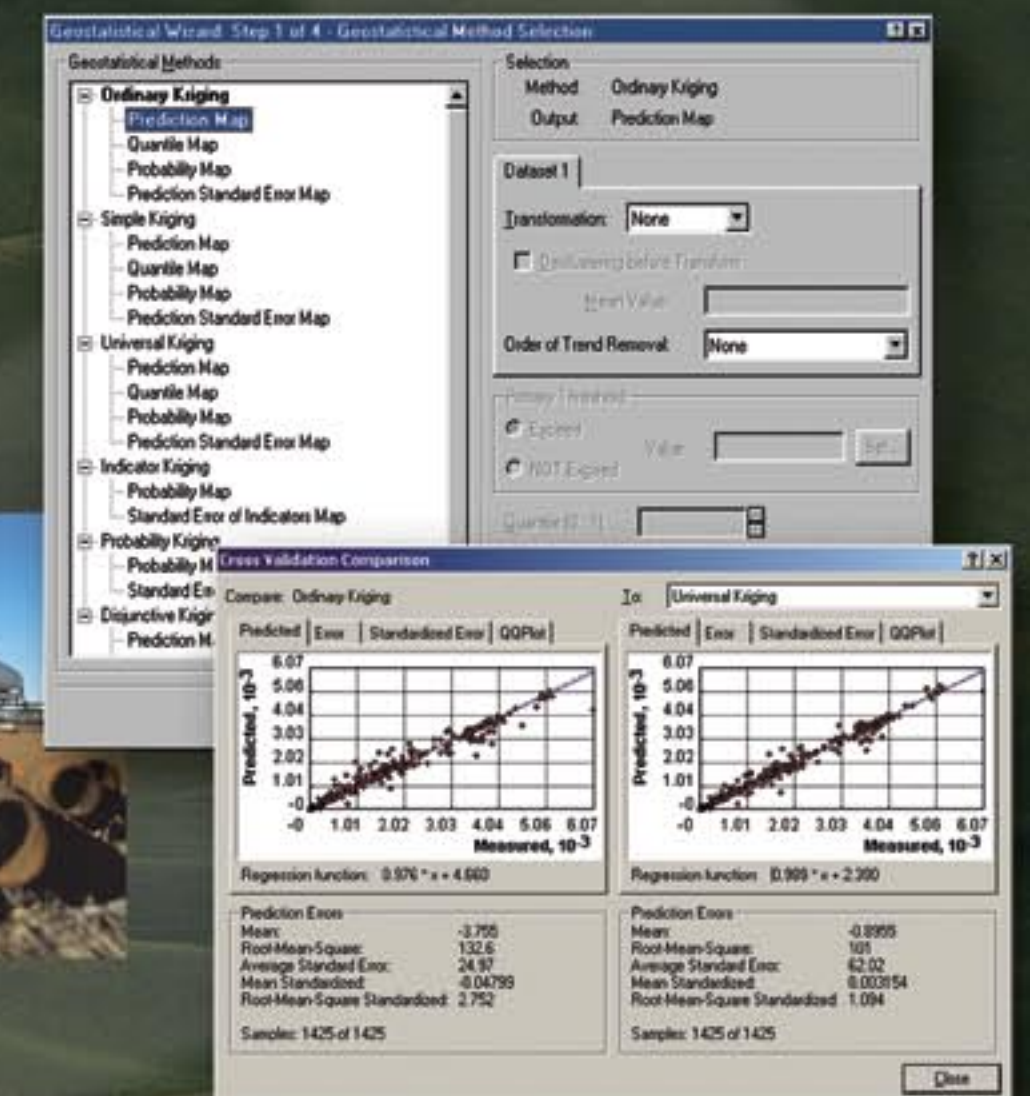
Examine
Distribution
Statistics



2

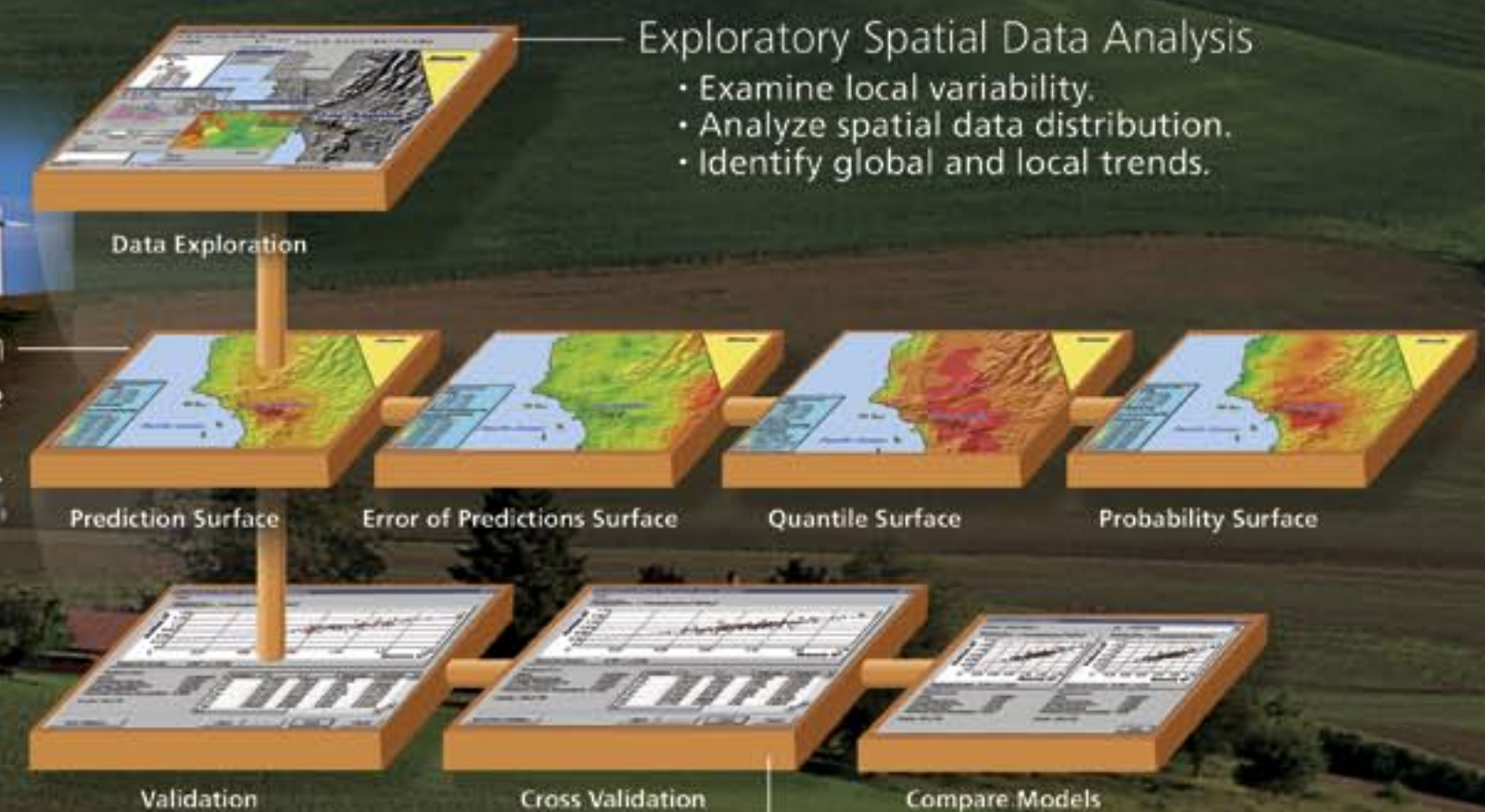


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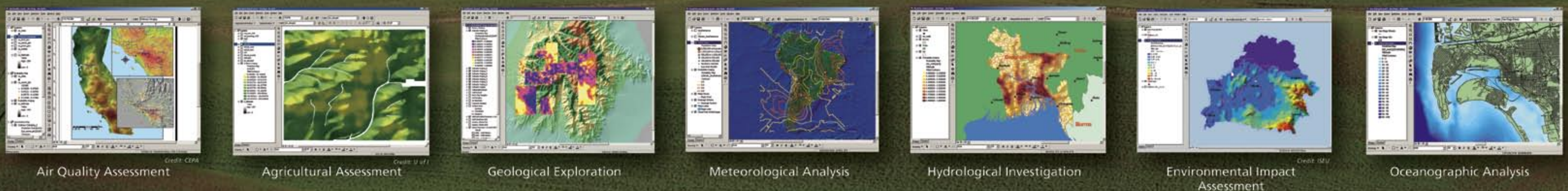


Sophisticated Statistical
Methods for Improved
Decision Making

Surface Creation
• Create a surface with a variety
of output types.



Perform Diagnostics
• Assess the statistical
accuracy of the surface.



ArcGIS Geostatistical Analyst

For more information, call 1-800-447-9778 or visit ESRI's Web page at www.esri.com/geostatisticalanalyst.