

Quality Control – Quality Assurance



Why QC – QA?

Data should always be taken with a grain of salt

**Individuals or groups responsible of data quality
-> person in the loop ... Not practical**

Dissemination of data done with confidence

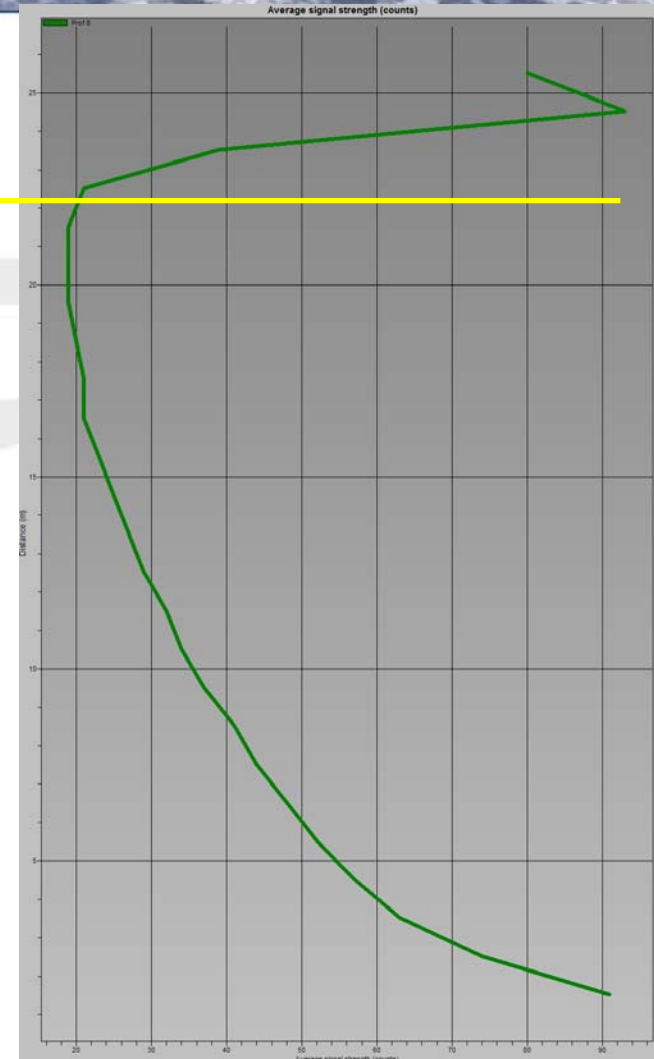
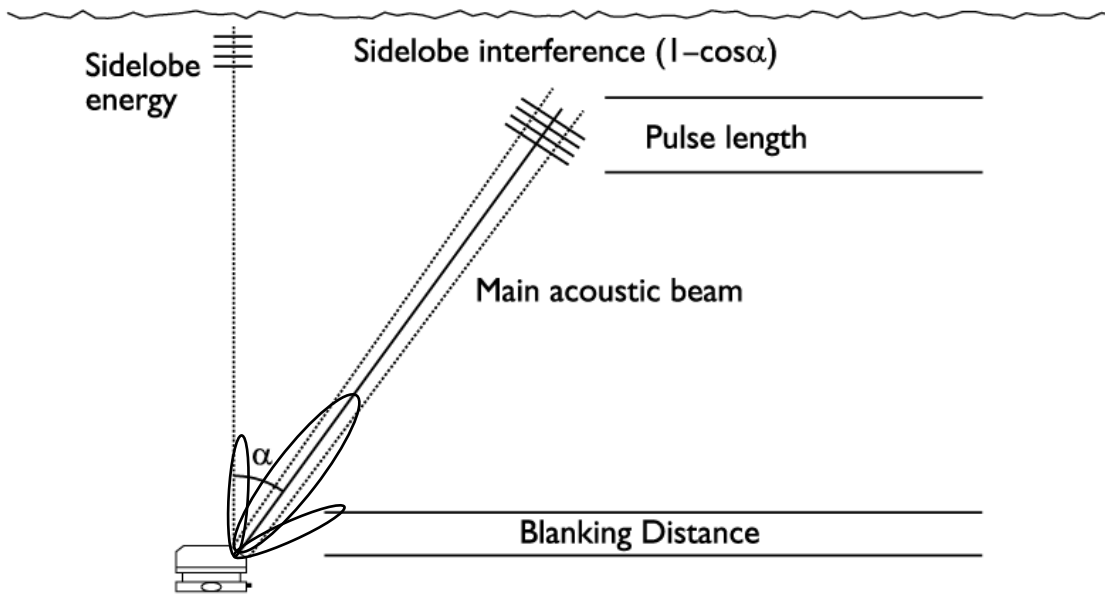
What is typically done?

