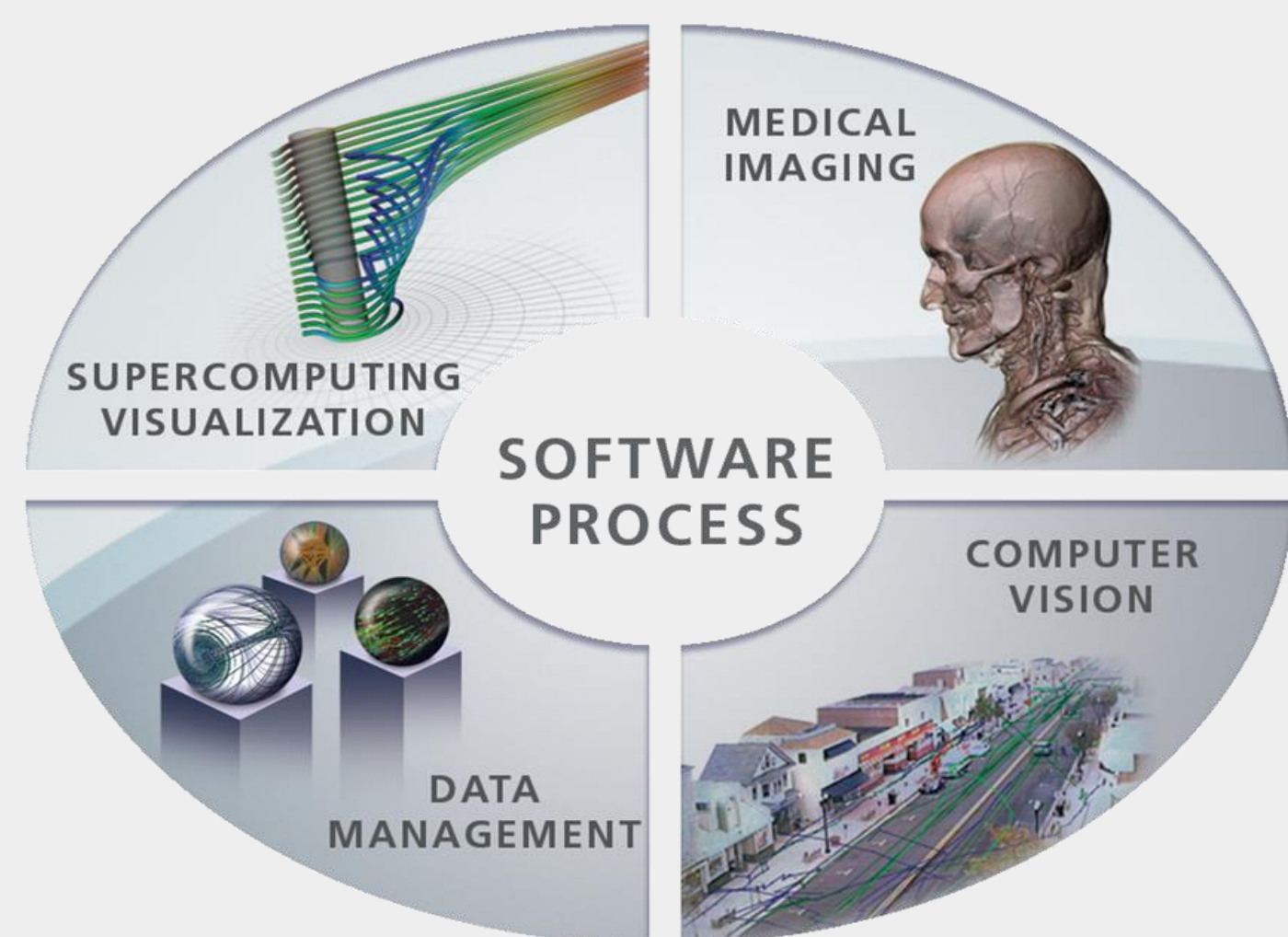# ParaView v5.7
Features Quick Peek

About Kitware

- Software Development Company
- Primarily work in Open Source
- Founded in 1998
- 140+ employees and growing
  - 3 offices in the US
  - 1 in Europe founded in 2010
- Focus in
  - Scientific computing
  - Large data visualization
  - Medical image processing
  - Informatics
  - Computer vision
  - Scientific data publishing
  - Quality software processes

