

Ocean Data View goes Online

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Ocean Data View – desktop versus online versions

Ocean Data View (ODV; <https://odv.awi.de/>) is a popular software package for the analysis, exploration and visualization of oceanographic and other environmental data. ODV has more than 80,000 registered ODV users, and, based on recent software download logs, more than 10,000 active users. ODV-created graphics material is regularly published in textbooks as well as scientific journals, including high-level journals, such as *Nature*, *Science*, *PNAS* and *PlosOne*. ODV plays a fundamental role in the SeaDataNet (SDN), SeaDataCloud (SDC) and EMODnet projects, and is employed for data import, parameter aggregation and harmonization as well as for data quality control. The resulting large aggregated data collections are shared as ODV collections.

In the classical desktop configuration, a user installs the ODV software on the computer and then copies the datasets to be worked on to the same machine. The computer can be connected to the Internet, but this is not a requirement. ODV runs successfully in remote locations, with poor or no Internet connection at all. This configuration is ideal when working with private datasets and sharing with colleagues or communities is not intended or not a priority.

When working with large community datasets, however, such as the World Ocean Atlas (<https://www.nodc.noaa.gov/OC5/woa18/>), GO-SHIP and CLIVAR global ocean repeat hydrographic data (<https://cchdo.ucsd.edu/>), or aggregated regional SeaDataNet collections (<https://www.seadatanet.org/Products/Aggregated-datasets>), the desktop ODV configuration has drawbacks. Usually, community datasets are very large and use up significant amounts of precious disk space. Scarcity of storage space, especially on laptops, often sets limits to the selection of datasets that can be analyzed and worked with simultaneously. Making copies of the datasets on every client computer not only wastes storage, these copies also become outdated and need to be refreshed, whenever new versions of the datasets are released.

To overcome these drawbacks, we have developed and implemented webODV, a second, online version of ODV. webODV works in a client/server configuration as shown in Figure 1.

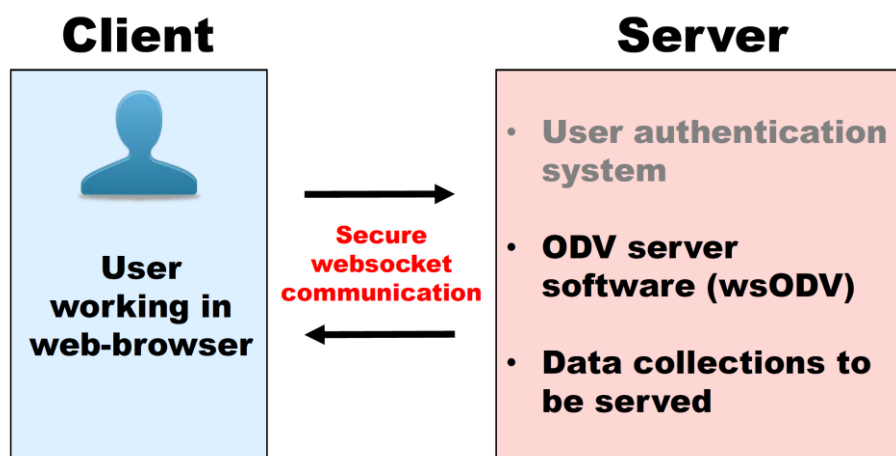


Figure 1: webODV configuration

webODV Configuration

In the webODV configuration (Fig. 1), datasets as well as the ODV software reside and run on a dedicated server machine, not on the client computer. All that is needed on the client computer is an up-to-date web browser (Chrome, Safari, Edge, Firefox). The client communicates with the server over the Internet using secure websocket communication. The ODV running on the server (wsODV) is a special version of ODV containing an embedded websocket server in an otherwise fully functional ODV application. Websockets are a relatively new web technology providing a permanent, bi-directional connection with very low latency. This is crucial for a responsive, interactive user impression. The actual client/server communication uses a set of JSON-encoded request/reply commands. Both, the special server-side wsODV application as well as the command documentation are public. This allows interested parties to develop and establish webODV webservices of their own.

ODV-online

We are developing a number of web services using the webODV configuration above. One specific service called *ODV-online* aims to provide the look-and-feel and functionality of the desktop ODV in the browser window (Fig. 2). Here the browser window resembles the ODV desktop application window consisting of a canvas with station map and data windows, and metadata, sample data and isosurface value lists on the right side. As in the desktop ODV, left mouse clicks on stations or data points select these items. Right-clicks bring up context menus providing the familiar ODV functionality. Users can download image files of the entire canvas or individual windows and can export the data of the current station set or of individual data windows. The ODV-online interface can also be used to perform data quality control in the same way as the desktop ODV. The *ODV-online* JavaScript code is available to interested parties.

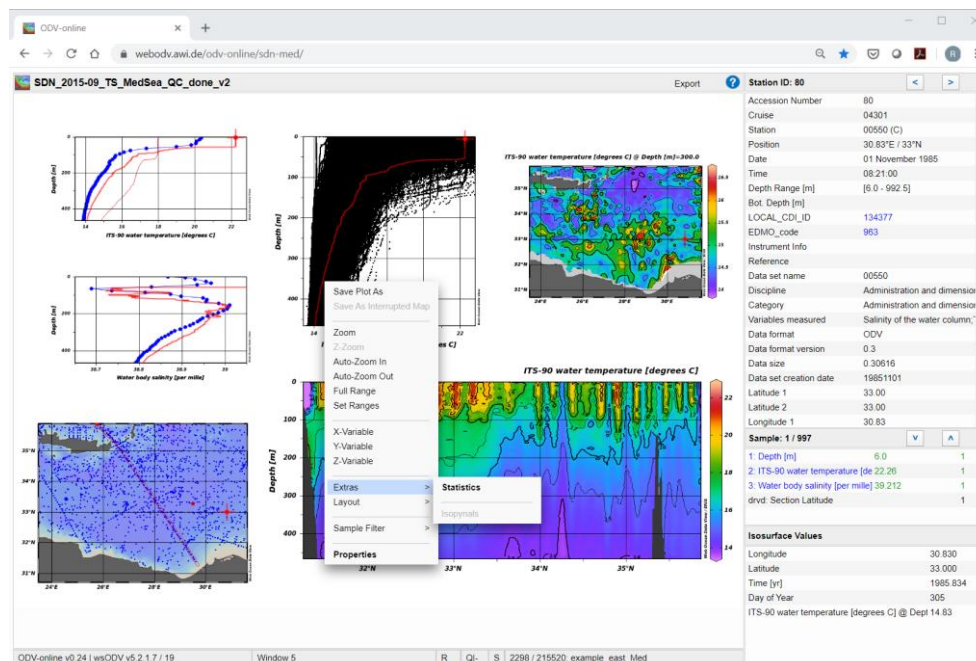


Figure 2 : ODV-online browser interface