4.5 Lowered ADCP processing on D285/6   Hugh Venables, Raymond Pollard

The 150 kHz LADCP mounted on the stainless steel rosette was used on every stainless cast except for a few shallow ones. Data were copied over to ladcp/raw and then renamed using the directory structure given at the end of this section. The Visbeck processing scripts were used, with modifications developed on Marine Productivity cruises and updated a little. The major improvement was to use the ship-mounted ADCP to constrain the Visbeck fit at the surface. Ascii files were created from the CTD data, the navigation stream and the ocean surveyor ADCP for the duration of the cast. donavpro was used when the navigation stream had already been processed, donavraw only being used if not as it was much slower. dosurasc created ascii. A master matlab script was left in ladcp/m and this was edited to create the first script ladnnnnn.m (where nnnnn is the 5 digit station number) but then these were recursively copied, renamed and edited in the matlab editor, using the find and replace function to change the cast numbers quickly. The data were copied to the appropriate directory: withSADCP or withoutSADCP.

On some casts the script getdephti.m fails, on the second loop, to find the bottom despite the first loop successfully identifying a bottom close to that expected from the CTD altimeter or PES depth. In order to make it create a bottom track in these cases the script was modified and renamed getdepthioneloop.m and this was called by laproconeloop.m and the ladnnnnn.m was modified to call this rather than laproc.m.

Removal of prompt for type

Due to the need to reprocess all the casts to obtain data without SADCP and the fact that only one instrument (300kHz) was used the prompt for the type of instrument was commented out of the matlab script and set automatically to 'w'. This allowed many casts to be run in one batch by listing the names of each script in an m-file and running that. This saved a lot of time and so it may be worth having different scripts for different instruments if more than one is being used.

With and without SADCP constraint comparison

compare.m and compare2.m were written to calculate the average difference between results with and without SADCP data used as a constraint to the inversion. compare2.m averages over the full depth of all casts whereas compare.m allows the depth limits of the comparison to be entered and only casts with data spanning the limits are included. Comparisons are shown in Table 4.4

It is noticeable from Table 4.4 that there is a greater difference in the surface 500m on deep casts, lasting over 2 hours. This is presumably due to variations in the surface layer being averaged out in the SADCP data. Using this as a constraint to the inversion is therefore acting more to average out short timescale motions than to correct for measurement error in the LADCP instrument as differences are <1cm/s for shallow casts but up to 6cm/s for deep casts. If it is to be used to correct for instrument error then the particular data from the Ocean Surveyor relating to the down and up cast should be

extracted and used separately and if the average is wanted then the Ocean Surveyor data should be averaged over as long as we were on station.

Quiver plots of average velocities

vect.m plots the average velocity of each cast, between specified depth limits, as a quiver plot, with an arrow added for scale. vectbott.m does the same but from the bottom up to a specified height above the bottom.

Directory structure

data61/ladcp/m: Location of all matlab scripts and pstar scripts to process ctd, navigation and SADCP data and the place where data and graphs were originally saved to.

data61/ladcp/m/withsadcp: Results with Ocean Surveyor data used as a constraint.

data61/ladcp/m/withoutsadcp: Results without Ocean Surveyor data.

data61/ladcp/raw: Location of raw data ftp'ed from LADCP PC. Files renamed from nnnnn000.000 to wnnnnn.000 so they are found by matlab script.

data61/ladcp/nav: Location of ascii navigation files, put there when donavpro or donavraw run.

data61/ladcp/ctd: Location of ascii CTD data, put there when doctdasc run.

data61/ladcp/sur: Location of ascii Ocean Surveyor data, put there when dosurasc run.

data61/ladcp/sur/surhidden: Location of SADCP data once it had been used to allow a second run without it being found by the matlab scripts.