What is ParaView ?   www.paraview.org

An **application** and **architecture** for **display** and **analysis** of **massive** scientific datasets:

- **Application** - you don't have to write any code to analyze your data
- **Architecture** - designed to be extensible if you want to code
  - Notably custom apps (ParaViewWeb), plugins and python scripting
- **Display** - excels at traditional sci vis qualitative 3D rendering
- **Analysis** - data drill down through charts, stats, all the way to values
- **Massive** - scales from netbooks to worlds largest supercomputers

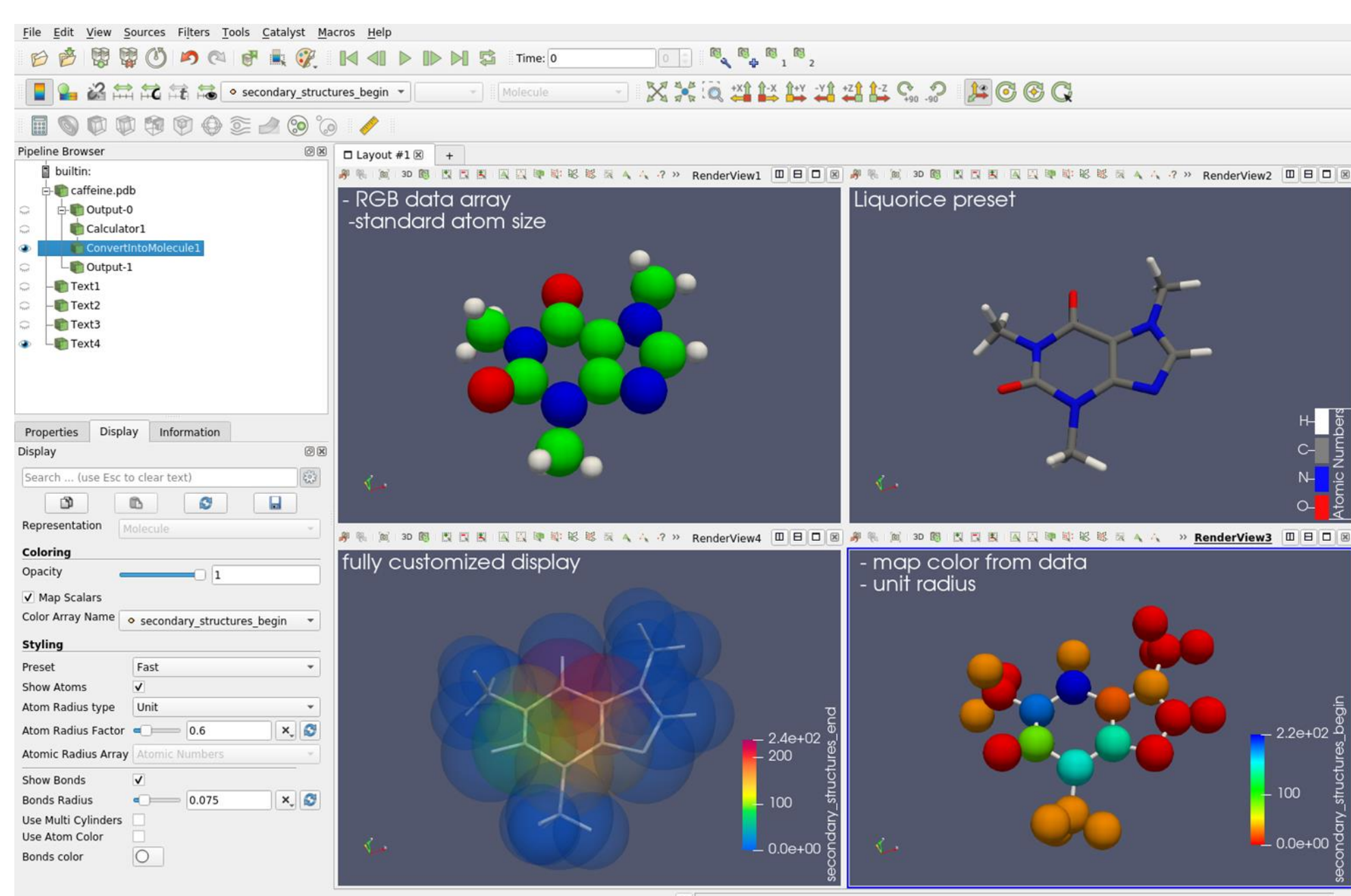Strength is its flexibility - *you create arbitrary pipelines with it.*

