VisIt overview

Hands-on training in Visualization for Summer of HPC 2013

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CAPACITIES

e-infrastructure

Outline

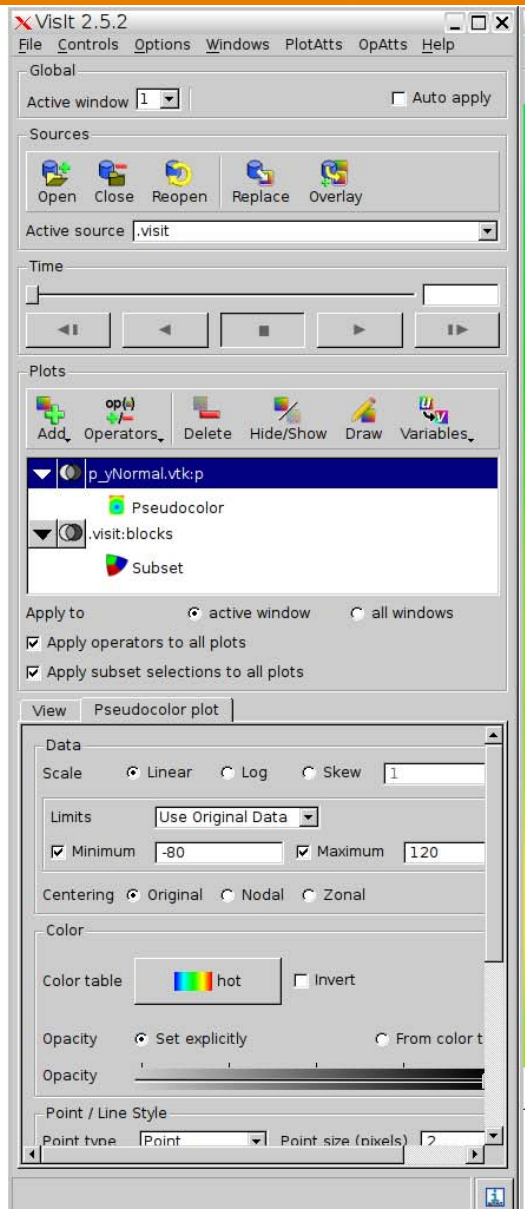
- Graphical User Interface
- Plotting methods
- Operators
- Data exploration

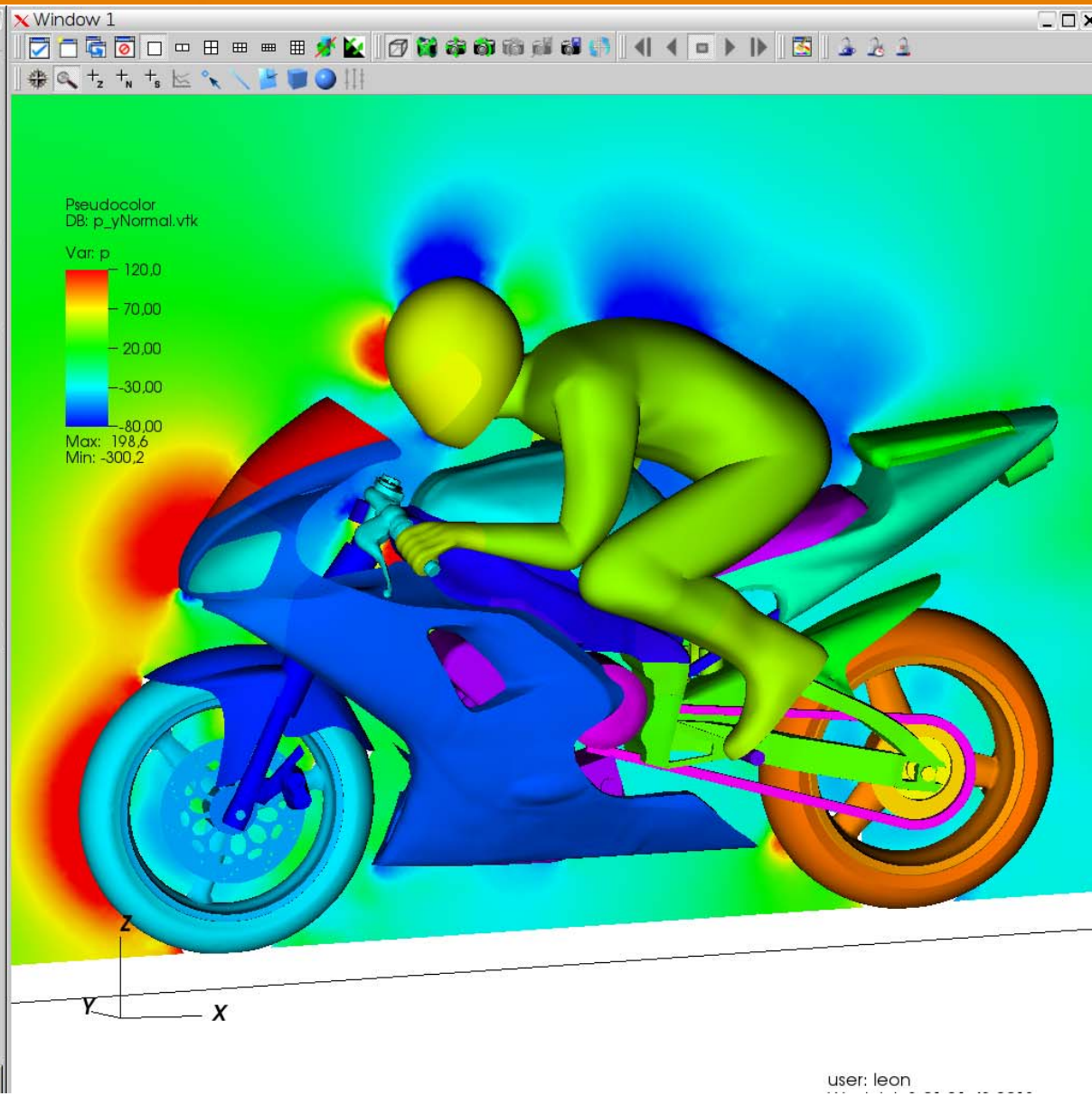
Basic screenshots taken from VisIt web page https://wci.llnl.gov/codes/visit and support page http://www.visitusers.org/

GUI

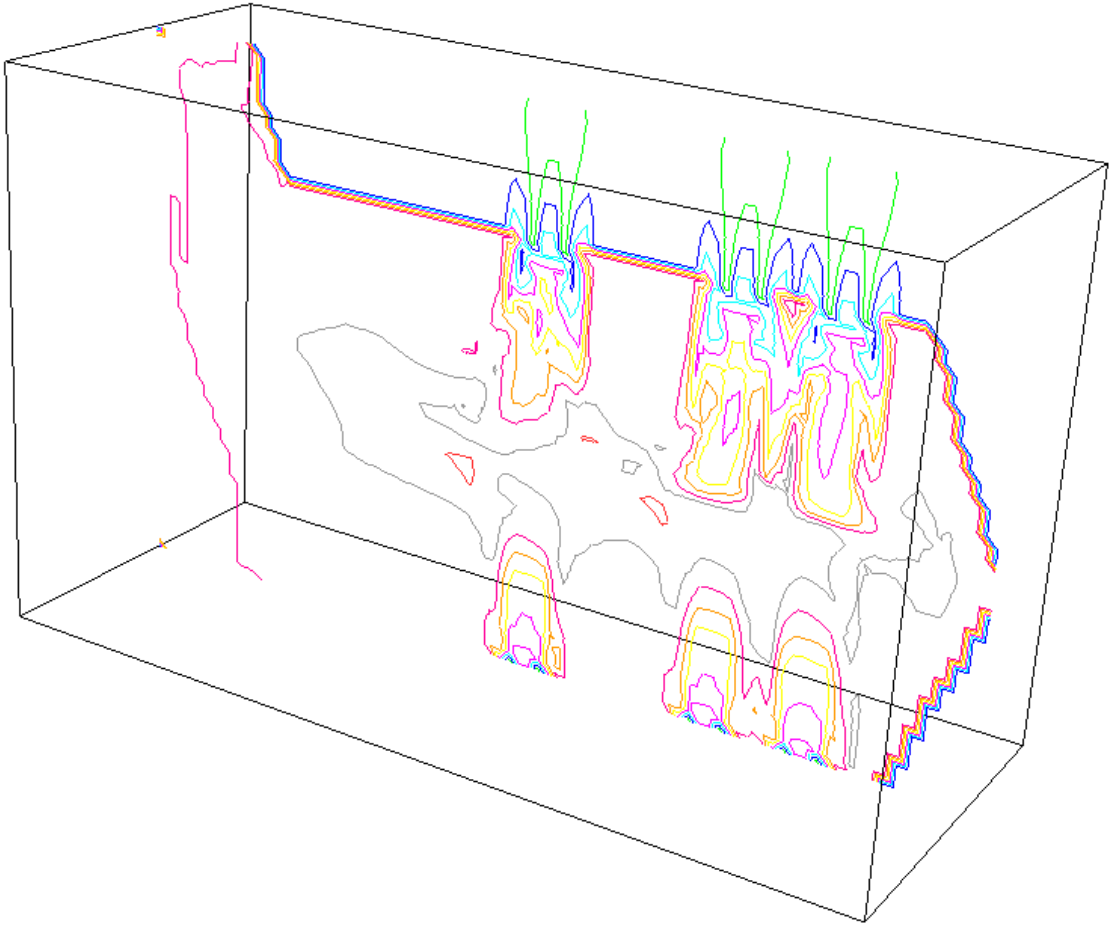
Control panel and several visualization windows available.

