ADCP Intercomparison Study
Influence of Drilling Risers/Structures on Acoustic Current Profile Measurements

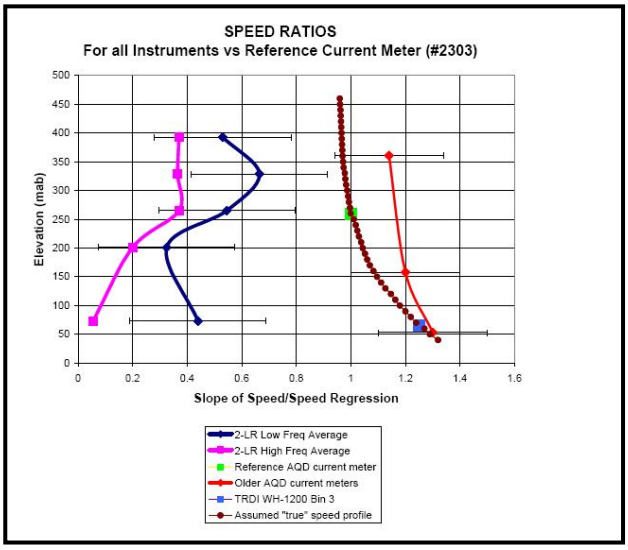
Project Characteristics:

- *Deepwater Moorings*
- *ADCP and Single Point Current Measurements*
- *Joint Industry Project – Offshore Oil and Gas Research*

The Eddy Joint Industry Project (EJIP) funded this study to assess the performance of the TRDI 75kHz Long Ranger ADCP (LR-75) in deepwater in the Gulf of Mexico. Until recently, the LR-75 was the only commercially available deepwater profiling current sensor and was widely used by the oil industry. Anecdotal evidence of poor performance (limited range, questionable data) of this instrument when used in low-scattering environments had been reported, leading the industry to seek alternatives.

Woods Hole Group carried out this study over a three-month period in 2006 at a site water depth of 2000m near a semi-submersible drill rig. The study involved three ROV-deployed ADCPs mounted in tripods on the sea floor – two LR-75s and one 300kHz Sentinel Workhorse ADCP (WHS-300) – oriented such that none of the beams pointed at the riser. In addition, five current sensors of various types were deployed on a short mooring that extended 500m above the sea bed, located 1km from the tripods.

Despite low backscatter conditions, the LR-75s provided apparently-valid data to 350m above the bottom. However, intercomparison of the LR-75 and other current meters, plus a fortuitous removal of the drilling riser for a day, proved that side-lobe interference can cause a general low bias in the measured current speeds. The interference was caused by structural components located beyond the previously considered valid range.



The extent of the low bias varied with distance from the LR-75, but was still in the range of 10-15% at the maximum attainable range (350m). Reflection or reverberation of side-lobe acoustic signals is responsible for these errors.

This unexpected result has significant implications for past and future measurements with this (and other) acoustic sensors, and points to the need to carefully consider error sources when deploying acoustic Doppler instruments in the vicinity of large structures. Interference caused by structures affects the acoustic measurements at a wider range than previously accepted.

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