... Warning?

Repair?

Exclude?

Excluding side lobe contamination

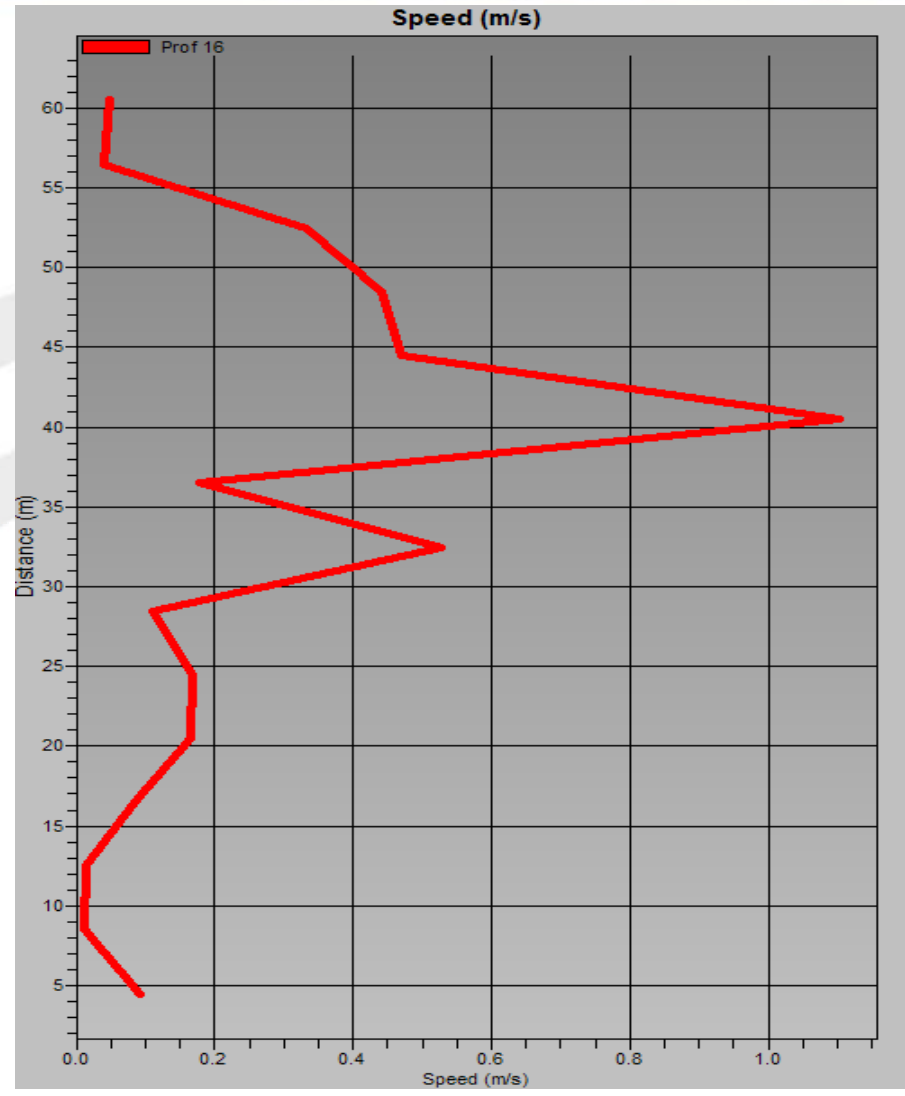


- Remove contaminated cells**
- Identifying depth (pressure or SNR)**
- Keeping only cells within a percentage (90%)**