Details at training.

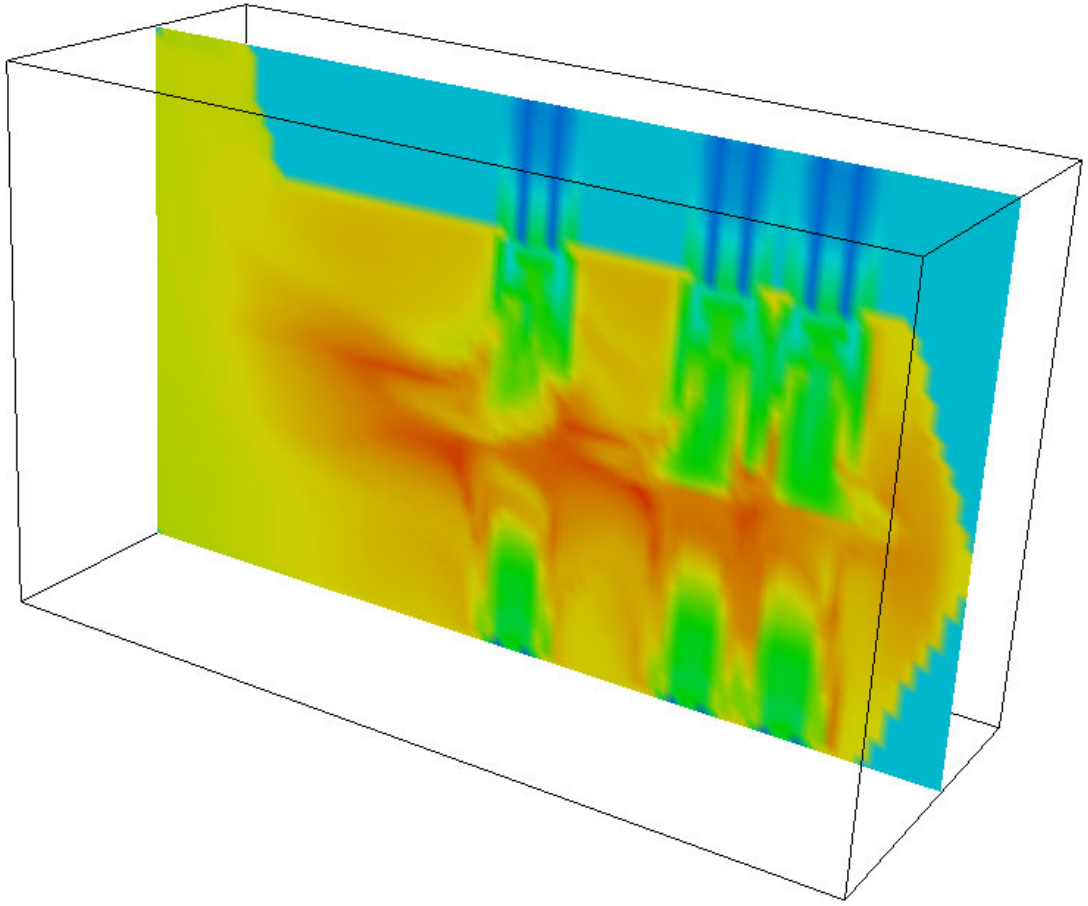




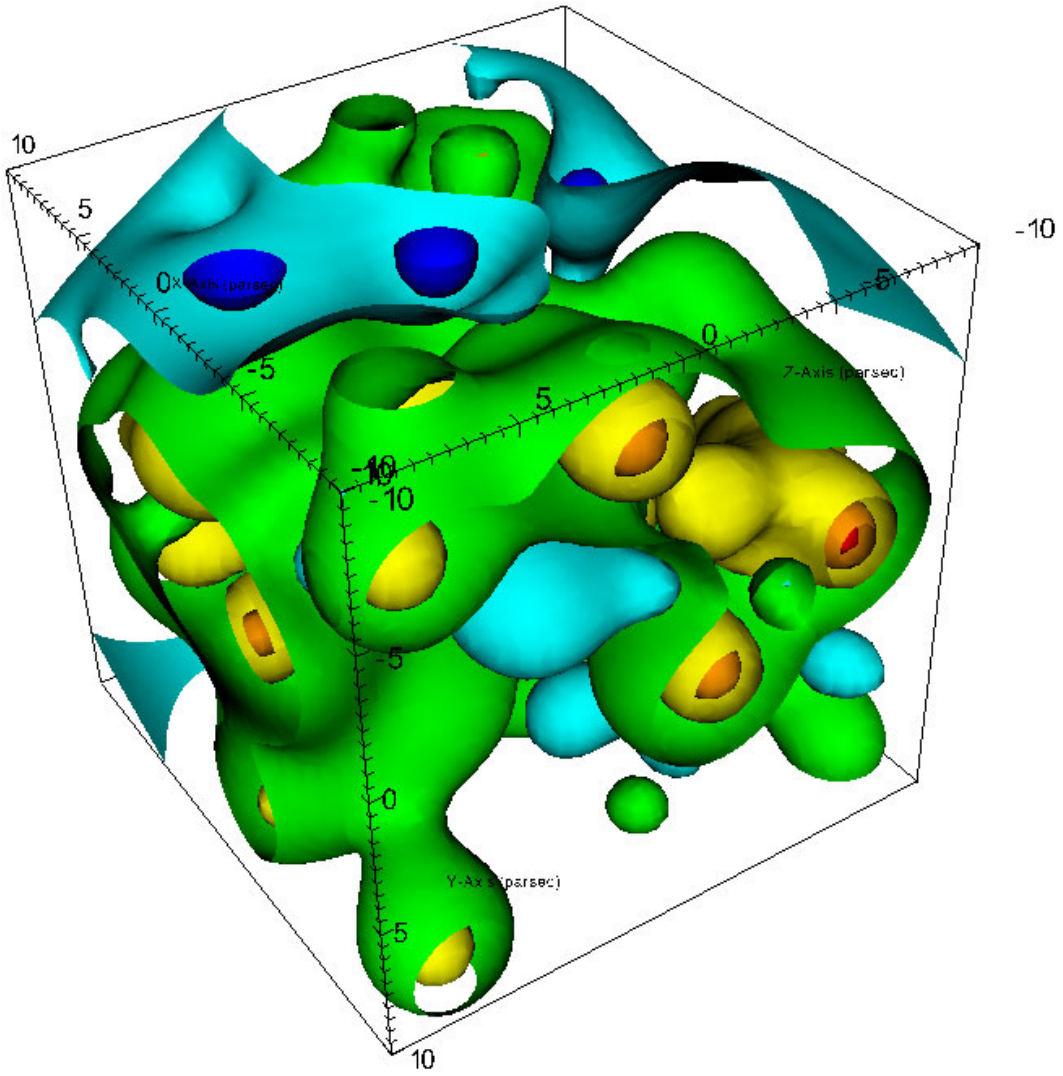
Plotting methods



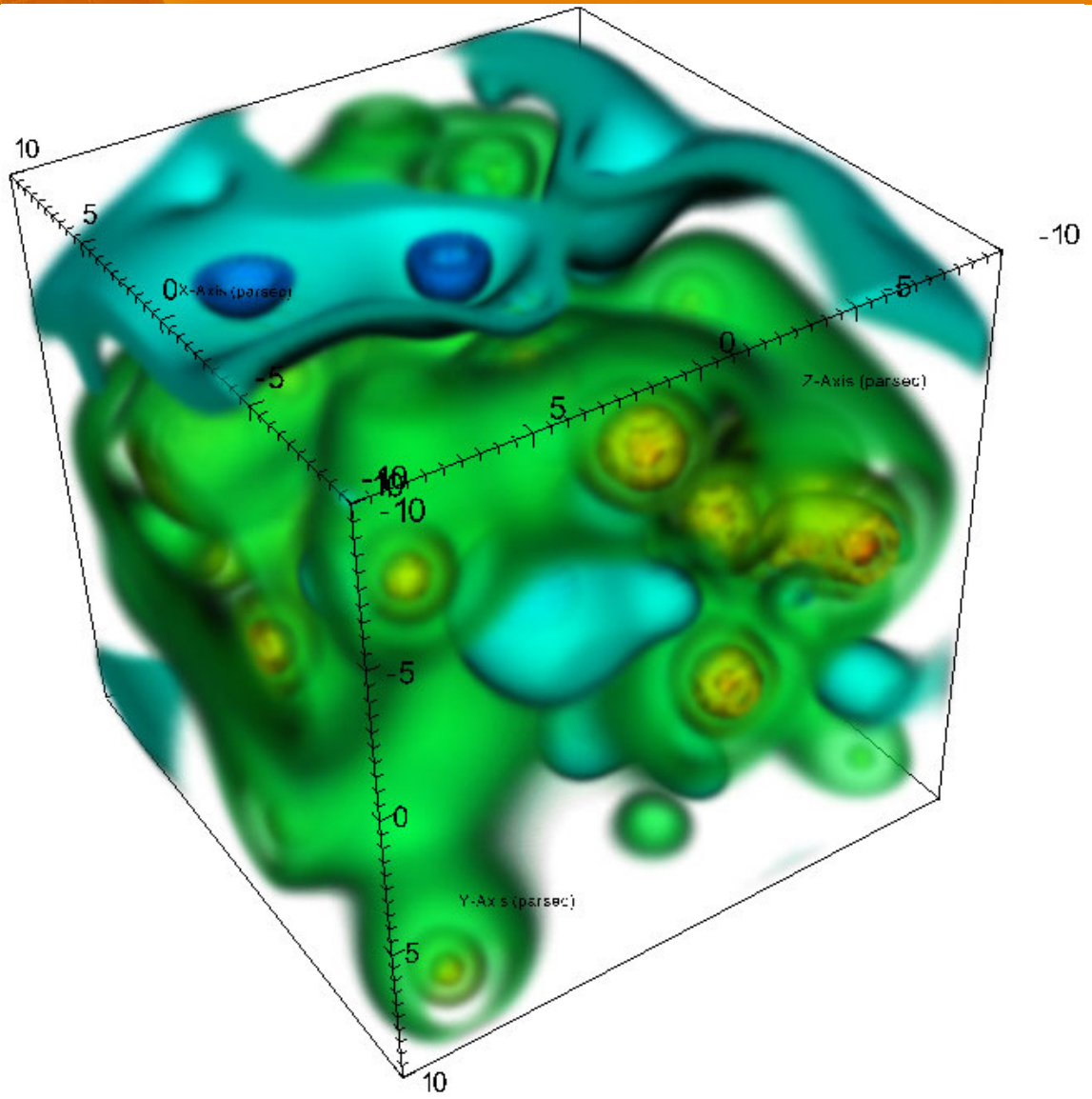
The **contour plot** is used to display lines of constant temperature on a planar slice through a simulation of a gas-burning furnace.



