

Antelope 5.0

March, 2010

Antelope User Group Meeting

Prague, Czech Republic



Why is Antelope 5.0 is a Major New Release?

- All release versions are fully 64-bit compliant
- Requires fully 64-bit compliant Operating Systems; no problem for Solaris and MacOSX users, may be a problem for Linux users
- Requires 64-bit processors
- No more `orbserver64`
- Can handle large databases, large SEED files (no more 32-bit limitations)
- Took three years of development work. We are certain there are remaining bugs. We ask for your help and patience in making this transition.

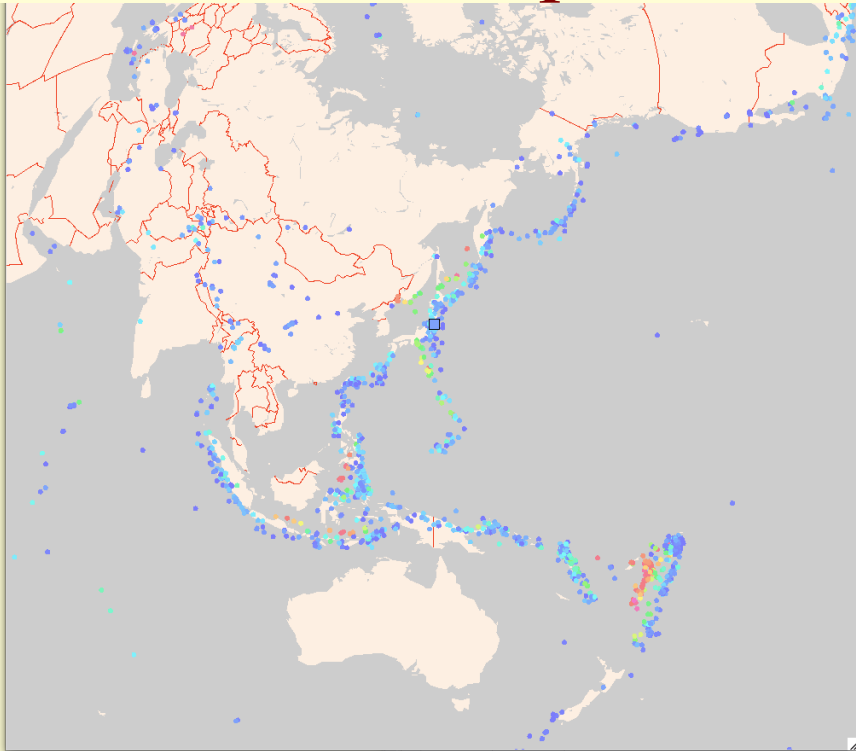
New P-arrival Based Mw Measurement, Mwp

- Implementation of a method originally developed by Tsuboi and further developed as a completely automated method by Marthijn de Kool at Geoscience Australia
- Can automatically produce accurate estimates of total moment magnitude for great earthquakes within 10 minutes of latest P arrival
- Implemented in Antelope as a new computational module for `orbevproc`
- $M_{wp}=9.1$, USGS/NEIC $M_w=9.1$ for 2004 Sumatra earthquake, $M_{wp}=8.8$, USGS/NEIC $M_w=8.8$ for 2010 Chile earthquake, $M_{wp}=8.2$, USGS/NEIC $M_w=7.9$ for 2008 China earthquake
- For 93 events with $M_w \geq 6.0$, $M_{wp}-M_w$ mean error = 0.083 with standard deviation of 0.143

New Implementation of `dbevents`

- All perl using `bp1ot(3)` utility
- Much faster than old version
- More dynamic than old version
- Allows user specification of spreadsheet columns
- Can sort and subset events
- Map plotting will provide many different plot styles (color/symbol/size coding vs. depth, magnitude, etc.)
- More detailed data “drilling”
- Still in development, but a version will be provided in the 5.0 release