Velocity Outliers

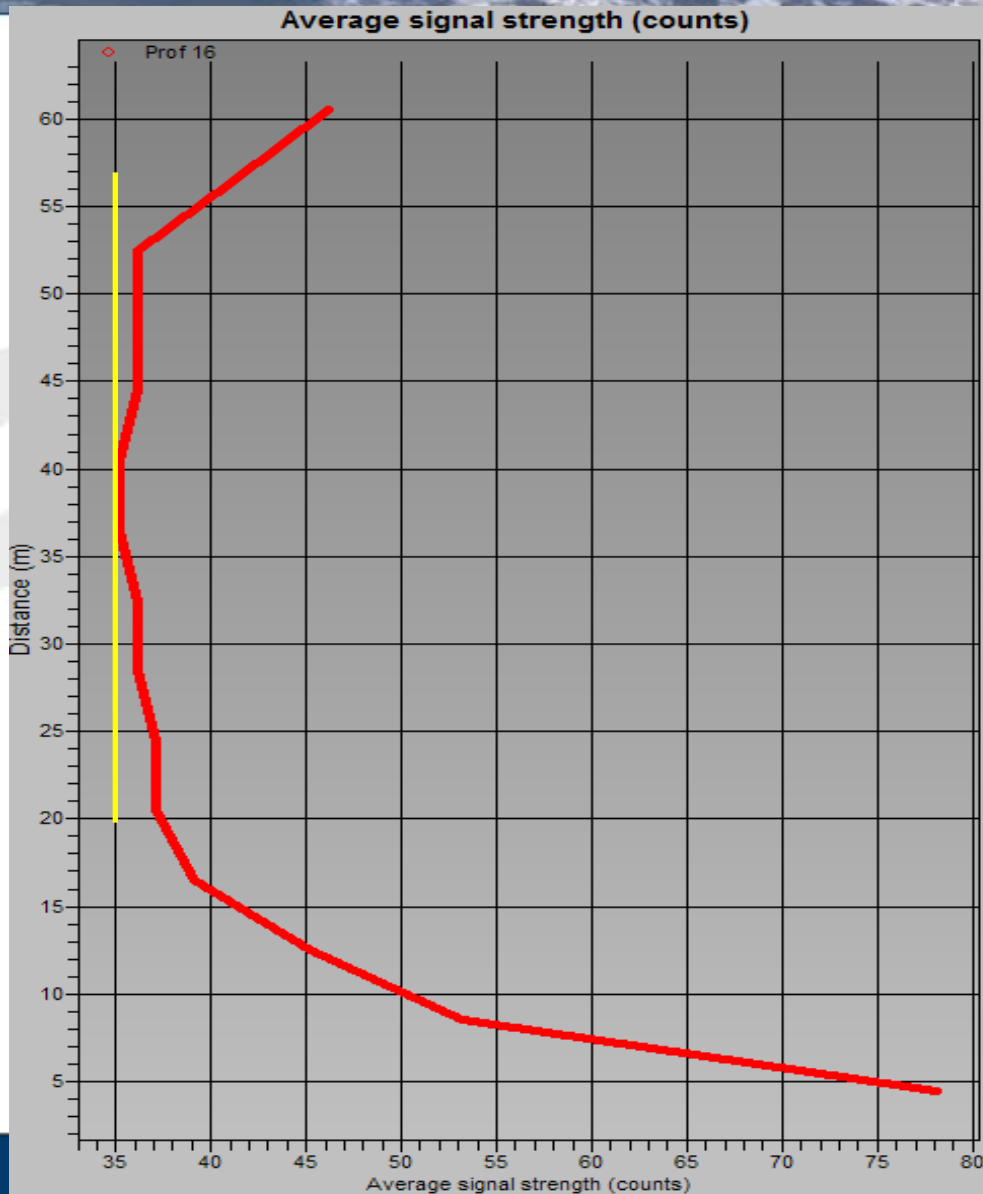
**Flag or remove cells
where velocity
estimates that exceed
some # std dev**





