



## **Developments in the SediView Technique for the processing of ADCP backscatter data to extract suspended sediment concentration profiles in flocculated sediments**

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From its appearance in the 1980's researchers have recognised the possibilities offered by Acoustic Doppler Current Profiler's (ADCP's) as a means of obtaining information on fluid motion and concentration profiles in both muddy and sandy environments.

To date much research effort has been directed in using ADCP's to indirectly observe variations in sandy sediments in suspension using the intensity of the backscattered energy returned from an ADCP and indeed to applications involving mixed suspensions of Sandy and Silty sediments.

Studies of naturally flocculating sediment suspensions have however been limited due to practical difficulties in obtaining measurements of floc properties and the incomplete understanding of the interaction taking place between high frequency sound waves and the flocculated particles whilst those that are available have tended to be based on academic studies utilising multi-frequency acoustic sensors rather than the more ubiquitous Acoustic Doppler profilers used in commercial marine monitoring applications and hence their findings are limited in their application.

In response to the need to provide water column concentration estimates for engineering applications the Sediview<sup>TM</sup> method was developed as a means of analysing acoustic backscatter data collected using standard ADCP profilers by means of a robust field methodology supported by software tools and the approach been applied to datasets collected in estuarine and fluvial environments worldwide through it's application on dredging and maritime engineering projects.

The poster describes the application of Sediview<sup>TM</sup> methodology to the application of determining sediment concentration estimates from flocculated sediments measured at a site located within the Turbidity Maximum Zone of the Thames Estuary, UK, and in particular the application of a dual frequency approach to the problem.

The experimental investigations described focused on the Acoustic backscatter from ADCPs transmitting at two quasi-simultaneous frequencies (1.2 and 0.6 MHz) through a water column dominated by populations of flocs ranging from 100s to 1000s of microns in diameter. The application of flocculation data to a Sediview calibration is demonstrated and comparisons made by implying 'non-flocculating sediment assumptions' to naturally cohesive sediment suspensions, in order to quantitatively demonstrate the importance of using flocculation data for cohesive suspensions when using ADCP backscatter to monitor SPM in predominantly estuarial locations.