New Implementation of dbevents



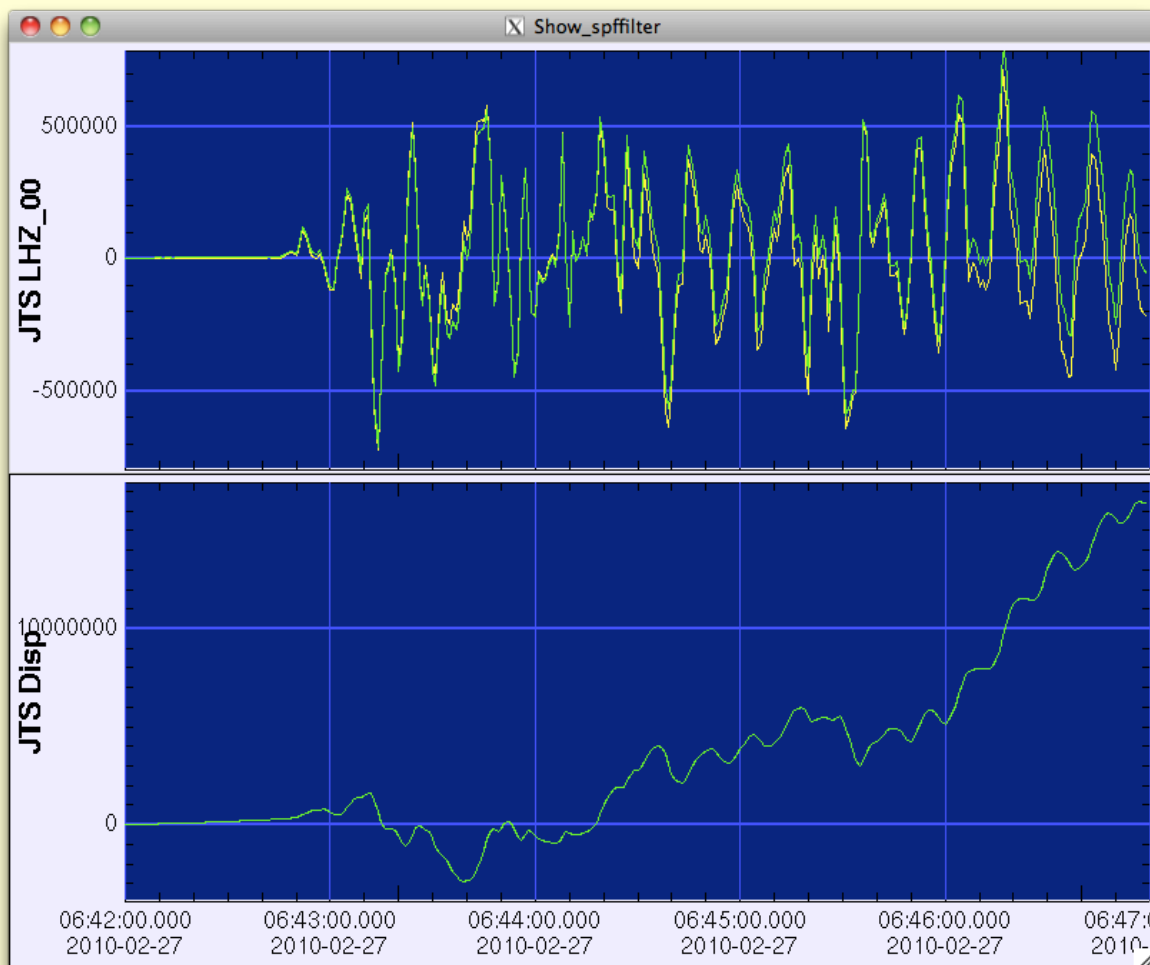
X Dbevents														
auth	rev	depth	mb	ms	mwp	mw	ndf	nass	latncy	region				
MbMwp	*	170.77	4.6					8	9	00:31:43	NEAR COAST OF CENTRAL CHI			
MwpMs	*	10.28	5.5					18	24	00:45:29	NEAR COAST OF CENTRAL CHI			
MwpMs	*	0.00	6.0	6.8	6.6			30	50	00:45:07	OFF COAST OF CENTRAL CHIL			
MsMwp	*	97.22	4.7					11	11	00:36:17	NEAR EAST COAST OF HONSHU			
MsMwp	*	27.13	4.8					9	9	00:35:05	KIZANG			
MsMwp	*	34.88	4.8					11	11	00:36:56	NORTHERN SUMATRA, INDONES			
MwpMs	*	0.00						10	11	00:10:15	OFF COAST OF OREGON			
GS:US		10.00	5.0					57	0	00:24:03	NEAR COAST OF CENTRAL CHI			
MwpMs	*	52.39	5.6	6.1	6.1			23	37	00:49:44	OFF COAST OF CENTRAL CHIL			
MbMwp	*	105.67	5.2					19	24	00:30:04	RYUKYU ISLANDS, JAPAN			
GS:US		35.00	5.0					69	0	02:42:10	NEAR COAST OF CENTRAL CHI			
GS:US		184.50	5.2					23	0	00:22:20	FLORES REGION, INDONESIA			
MwpMs	*	68.56	5.4	5.2				11	25	00:46:24	SOUTH SANDWICH ISLANDS RE			
MbMwp	*	8.17	5.3					23	25	00:48:44	CHAGOS ARCHIPELAGO REGION			
MwpMs	*	0.00	5.7	5.3				30	56	00:59:47	SOUTH INDIAN OCEAN			
MwpMs	*	0.00	5.4					18	24	00:22:20	NEAR COAST OF CENTRAL CHI			
USGS:US		35.00	5.0					30	0	00:19:06	NEAR COAST OF CENTRAL CHI			
OtDb1MbMsMwp	*	34.34	5.1					12	12	00:32:42	NORTHWESTERN KASHMIR			
OtDb1MbMwp	*	105.44	4.8					16	16	00:36:52	PHILIPPINE ISLANDS REGION			
USGS:US		35.00	5.0					14	0	00:23:09	NEAR COAST OF CENTRAL CHI			
USGS:US		35.00	5.0					37	0	00:35:18	NEAR COAST OF CENTRAL CHI			
OtDb1MbMwp	*	171.60	5.0					15	19	00:21:01	CENTRAL CHILE			
OtDb1MwpMbMs	*	62.34	5.1					14	16	00:31:10	MINDANAO, PHILIPPINES			
OtDb1MbMwpMs	*	44.07	6.3	6.5	6.7			28	76	00:28:53	NEAR EAST COAST OF HONSHU			
OtDb1MbMwpMs	*	47.06	5.4					26	39	00:28:13	NEAR COAST OF CENTRAL CHI			
OtDb1MbMwpMs	*	0.00	5.2					9	13	00:21:04	OFF EAST COAST OF HONSHU,			
OtDb1MbMsMwp	*	97.79						8	8	00:17:23	EL SALVADOR			
OtDb1MwpMbMs	*	64.61	6.3	5.9	6.5			29	55	00:34:25	HALMAHERA, INDONESIA			
OtDb1MbMwpMs	*	42.42	5.6	4.9				29	42	00:37:50	OFF EAST COAST OF KAMCHAT			
USGS:US		38.20	5.0					38	0	02:22:11	NEAR COAST OF CENTRAL CHI			