SNR check

Identify cells where SNR falls below a defined level (3 dB)

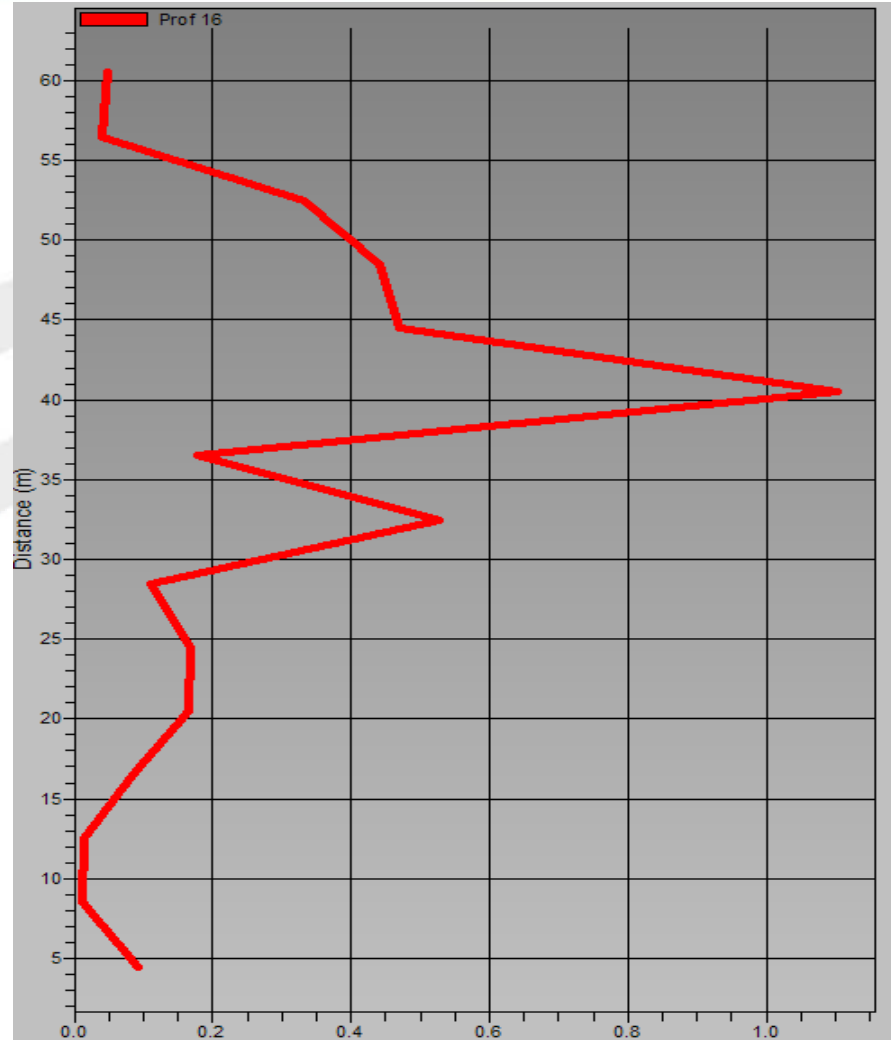




SNR Spikes

Exclude data where very high SNR (70 dB)