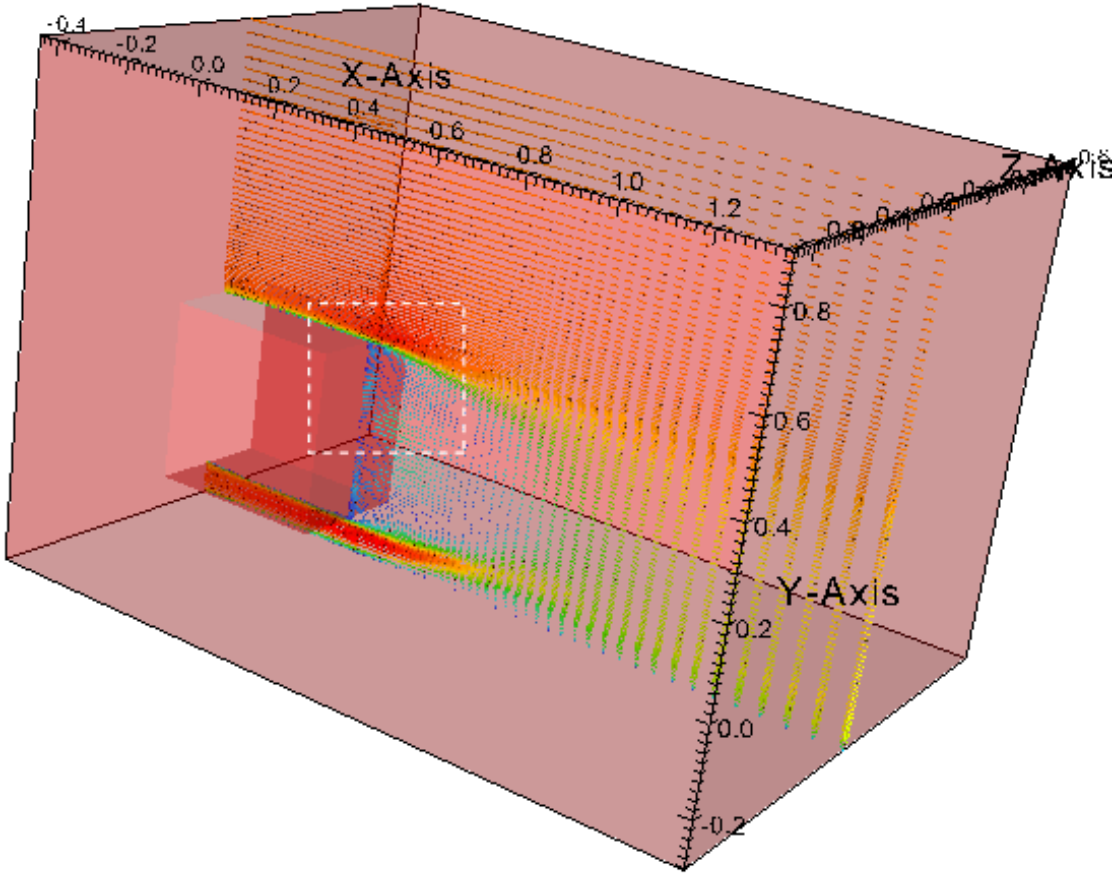
The **pseudocolor plot** is used to map temperature to color on the same planar slice.



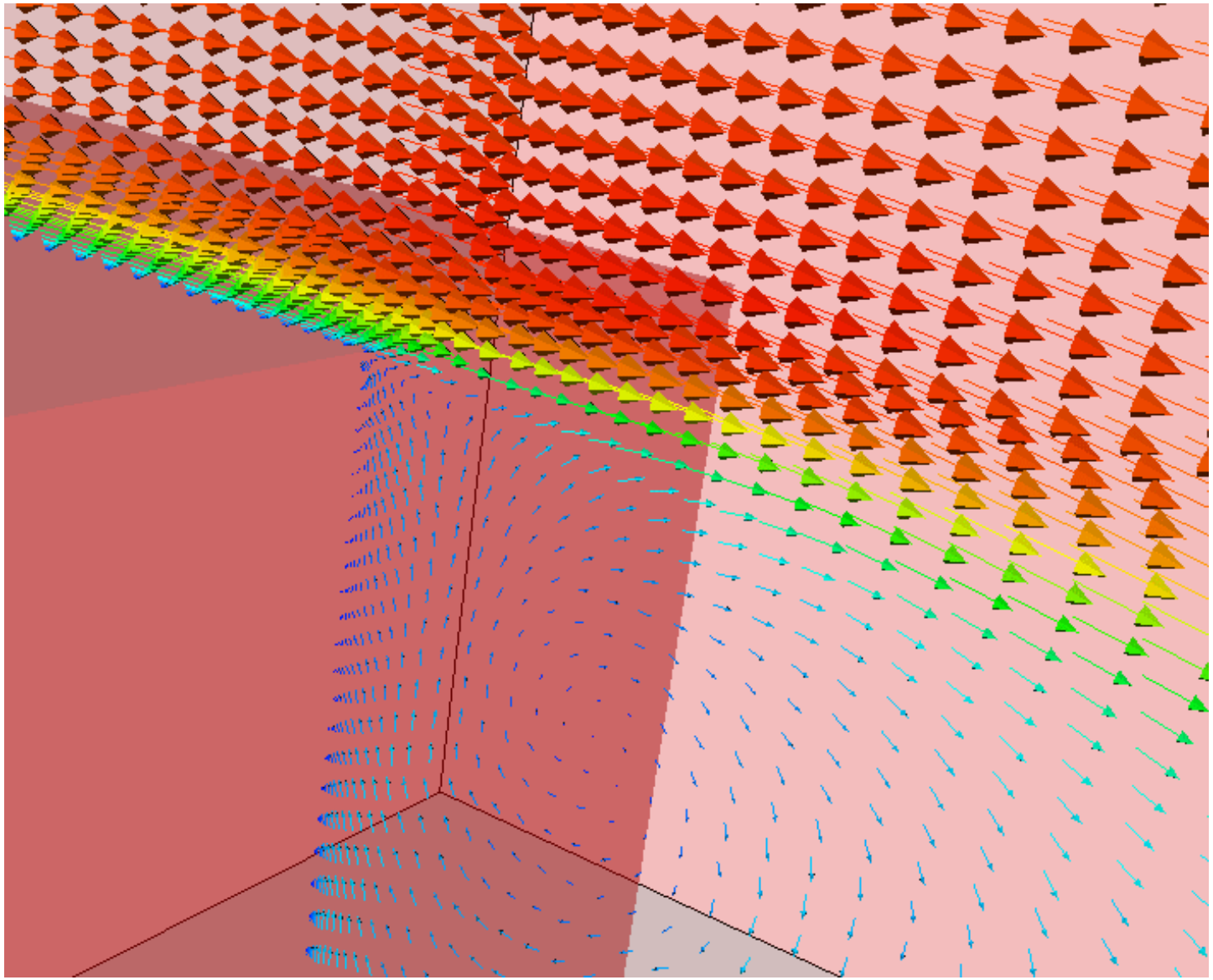
The **contour plot** is used to display surfaces of constant value through a three-dimensional volume.



