EW0207
Processing Sequences By Region
Provided by Canales, J.P., Van Ark, E., and Carbotte, S., 2008.

Southern lines (Canales et al., 2005):
Sequence Steps and parameters

Geometry	CMP gather, 80-fold (6.25 m CMP interval)
Trace editing	
DMO-based suppression of scattered energy	NMO (1500 m/s)
	bottom mute at the primary multiple
	DMO
	f-k dip filter (apparent dips exceeding 2 ms per trace)
	remove NMO (1500 m/s)
Stacking	band-pass filter 5 –30 Hz, 12 dB/oct
	velocity analysis every 50– 100 CMP
	NMO
	mute (stretch and surgical)
	stack
Time migration	band-pass filter 5 –30 Hz, 12 dB/oct
	top mute at the seafloor
	finite difference algorithm [Lowenthal et al., 1976]
	(maximum dip 5 ms/trace, layer thickness 50 ms)

Endeavour lines (Van Ark et al., 2007):
Processing Step Parameters

Geometry	
CMP gather	80-fold, 6.25 m CMP Interval
Trace Editing	
Hand-edit bad channels	
Automatic spike detection	0.5 s windows, 1.25– 2.75 s TWTT on each trace
DMO-Based Suppression of Scattered Energy	
NMO	1500 m/s (water velocity)
Bottom mute below first multiple	
DMO f-k dip filter	apparent dips >2 ms/trace
Remove NMO	1500 m/s
Stacking	
Band-pass filter	5 – 30 Hz, 12 dB/octave
Velocity analysis	every 100 CMP
NMO mute	stretch and surgical
Stack	
Time Migration	
Band-pass filter	5 – 30 Hz, 12 dB/octave
Top mute above seafloor	
Finite difference algorithma	maximum dip 5 ms/trace, layer thickness 50 ms

Ridge flank seismic transects

Processing Description supplied by Suzanne Carbotte:

(This is a text version of EW0207.proc.description.doc.)

The prestack processing strategy used for this subset of the EW0207 MCS data consisted of: Standard straight-line CMP bin geometry; F-K and bandpass (2-7-100-125 Hz) filtering to remove the low frequency cable noise; amplitude correction for geometrical spreading; surface consistent minimum phase predictive deconvolution to balance the spectrum and remove short period multiples; surface consistent amplitude correction to correct for anomalous shot and receiver-group amplitudes not related to wave propagation; trace editing; velocity analysis using the velocity spectrum method; normal moveout (NMO) and dip moveout (DMO) corrections to align signal for stacking; and CMP mute to remove overly stretched data. The prepared prestack data, with and without the automatic gain control, were then stacked. The poststack processing included seafloor mute, primary multiple mute to reduce migration noise, bandpass filtering (2-7-100-125 Hz), and time migration to collapse diffractions and position the recorded reflection events to their true subsurface locations. To improve imaging below the layer 2A/2B boundary, the late traveltime data were additionally bandpass filtered at 2-7-20-40 Hz and mildly coherency filtered.

Extracting an image of the layer 2A/2B boundary, often referred to as the 2A event, requires a somewhat different processing scheme because this event is not a true reflection. The prestack data preparation is identical up to the velocity analysis, which is done on bandpass filtered (2-7-40-60 Hz) constant velocity stacks. When the normal moveout velocities that best flatten the retrograde branch of the 2A refraction are chosen, the data are stacked. The stacked layer 2A event is time migrated and coherency filtered. Surgical mute is then used to extract the layer 2A event, which is afterwards merged with the reflection section to form the final, composite seismic image.

References

Canales, J. P., Detrick, R. S., Carbotte, S. M., Kent, G. M., Diebold, J. B., Harding, A., Babcock, J., Nedimovic, M. R., and van Ark, E., 2005, Upper crustal structure and axial topography at intermediate spreading ridges; seismic constraints from the southern Juan de Fuca Ridge, Journal of Geophysical Research, vol. 110(B12), DOI: 10.1029/2005JB00363.

Van Ark, E. M., Detrick, R. S., Canales, J. P., Carbotte, S. M., Harding, A. J., Kent, G. M., Nedimovic, M. R., Wilcock, W. S. D., Diebold, J. B., and Babcock, J. M., 2007, Seismic structure of the Endeavour Segment, Juan de Fuca Ridge: Correlations with seismicity and hydrothermal activity, Journal of Geophysical Research, vol. 112, p. B02401, DOI: 10.1029/2005JB004210.