Sources include fish



Correcting for excessive tilt

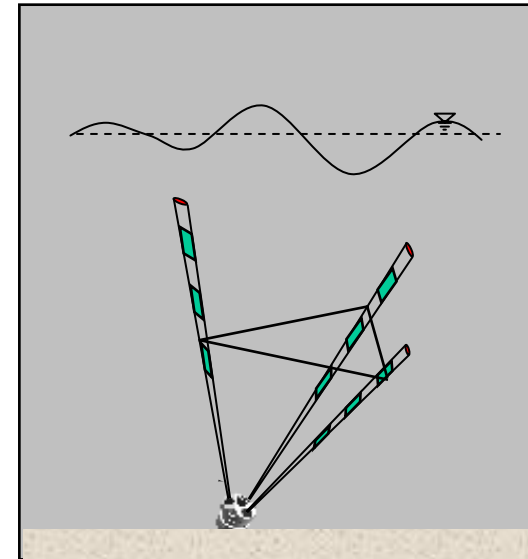
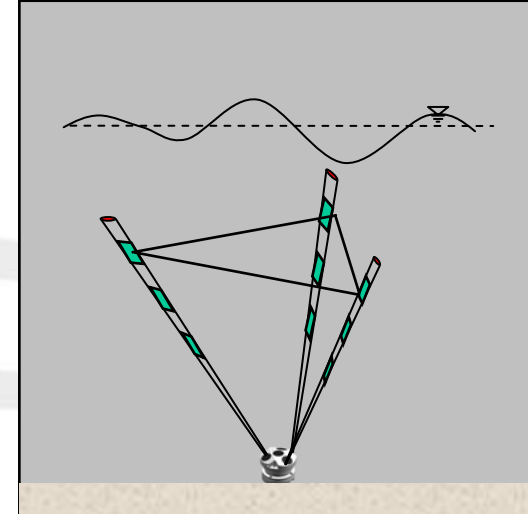
More of a data processing than QC