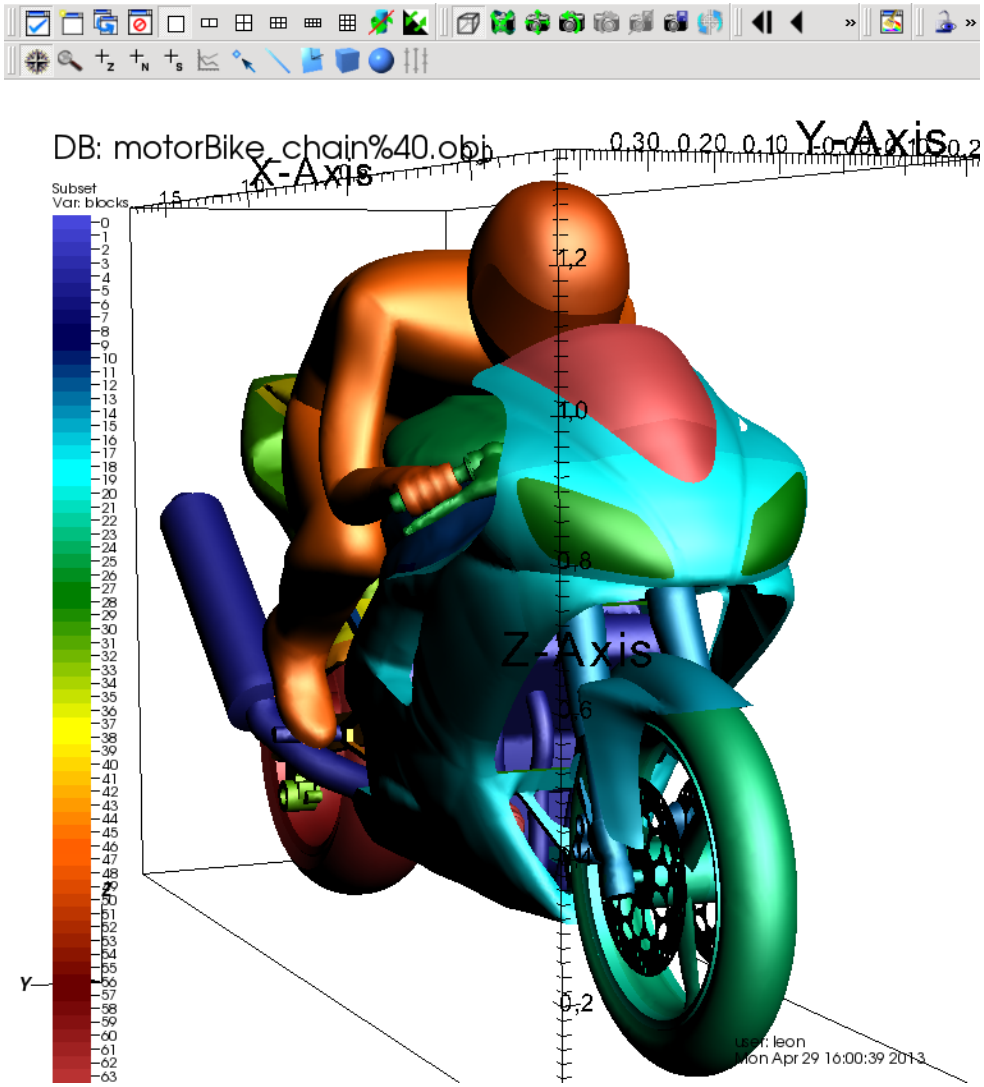
The **volume plot** allows the potential to visualize all the data within a three-dimensional volume by mapping scalar values to an opacity and color value.



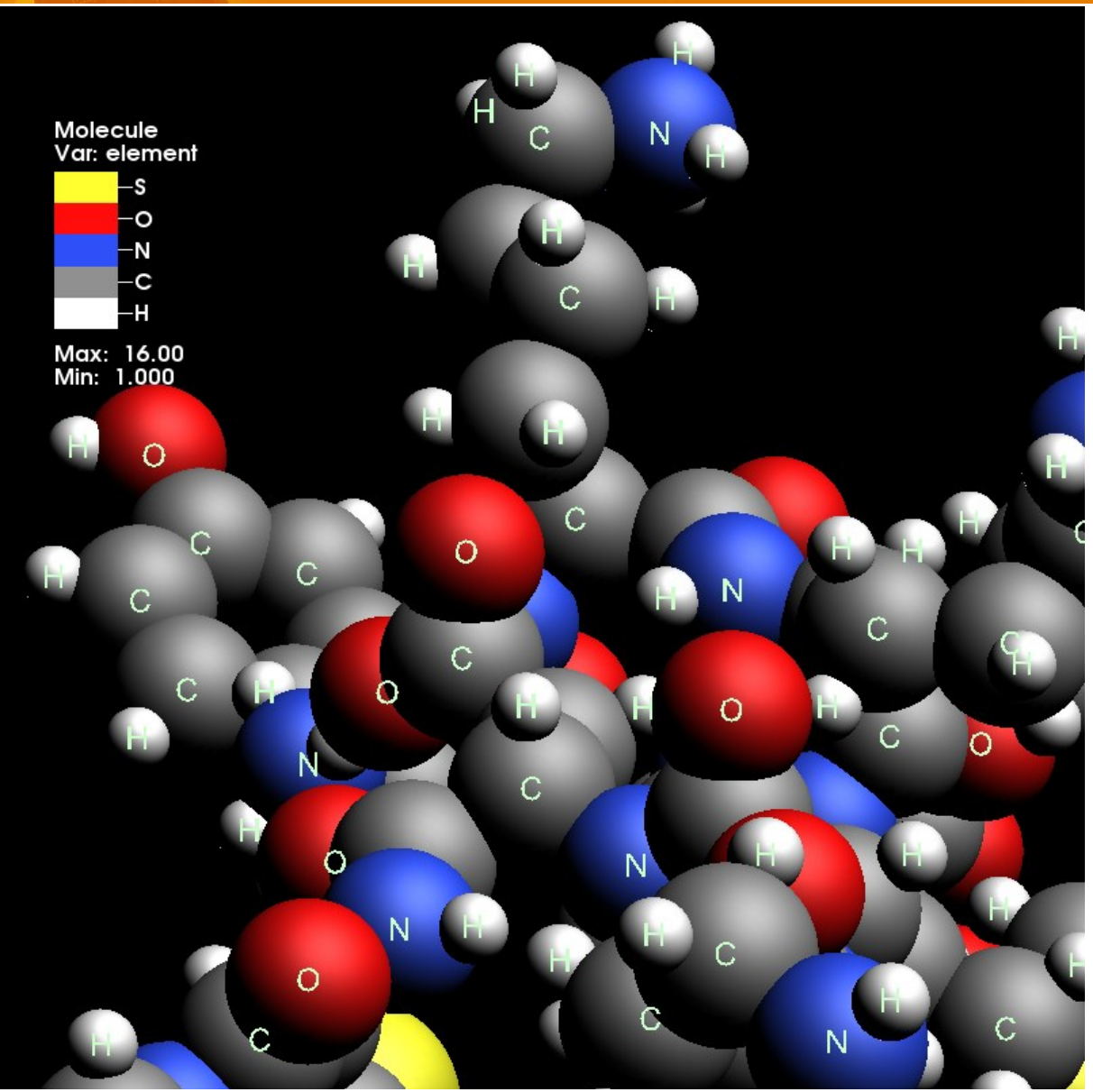
The **vector plot** allows the ability to visualize vector fields by placing arrow glyphs within the vector field indicating direction and magnitude.



The **vector plot** close up showing the turbulant flow directly behind the box.

