

## Implementing a 3D Visualization Tool for Water Column Data

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The goal of my project was to implement a 3D visualization tool for water column data. Water column data (WCD) is obtained by lowering a probe into the ocean, with the probe recording values for temperature (DEGC), salinity (PSU), oxygen (ML/L), fluorescence (UG/L), and transmission (%) at constant intervals of pressure (DB). Thus the data is discrete, but has enough values that it can give the semblance of a continuous data set with a little shading. The visualizer first takes the latitude and longitude of each probe cast and places a circular SurfaceShape at that point. Thus the user can see the exact location of the data on a 3D globe that is constructed by WorldWind. The user is then able to click on the surface shape, at which point the data are used to compute an image that represents the datum values as scaled RGB color values. Since the data is representative of a vertical line through water, a vertical column is used to display the image. The image is wrapped around the column as a texture and displayed to the user above the location of the circle. The user is also able to interact with the columns themselves. Rolling the mouse over the column displays a line on the circumference, the height of which can be controlled with the height of the mouse. The top of each column then displays its particular color at the depth of the black line. The depth is also displayed as an annotation on the lower part of the screen. This final feature enables the user to view an isobar across the selected data set. It is my hope that this tool will better enable researchers to easily understand new data sets. Future improvements include re-factoring to improve clarity of program, modification of internal data structures for better memory use, more flexible data input, selection of data isopleths and user control of color scale to highlight specific data ranges.