Transform to Beam coordinates

Remap according to where expected cell depth would have been

Interpolate velocity from neighboring cells

Convert to ENU velocities

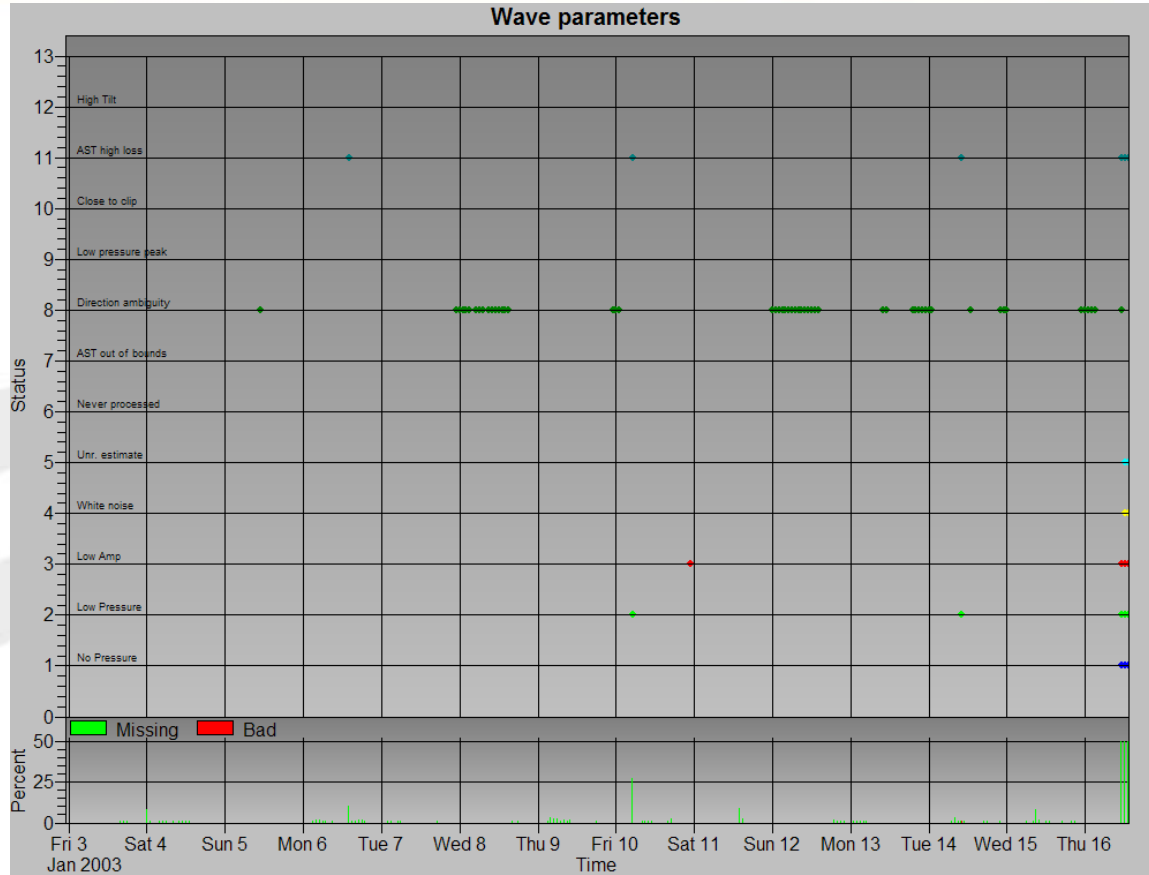


Wave Error Codes

Binary coded messages

00101011100

- High tilt
- Close 2 clipping
- Dir ambiguity
- Bad AST
- Unreasonable
- White noise
- Low SNR
- No Peak
- Low Pressure
- No pressure





No pressure

Indicates the pressure was too low and instrument was most likely out of the water or very close to the surface.

Evaluated by mean pressure.

0.5 meters is the level of warning.



Low Pressure

Very low amplitude on the pressure signal

No dynamic pressure in the time series

Check variance (few mm ?)



No peak in spectra

Transformed spectra increases without a peak in the spectra

PUV systems

Hard to estimate peak estimates and spectral based estimates



Low SNR

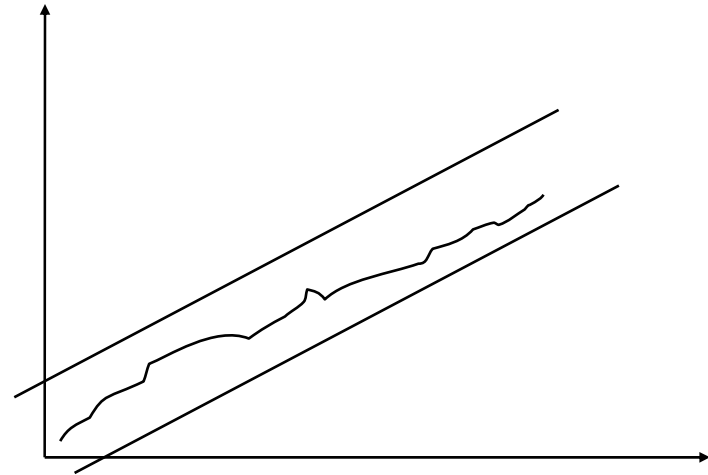
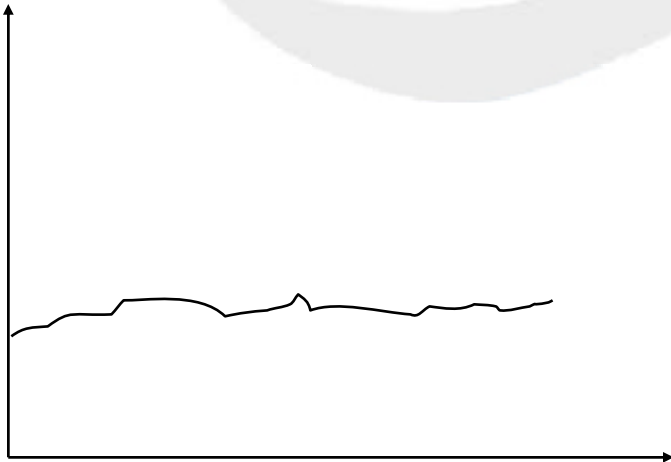
**Low SNR for acoustic signal
would lead to noisy velocity
estimates**

**Directional estimates have lower
accuracy**

White Noise Test

Spectra that are flat would have this spectra and not represent a typical ocean spectra