orid	origin time	auth	rev	latitude	longitude	depth	mb	mb Itncy	ms	mwp	mwp Itncy	mw	ndef	nass
27004	10073 03/14 08:08:05.300	USGS:US		37.7802	141.5623	39.00						6.6	299	28
27000	10073 03/14 08:08:04.007	OtDb1MbMwpMs	*	37.9615	141.0119	4.74	6.4	01:13:47	6.5	6.7	01:13:47		28	68
26998	10073 03/14 08:08:11.907	OtDb1MbMwpMs	*	37.9948	141.0116	68.42	6.3	01:06:38	6.5	6.7	01:06:38		28	69
26990	10073 03/14 08:08:06.934	OtDb1MbMwpMs	*	38.0811	141.1086	25.28	6.4	00:31:35	6.5	6.7	00:36:07		27	77
26989	10073 03/14 08:08:08.469	OtDb1MbMwpMs	*	38.1006	141.0663	38.41	6.3	00:30:05	6.5	6.7	00:35:00		27	76
26986	10073 03/14 08:08:08.530	OtDb1MbMwpMs	*	38.0234	141.2130	44.07	6.3	00:29:17	6.5	6.7	00:33:55		28	76
26985	10073 03/14 08:08:08.531	OtDb1MbMwpMs	*	38.1243	141.0091	38.04	6.4	00:28:07	6.5	6.7	00:32:51		27	75
26984	10073 03/14 08:08:08.516	OtDb1MbMwpMs	*	38.1232	141.0144	37.78	6.4	00:28:07	6.5	6.7	00:31:47		27	75
26982	10073 03/14 08:08:08.592	OtDb1MbMwpMs	*	38.1287	140.9869	39.14	6.3	00:24:38	6.5	6.7	00:29:33		26	74
26981	10073 03/14 08:08:06.548	OtDb1MbMwpMs	*	38.1046	141.0025	21.99	6.4	00:22:31	6.5	6.7	00:24:22		26	72

New Filtering Capabilities

- Implemented as standard Antelope time-domain filters using the `wffil(3)` API
- SPF - arbitrary set of S-domain numerator and denominator polynomial factors
 - Generalized first and second order polynomials
 - Can be used to apply inverse sensor responses or to equalize response functions
 - Can be used anywhere a filter string appears in Antelope
 - Note that looking up particular instrument responses and converting from poles & zeros representations to S-domain polynomial factor representations is not done automatically by this filter

