The Visualization Process

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10 Steps to Creating a Scientific Visualization

1. *Get the data.* Find out something about it. Is it 1D, 2D, or 3D? What are the units? What is its coordinate system? If a map, what is its map projection? What is its spatial dimension? What is its data dimension?
2. *Formulate a scientific strategy*. What do you want to know about the data? How do you want to show it? Are you confirming something expected? How do you know this is what is expected? Are you trying to uncover something unexpected?
3. *Formulate a user strategy.* Who do you want to show this to? What are their backgrounds? What final format/medium do you need it in? Color or grayscale? What transfer function? Static or dynamic display? Monoscopic or stereoscopic? Should you worry about color blindness?
4. Import the data. (This often takes way more time than you would *ever* imagine …)
5. Create a *simple* program, network, script, etc. Point clouds work well.

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6. Use the simple program to confirm that the data is being handled correctly.
7. Incrementally embellish the display. Save it often! Show it to the consumer often!
8. Choose what quantities you want to interact with. Change the interaction styles to match the quantities being modified. For example, compass direction quantities should be shown and interacted with in angular coordinates.
9. Create the necessary titles, labels, legends, etc., especially if this will have to stand on its own. Be sure to include units!
10. Create the final output. Pay attention to your color choices, your contrast, color gamuts, color blindness, and the resolution!

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