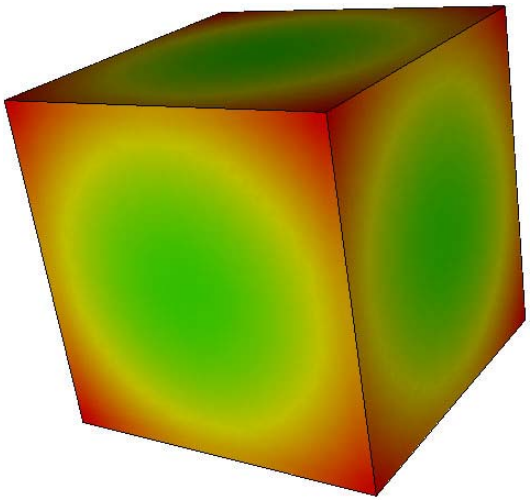


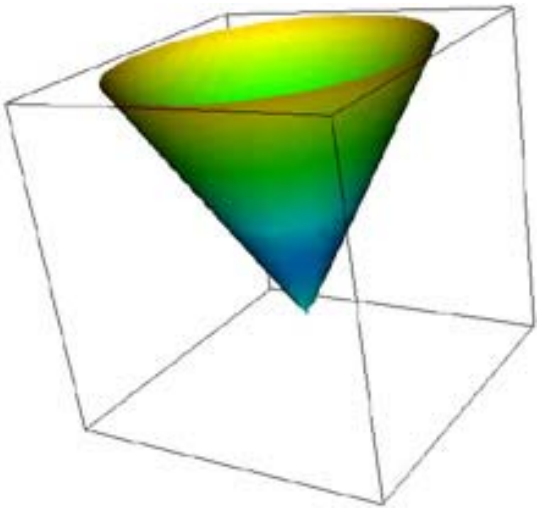
The **subset plot** is used to display different parts of an assembly. Portions of the assembly can be selectively turned on and off..

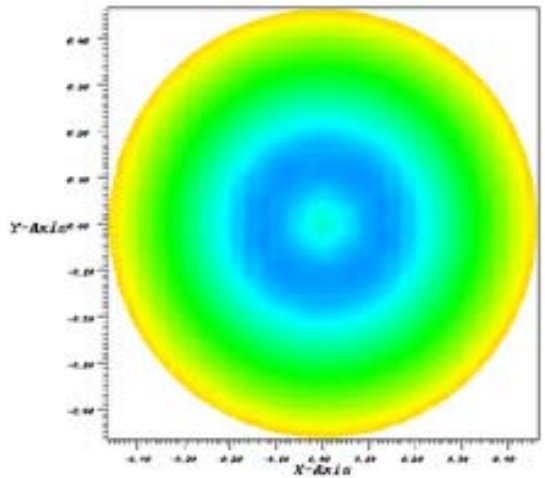


The **molecule plot** is used to display molecular structures within VisIt. The Molecule plot can render molecules using different techniques, including those shown. VisIt's **label** plot can also be used to add the element names or molecule names to the visualization.

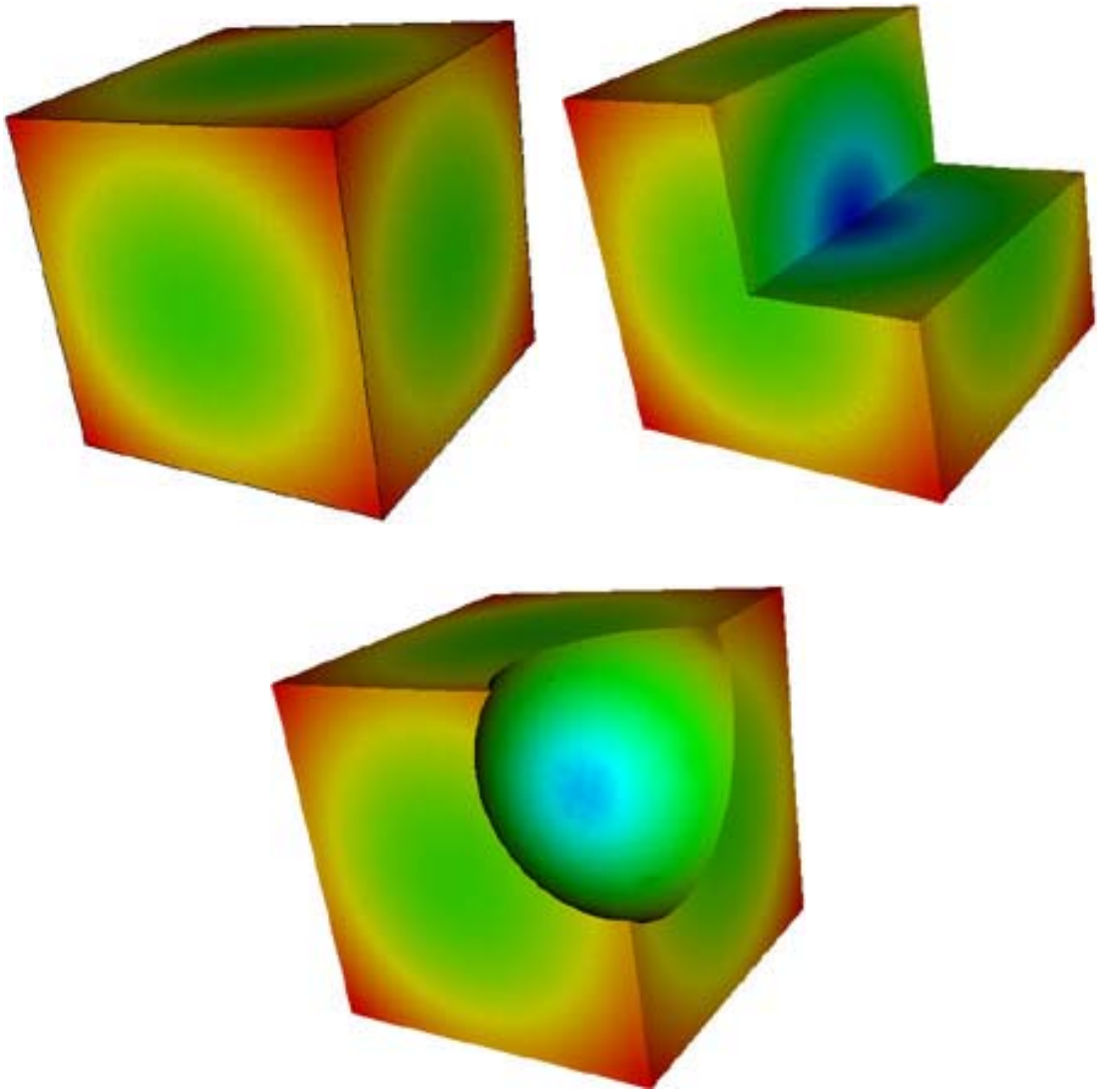
Operators (filters)