Molecular Visualization

ParaView allows a more finer way to control the molecule display. In addition to the existing presets, each underlying parameter as atom radius or bond coloration are now accessible through the interface. By default ParaView uses standard value for color and radius following the atomic number, but it can be overridden by a custom data array - see Figure 1.

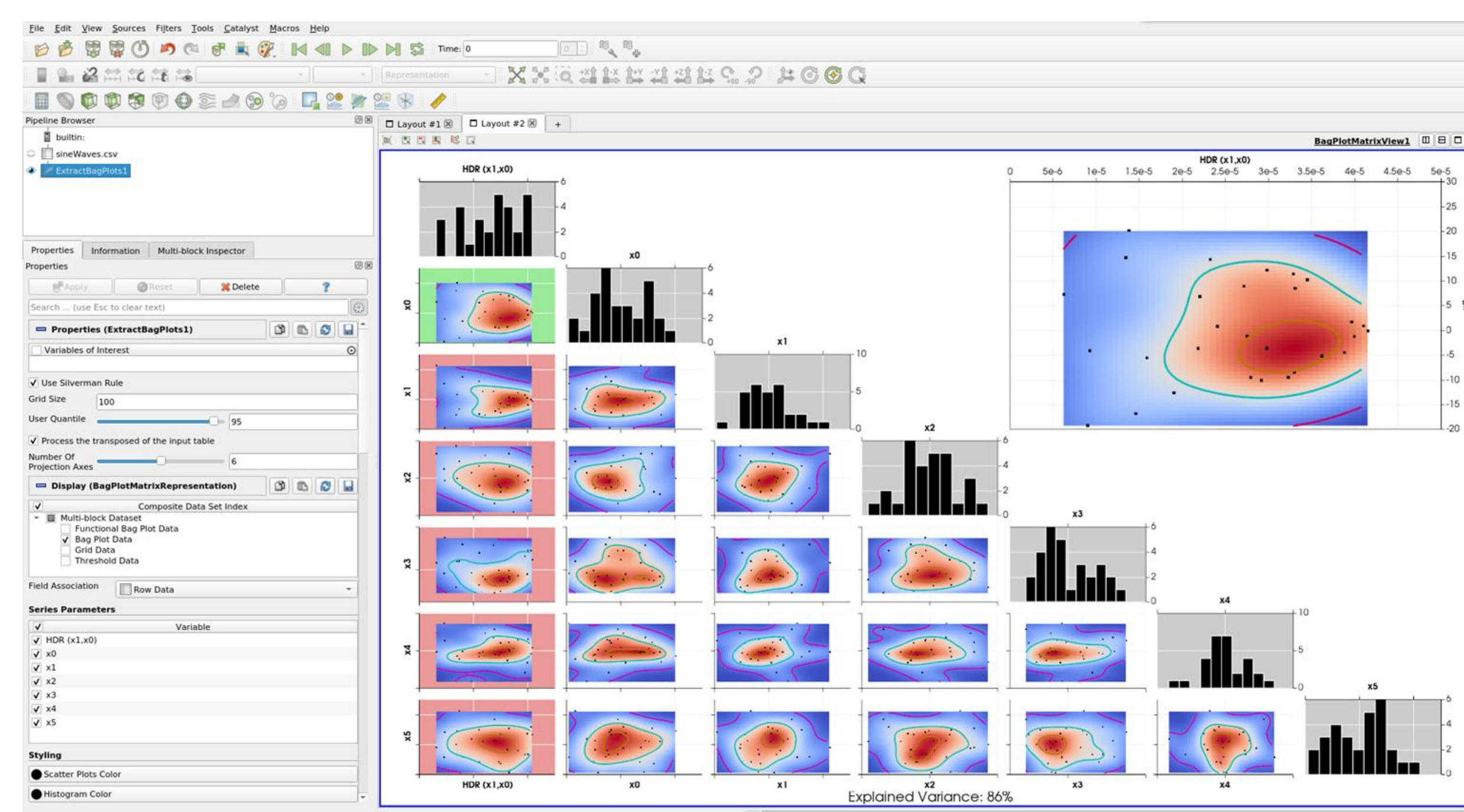In addition, the list of filters supporting molecule is growing, e.g. with the *Calculator*.