Low sea states or spikes in time series





Unreasonable Estimates

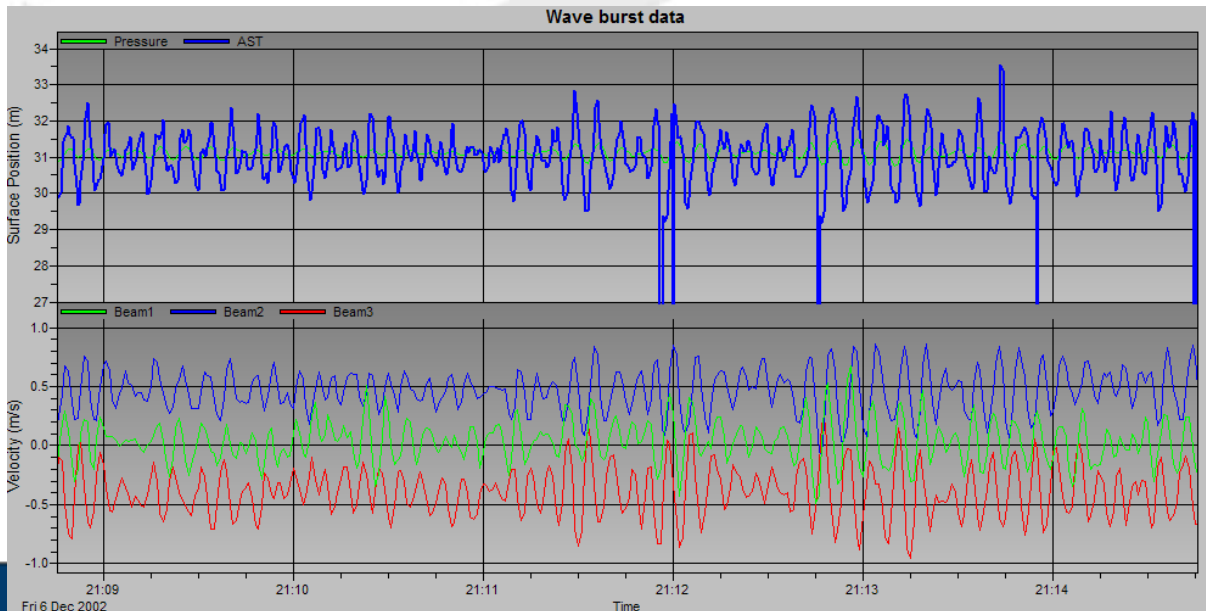
	Min	Max	
Hs		20 m	
H10		25 m	AST only
Hmax		35 m	AST only
Tp	0.5 sec	50 sec	
Tmean	0.5 sec	35 sec	

AST despiking

Steps in Despiking:

1. Estimate mean AST distance
2. Estimate Std dev
3. Remove outliers beyond # std dev
4. Tighten acceptance level
5. Repeat steps 1-4