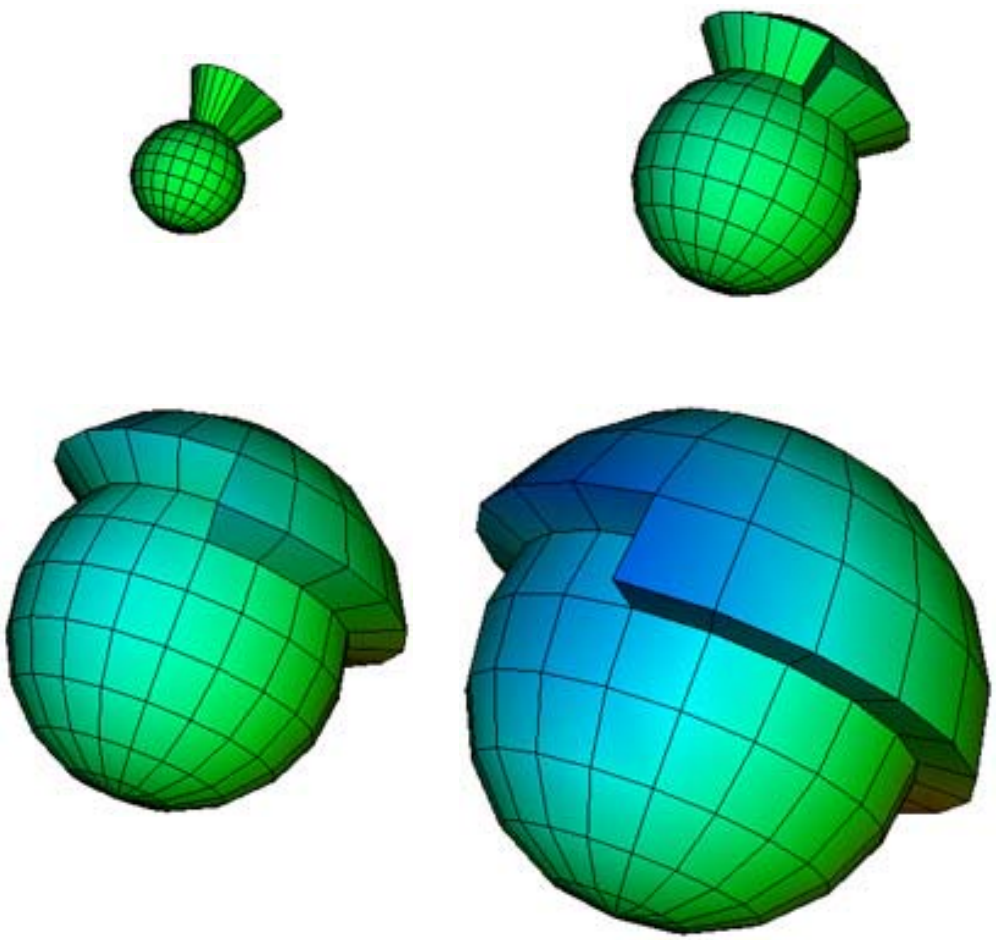




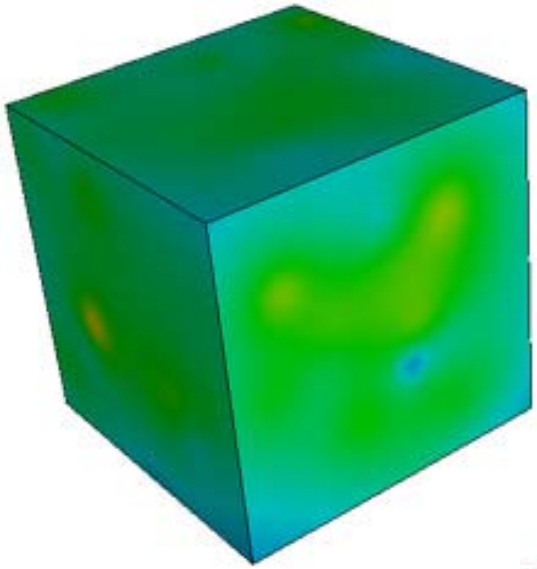
The **cone** operator is used to display data on the surface of a cone. The first image shows a field on the surface of the volume, the second image shows the field on the surface of a cone, and the third shows the field on the same surface mapped to a two-dimensional coordinate system.

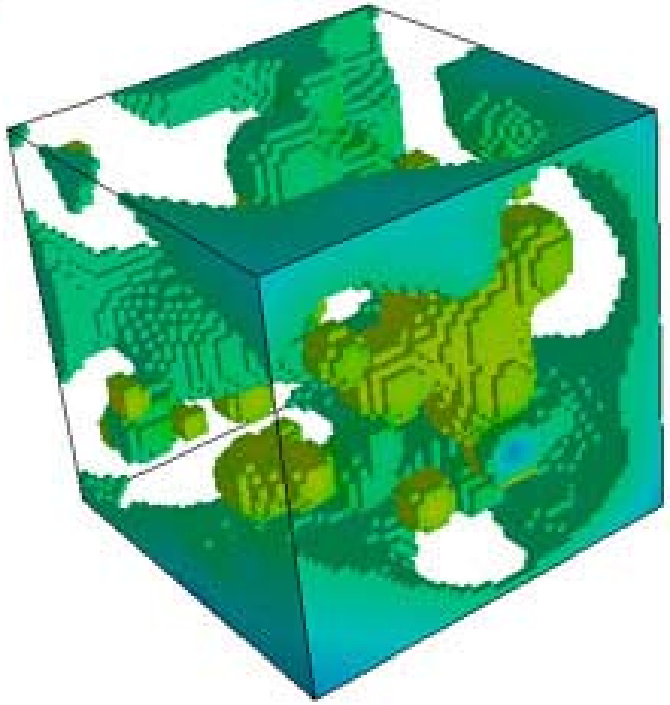


The **clip operator** is used to remove regions of a three-dimensional volume. The first image shows the entire volume, the second image shows a rectangular region removed from the volume, and the third image shows a spherical region removed from the volume.



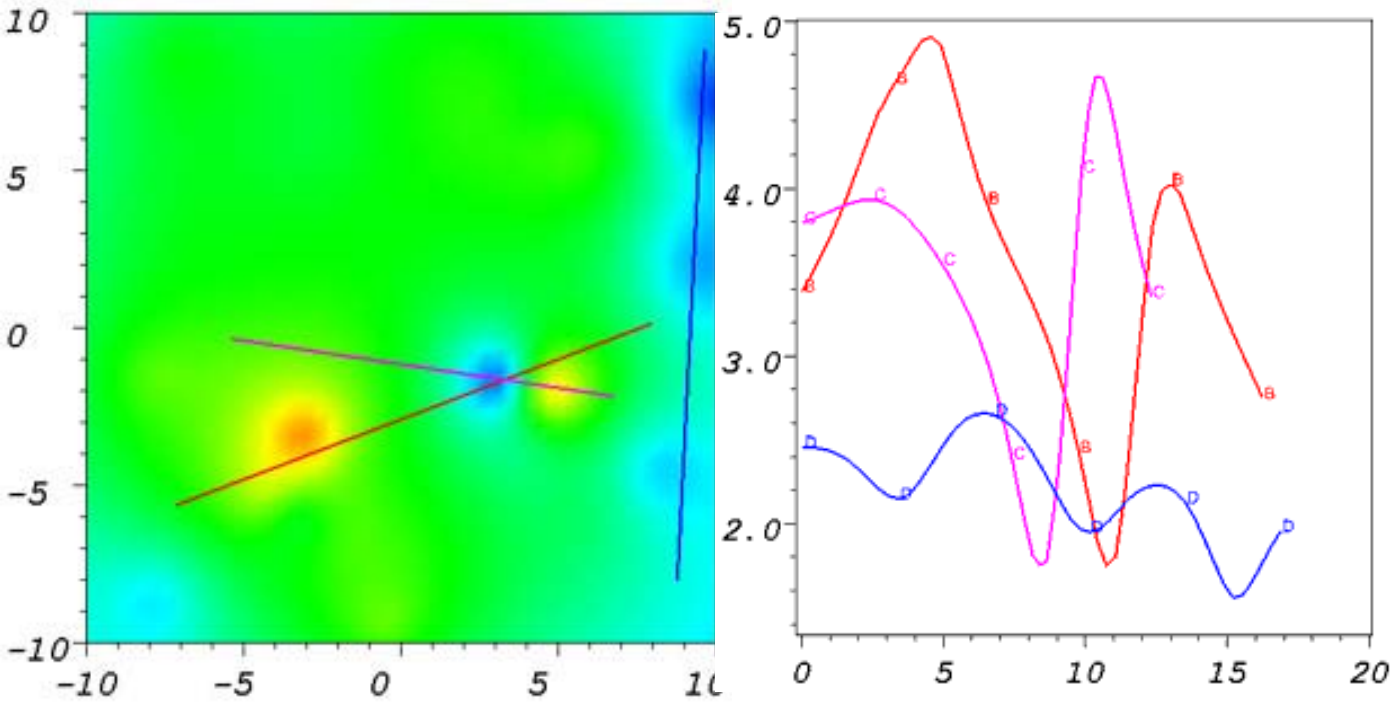
The **onion-peel** operator is used to display fields in a local region around a cell. The series of images shows the onion-peel operator used to display a seed cell and successive layers of cells around the seed cell.