Figure 1: Improvement of the Molecule representations:

Dedicated Bag Plot Matrix View

The *ExtractBagPlot* filter is now much easier to uses with a new option to specify the number of projection axis to uses and a dedicated *Bag Plot Matrix View* - see Figure 2.
This view automatically shows the correct data and also extract the associated variance.
Note that using this feature in conjonction of OpenTURNS analysis tools might improve your data-analysis workflow.

Both filter and view are now available through a dedicated plugin.

Figure 2: Example Visualization with Bag Plot Matrix View

Panoramic Projection View Plugin

This plugin brings a new Render View in ParaView called *Panoramic Projection View*. This view captures the scene 6 times with 6 different camera directions and combines them into a single projected image that can be visualized using a VR device, a dome screen, a cave, etc.

Two projection types are currently supported:
- Equirectangular projection, like the world map usual representation, see Figure 3;
- Azimuthal projection, also known as fish-eye.

It is also possible to specify the desired angle, from 90° to 360°, in order to get the correct output depending on the targeted device.
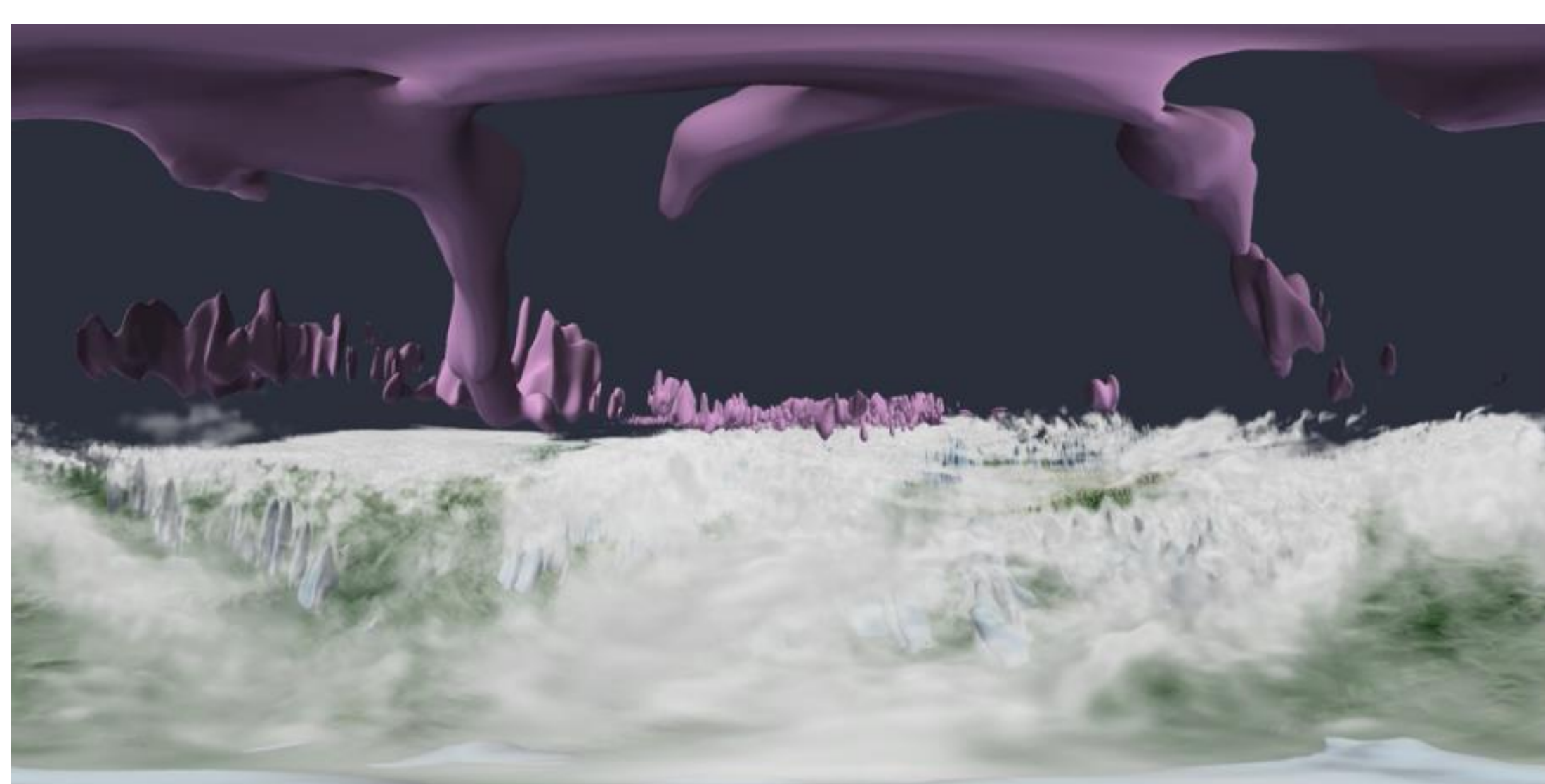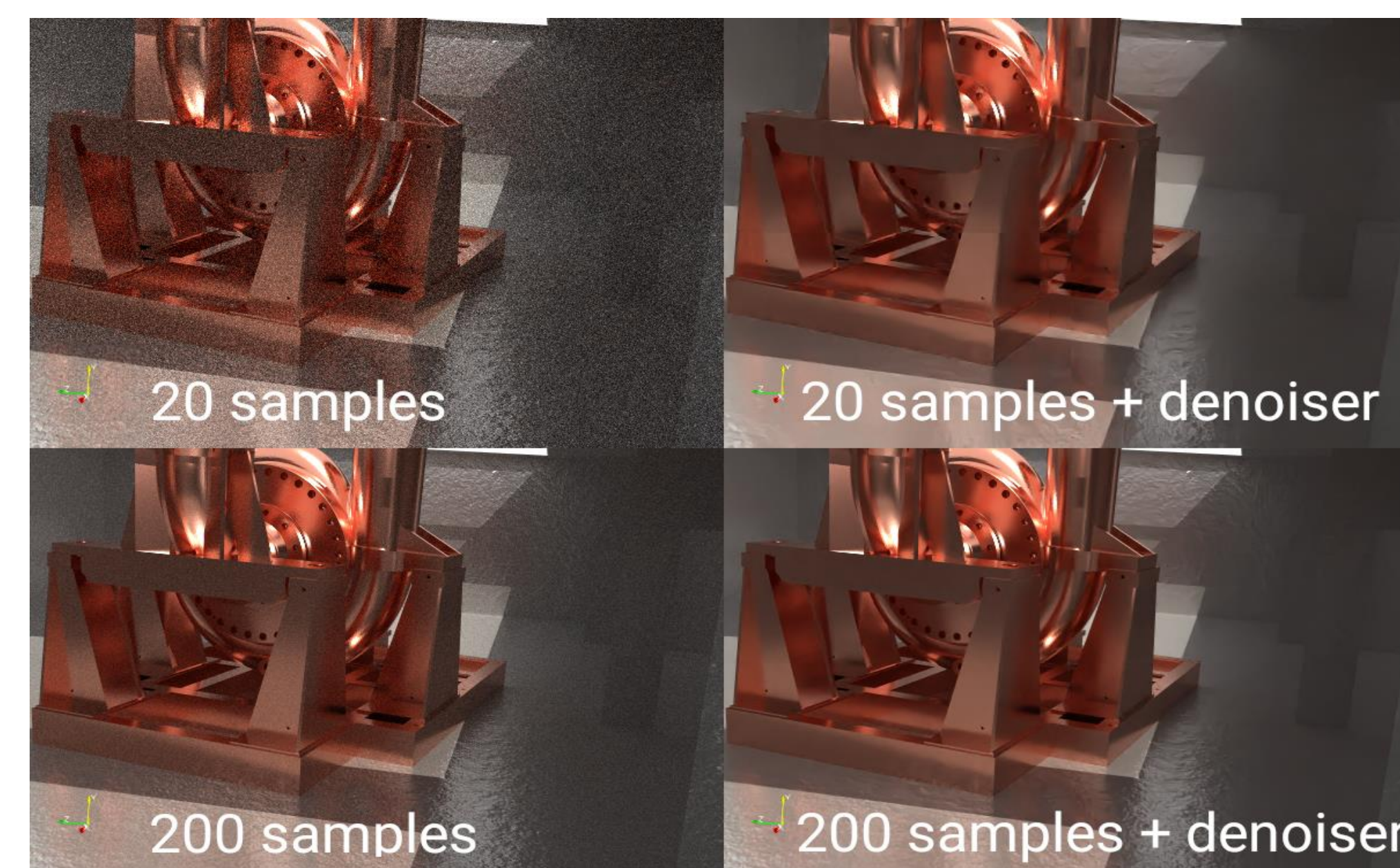
Figure 3: Real-time 360° projection of a scene mixing volume rendering and isosurfaces. This panoramic visualization can be reconstructed with a VR device. Dataset by DKRZ.

OSPRay's Path Tracer Denoiser with Open Image Denoise

OSPRay's Path Tracer has been introduced recently in ParaView 5.6. It allows realistic rendering of surfaces with complex materials. When the scene is complex (see Figure 4), a high number of samples per pixel is required in order to attenuate the noise in the rendered image.

A new feature allows now to post-process the rendered image using AI-accelerated technology *Open Image Denoise* developed by Intel without noticed computational overhead. This process uses the current RGB image combined with internal images (depth buffer and normal buffer) in order to suppress the noise with its deep learning approach.

20 samples | 20 samples + denoiser
200 samples | 200 samples + denoiser

Figure 4: Comparison of OSPRay with and without denoiser. Dataset by EDF.

Mathieu Westphal   mathieu.westphal@kitware.com
Joachim Pouderoux   joachim.pouderoux@kitware.com
Michael Migliore   michael.migliore@kitware.com
Nicolas Vuaille   nicolas.vuaille@kitware.com

Kitware SAS
6 cours André Philip
69100 Villeurbanne, France
www.kitware.eu