New Filtering Capabilities - Instrument Deconvolution



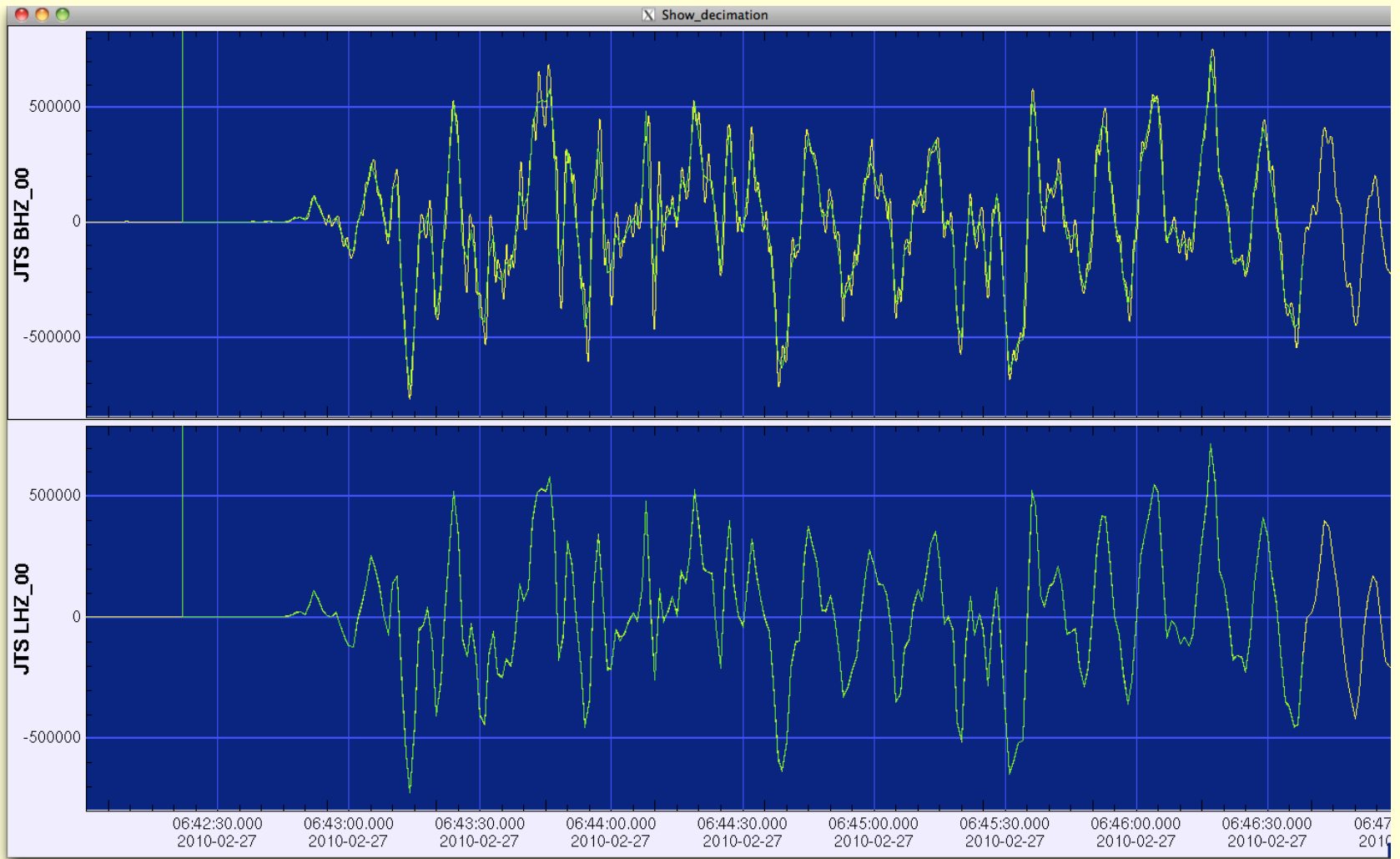
New Filtering Capabilities - Instrument Deconvolution

- Need to compose filter SPF string from instrument response poles and zeros.
- New Response perl module to support manipulation of Antelope response structures
- Need to worry about inherent deconvolution instabilities

New Filtering Capabilities

- DECIMATE - arbitrary FIR filter based decimation
 - FIR filters specified through normal Antelope FIR response files
 - Can be used to resample data to lower sample rates using real datalogger FIR filters
 - Can be used anywhere a filter string appears in Antelope. In particular can be used with real-time packet data, such as in `orbmonrtd` and `orbwfproc`.
 - Note that looking defining the FIR filter is not done automatically by this filter

New Filtering Capabilities - Resampling



Updated GSN Processing Template

- Still available through `rtdemo`
- Updated to include new Mwp magnitude computations
- Updated metadataabase (note that IRIS has a tendency to rename data channels)
- Updated to use `dborb2db` and `db2msd` and
 - Insensitive to incoming data fragmentation
 - Little or no `wfdisc` fragmentation regardless of incoming data
 - Eventually achieve good level of SEED compression

