

Development Of A Database Of Deepwater Current Measurements (DeepStar)

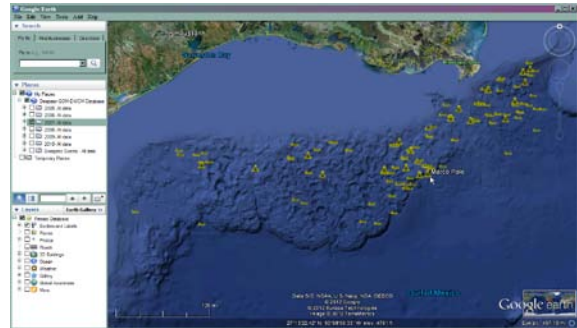
Project Characteristics:

- Database of deepwater current data
- Google Earth Interface
- QAQC and reformatting of BOEM NTL deepwater current data
- Data analysis to identify and evaluate strong current events

Since 2005 the US oil industry has invested tens of millions of dollars to collect ocean current data in the Gulf of Mexico made public through NDBC. The government required program resulted in a massive, multi-year archive of current data for the Gulf of Mexico. Woods Hole Group was contracted by DeepStar Technology Development (an offshore oil and gas industry partnership) for Deepwater Research to create a database of deep ocean currents for the Gulf of Mexico. This database is the first collection of quality-controlled and edited current data in a form convenient for further analysis.

The metadata associated with current records were verified against independent sources of station position information. Current data was subjected to internal and external data inspections. The processed yearly data files from each platform were dissected into separate station files. A specialized Custom Matlab Geographic User Interface (GUI) tool was used to access, edit and visualize the current data and associated TRDI ADCP internal quality indicators. Plots were created for each station data file and reviewed by an oceanographer for evidence of data deterioration from acoustic interference and/or other factors.

Process errors were detected by checking if velocities were consistent with regional circulation patterns. The procedure involved station inter-comparison and comparison of weekly current vectors with Sea Surface Height and Sea Surface Temperature (SSH/SST) charts produced by Louisiana State University/Earth Scan Laboratory (LSU/ESL).



A total of 560 'energetic' events were identified, including five major types (classes) of events characterized by:

- Type 1) Strong near-surface currents with strong velocity shears in subsurface layers (100-200m) – about 290 events;
- Type 2) Mid-water 'jets' without a surface expression – 88 events;
- Type 3) Strong inertial oscillations at mid depth – 60 events;
- Type 4) Strong inertial oscillations near the surface – 28 events;
- Type 5) 'Slab' (vertically homogeneous) flows in a wide layer without a well-defined peak – 60 events.

After the NTL current data were quality inspected and edited they were re-formatted for inclusion into the database. The database includes 546 quality-inspected and edited ADCP current records, for a total of 151.5 years of ADCP measurements, with associated detailed and accurate metadata. The database also includes time series plots of current speed and direction profiles for each record in the database, plots of strong current events, as well as data and graphic access tools designed to assist users in locating specific records and plots of the data. To provide easier and quicker access to the data, we designed and built two data access tools – a Google Earth-based tool that provides a geographic entry point; and a spreadsheet-based tool with a GUI interface that provides a platform-vs-time entry point to access desired station records.