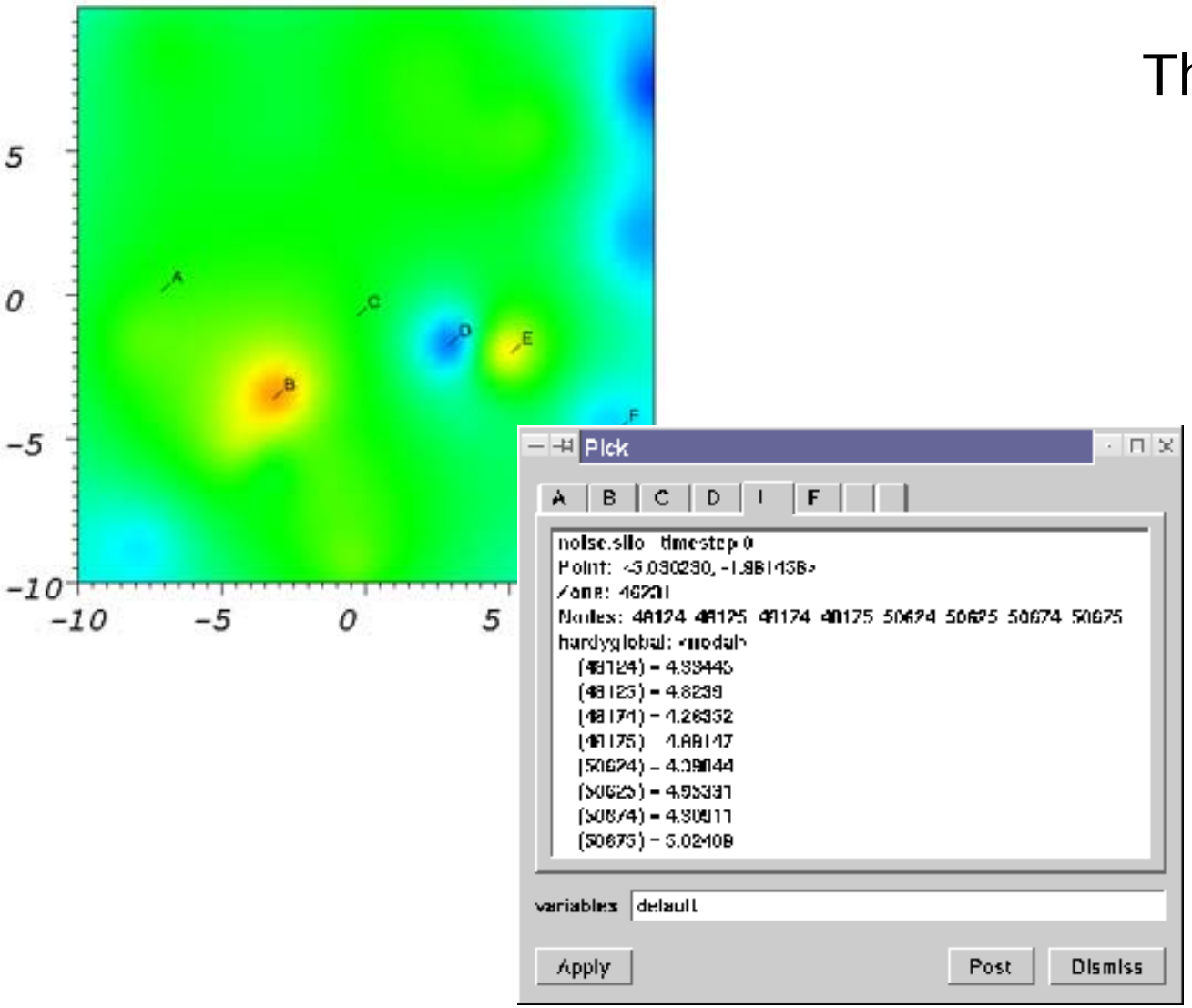


The **threshold** operator is used to display cells where a scalar field value falls within a specified range. The first image shows the entire three-dimensional volume. The second image shows only the cells where the scalar field values are above a specified value and below another specified value.

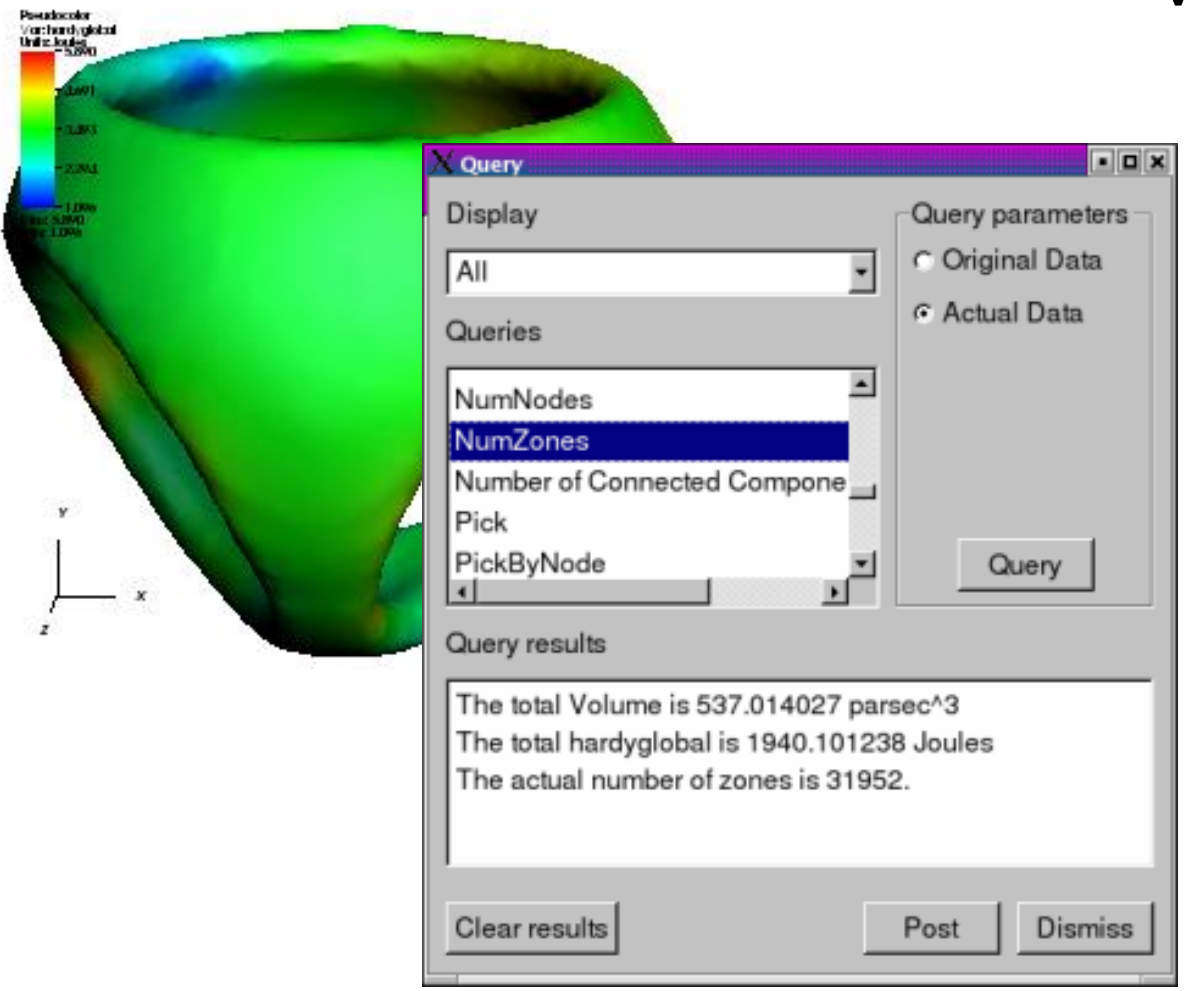
Data exploration



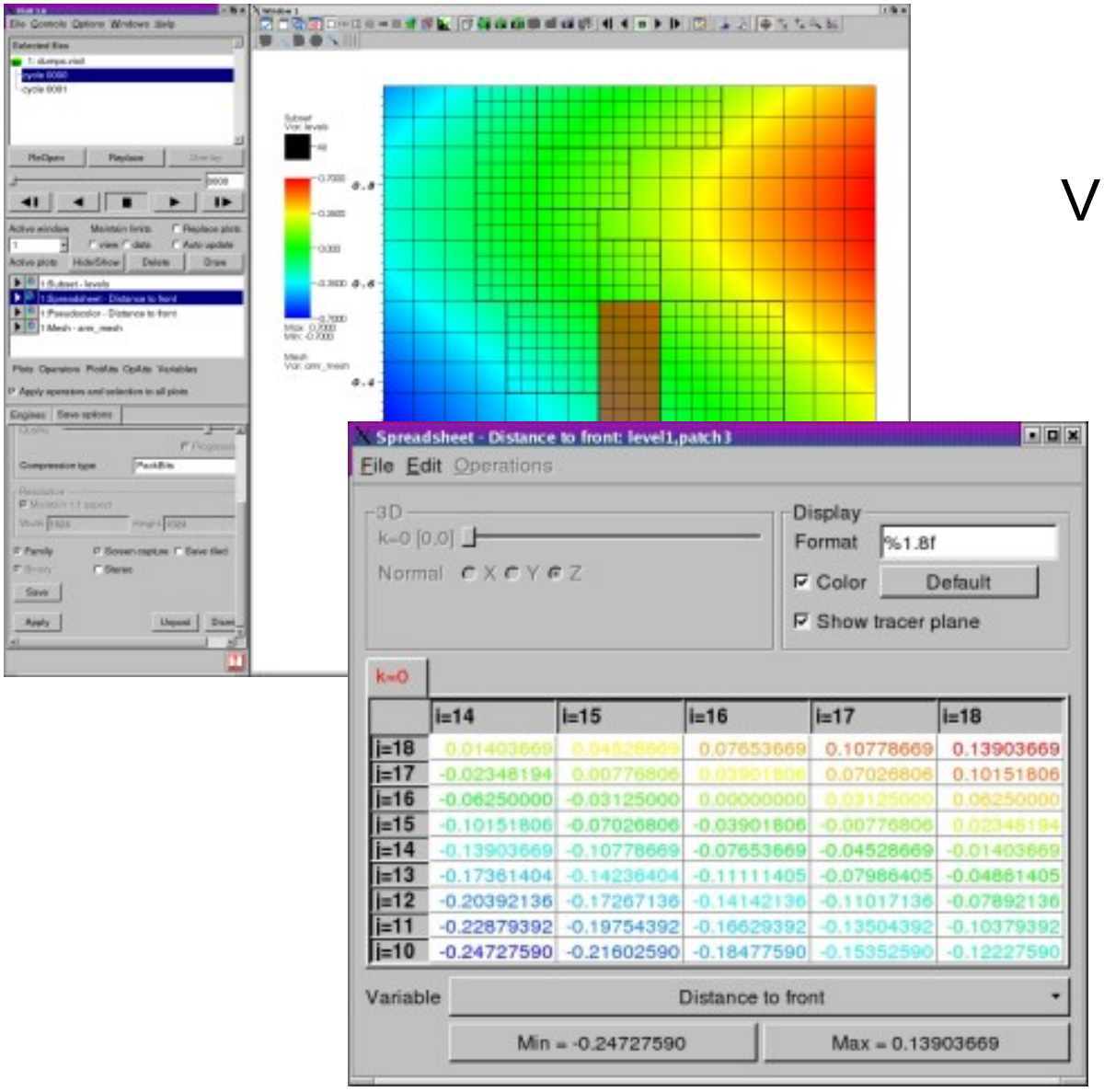
The **line-out** creates curves of field values as a function of distance along the line. The first image shows the scalar field and the lines through the data used to create the curves. The second image shows the resulting curves.