1. Large discontinuities (2.5m)
2. Difference between mean values of Pressure & AST



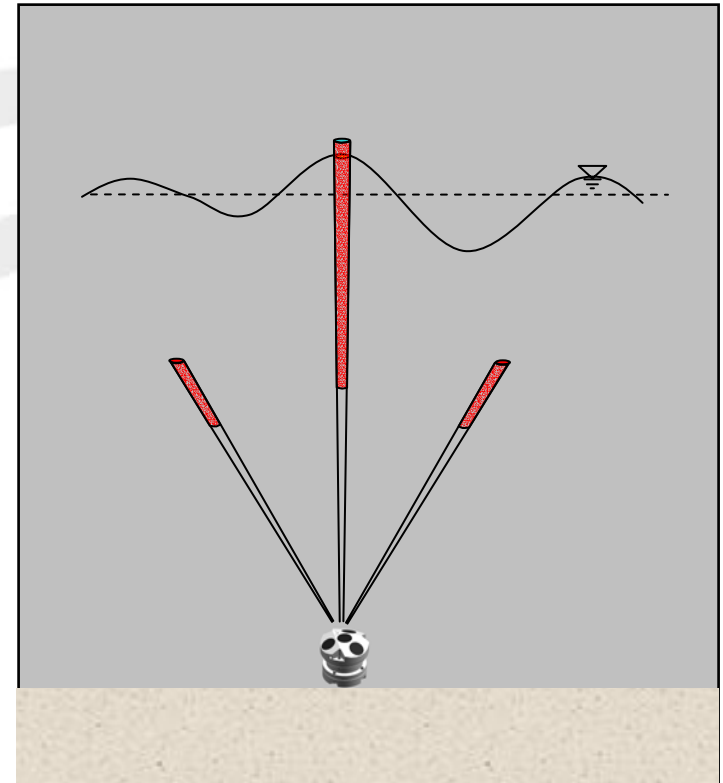
Close to Clipping

A check to insure that the top of the AST window is not close to the free surface.

Clean troughs & noisy peaks

Greatest range within 0.5 meters of end of AST window

Try to avoid at configuration time

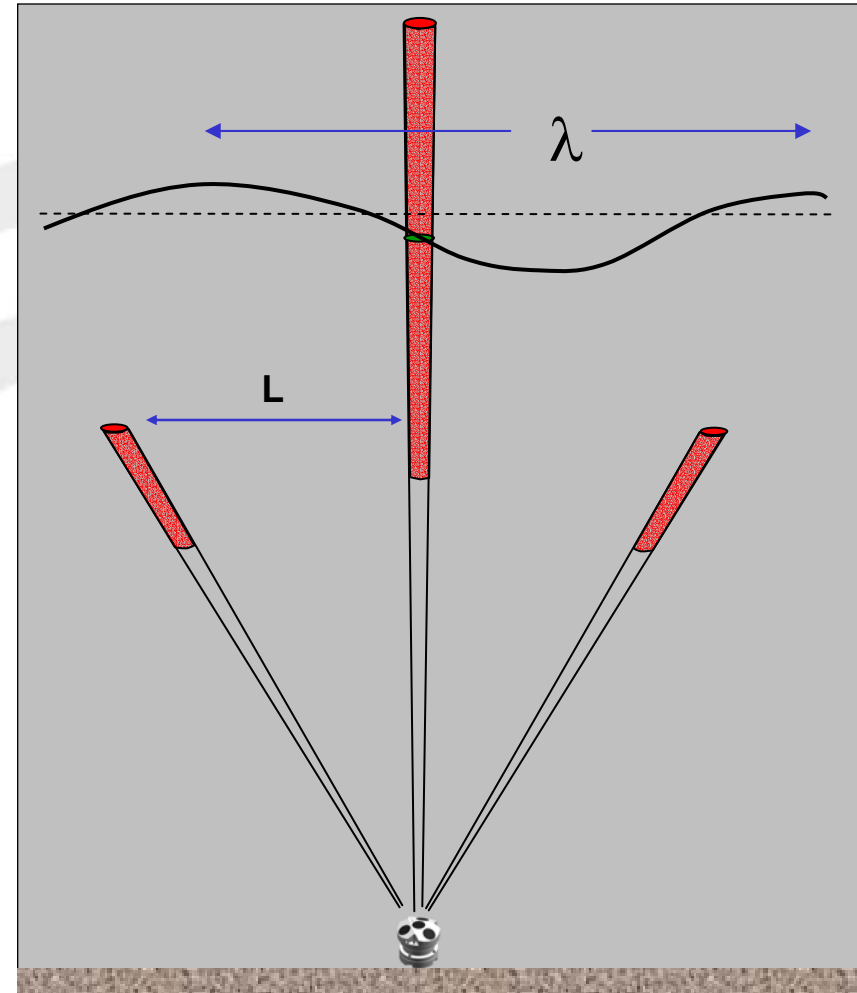


Directional Ambiguity

Measurement cell separation must be less than half wavelength

Directional quantities for waves with a higher frequency than this 'Nyquist' limit can not be unambiguously determined.

$$L < \lambda/2$$



Effects AST performance when greater than 10 degrees

Also effects directional estimates since "projected Array" no longer symmetric or large