The **pick** operation returns information about selected points including location, cell ID, node IDs, and field values. The first image shows the scalar field and the points that were picked. The pick output window shows the information about the selected points.

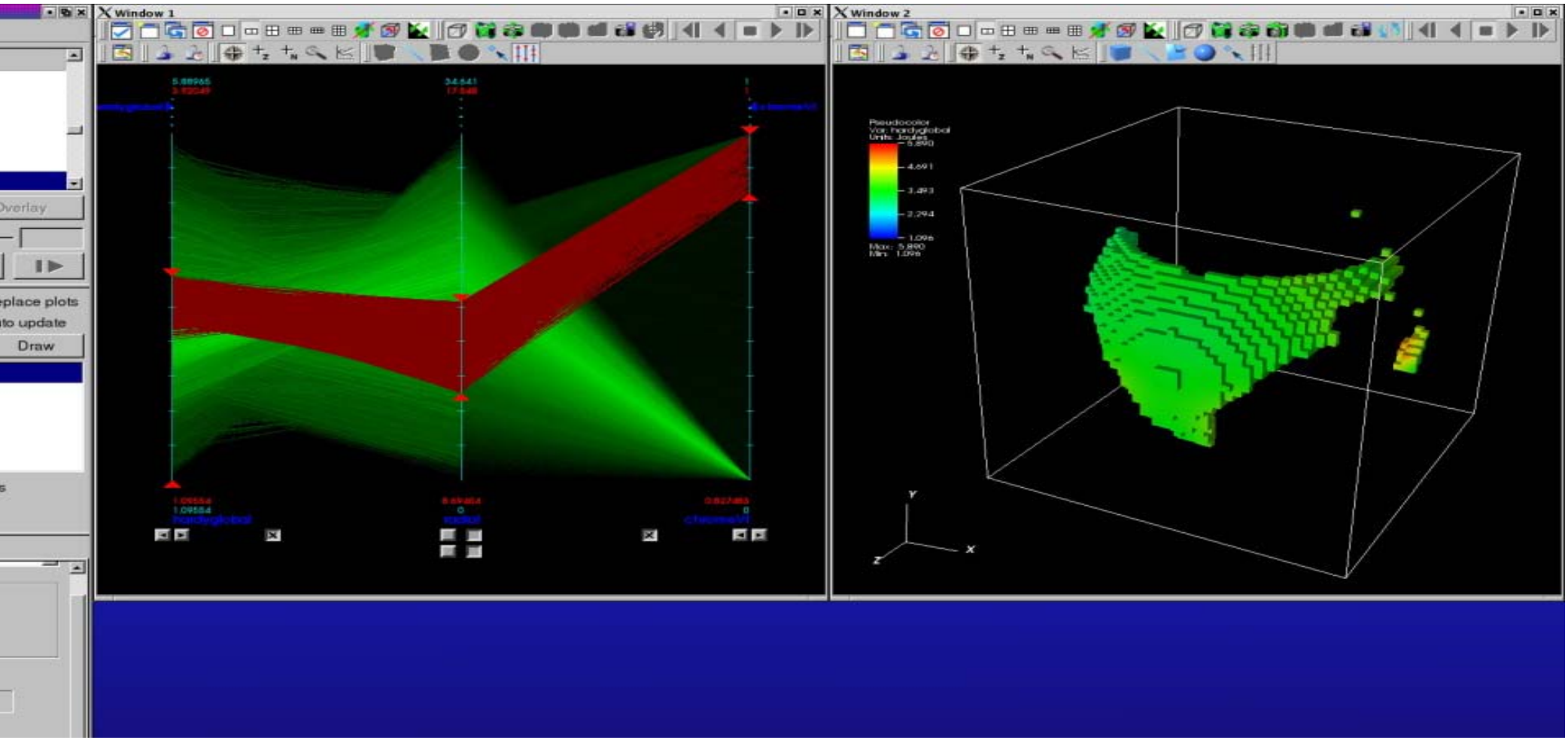


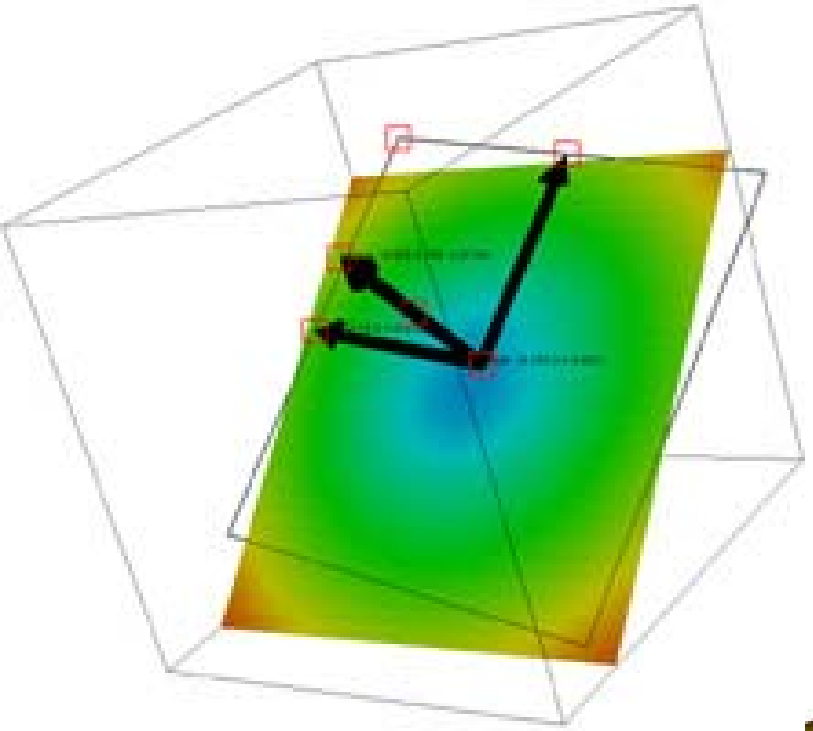
VisIt allows you to gather quantitative information from a scientific dataset through **queries**. A query is a type of calculation that can return values from a dataset or values that are calculated using data from the dataset. Some queries can even be executed for all of the time states in a scientific dataset to yield a Curve plot of the query's behavior over time.

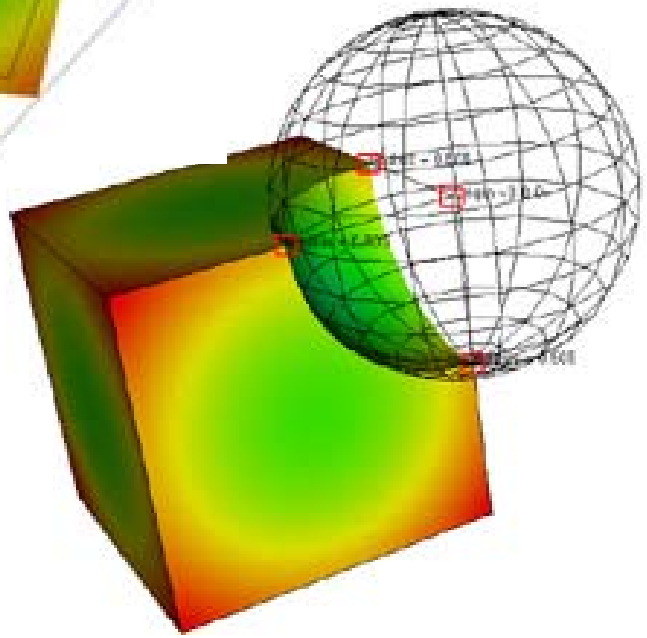


VisIt provides a **Spreadsheet plot** for direct examination of a scientific dataset. The Spreadsheet plot displays data in table format and allows users to slice through 3D data interactively.

Explore multivariate data using VisIt's **ParallelAxis plot** and locate trends and interactions between variables.







VisIt contains tools to interactively **position geometric shapes** used by the operators. The first image shows the **plane** tool, used to interactively position a plane. The second image shows the **sphere** tool, used to interactively position a sphere. VisIt also includes a **box** tool, a **line** tool, a **point** tool, and an **extents** tool. .

VisIt unique features

- Session store/restore
- Posting windows
- Java interface jVisIt
- Python/Qt GUI scripting
- XSLT plugin development
- SimLIB instrumentation
- Many formats for read/write (silo).
- Animation and keyframing
- Well documented