

FORMATS OF LOGGED DATA: *UPDATED 31-Jan-07*

BAROM: Vaisala Digital Barometer; ([barom_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	PRESSURE	
							(mBar)	UNITS
2006	350	17	12	29	88	bar1	1019.34	mbar
2006	350	17	12	30	70	bar1	1019.34	mbar
2006	350	17	12	31	71	bar1	1019.34	mbar
2006	350	17	12	32	70	bar1	1019.33	mbar

DPTH: Kongsberg-Simrad EM120/EM1002 Multibeam Depths; ([dpth_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	EM120_DEPTH	EM1002_DEPTH
							(meters)	(meters)
2006	352	15	26	6	420	dpth	0	480.6
2006	352	15	26	7	932	dpth	0	480.9
2006	352	15	26	9	486	dpth	0	480.41
2006	352	15	26	11	42	dpth	0	480.35

FLUORO: Seapoint Chlorophyll Fluorometer; ([fluoro_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	RAW HEX	RAW ANALOG
2006	350	17	12	28	842	flor	05f0	0.116
2006	350	17	12	29	922	flor	600	0.1172
2006	350	17	12	31	2	flor	620	0.1196
2006	350	17	12	32	82	flor	640	0.1221

GRAV: Carson Gravity Meter; ([grav_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	GRAVITY(DIAL)	SPRING TENSION	AVG BEAM	TCC	TC	VCC	AL	AX	VE	FXA	FLA	AX2
2006	350	17	12	40	938	rgrv	6990.58	6990.79	-16	-12	0	-6	-6	0	-18	-6	-12	-6
2006	350	17	12	50	933	rgrv	6990.62	6990.79	-17	-6	1	-6	-6	-6	-12	-12	-30	-6
2006	350	17	13	0	922	rgrv	6990.64	6990.79	-18	-6	1	0	0	-6	-18	-6	-12	-6
2006	350	17	13	10	914	rgrv	6990.66	6990.89	-26	-18	1	-6	-6	-12	-18	-12	-18	-6

Gravity = (3min filter) & SpringTension= (raw val)
 AL = Cross Axis Acceleration
 AX2 = ?? Acceleration

AVG_B = Average Beam (1min)
 AX = Long Circular Acceleration

TCC = Long Ramp Acceleration
 VE = ?? Acceleration

TC = Filtered Cross Acceleration
 FXA = ?? Acceleration

VCC = Vertical Axis Squared
 FLA = ?? Acceleration

GYRO: Sperry Marine Gyroscope ([gyro_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	HEADING
							(deg)
2006	350	17	12	28	374	gyr1	241.1
2006	350	17	12	29	371	gyr1	240.9
2006	350	17	12	30	373	gyr1	240.9
2006	350	17	12	31	374	gyr1	240.9

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MAGY: Geometrics G-882 Cesium Marine Magnetometer; ([magy_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	TOT FIELD	SIGNAL LEVEL	DEPTH (meters)
2006	28	0	35	58	444	magy	66350.18	42	0
2006	28	0	35	59	444	magy	44382.68	39	0
2006	28	0	36	0	444	magy	40180.02	39	0
2006	28	0	36	1	444	magy	37704.17	39	0

MET: RM Young Resistive Temperature Device (RTD); Rotronic Instrument Corp. Humidity Probe (HUMIDITY); RM Young Precipitation Guage (PRECIPITATION); Eppley Precision Spectral Pyranometer (PSP); Eppley Precision Infrared Radiometer (PIR); Biospherical Quantum Scalar Reference (PAR); ([met_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	DATA LOGGER SEC	PANEL TEMP (°C)	RTD TEMP (°C)	HUMIDITY (%)	HUM TEMP (°C)	PRECIPITATION (mm)	PSP (mVolts)	PIRb (mVolts)	PIRc (mVolts)	PIR Case	PIR Hemis	RTD Fan (mVolts)	HUM Fan (mVolts)	PAR (mVolts)
2006	290	0	0	1	307	met	13.4	31.005	28.013	68.013	28.344	2.722	6.946	-0.145	-0.214	2.242	2.186	2.5	2.5	1470.9
2006	290	0	0	2	307	met	14.4	31.005	28.013	68.013	28.344	2.722	6.943	-0.147	-0.216	2.241	2.184	2.5	2.5	1463.6
2006	290	0	0	3	307	met	15.4	31.005	28.013	68.013	28.344	2.722	6.959	-0.149	-0.218	2.241	2.184	2.5	2.5	1476.8
2006	290	0	0	4	307	met	16.4	31.005	28.013	67.947	28.344	2.728	6.977	-0.152	-0.222	2.241	2.184	2.5	2.5	1481.5

PGPS (P-CODE): Trimble/P-Code GPS; ([pgps_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	LATITUDE (deg)	LONGITUDE (deg)	EL (m)	HDOP	SOG (kts)	COG (deg)	#SATs	QUAL
2006	350	0	0	1	574	*gpy	21.31552	-157.887	24	1.1	0	3.4	8	3
2006	350	0	0	2	574	*gpy	21.31552	-157.887	24	1.1	0	3.4	8	3
2006	350	0	0	3	574	*gpy	21.31552	-157.887	24	1.1	0	3.4	8	3
2006	350	0	0	4	574	*gpy	21.31552	-157.887	23	1.1	0	3.4	8	3

POS-MV: Applanix POS-MV GPS/Inertial Measurement Unit; ([pos-mv_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	LATITUDE (deg)	LONGITUDE (deg)	HDOP	SOG (kts)	COG (deg)	#SATs	QUAL	HEADING (deg)	ROLL (deg)	PITCH (deg)	HEAVE (deg)
2006	350	17	12	27	895	*gpo	21.31541	-157.887	0.9	0	181.4	9	1	250.85	0.24	0.58	0.14
2006	350	17	12	28	895	*gpo	21.31541	-157.887	0.9	0	190.6	9	1	250.88	0.26	0.59	0.14
2006	350	17	12	29	895	*gpo	21.31541	-157.887	0.9	0	230.6	9	1	250.9	0.28	0.6	0.15
2006	350	17	12	30	895	*gpo	21.31541	-157.887	0.9	0	234.9	9	1	250.92	0.3	0.61	0.15

RPM: Shipboard Propulsion System; ([rpm_jday_raw](#))

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	PORT (rpm)	STBD (rpm)	BOW THRUSTER (%)	BOW THRUSTER AZIMUTH (deg)
2006	350	17	59	58	810	*rpm	0	-89.1	64.8	263.5
2006	350	17	59	59	810	*rpm	0	-89.1	65.2	263.5
2006	350	18	0	0	810	*rpm	0	-89	65.6	264.5
2006	350	18	0	1	810	*rpm	0	-89.1	66	259.1

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SIMRAD: Simrad GPS; ([simrad_jday_raw](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>LATITUDE</u> (deg)	<u>LONGITUDE</u> (deg)	<u>HEIGHT</u> (m)	<u>HDOP</u>	<u>SOG</u> (kts)	<u>COG</u> (hdg)	<u>#SATs</u>	<u>QUAL</u>
2006	350	17	12	28	50	*sim	21.31549	-157.887	28	1.5	0	0.1	8	1
2006	350	17	12	29	28	*sim	21.31549	-157.887	28	1.5	0	0.1	8	1
2006	350	17	12	30	7	*sim	21.31549	-157.887	28	1.5	0	0.1	8	1
2006	350	17	12	30	87	*sim	21.31549	-157.887	28	1.5	0	0.1	8	1

STW: Magnetic Speed Log (Speed Thru Water); ([stw_jday_raw](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>SPEED THRU WATER</u> (kts)	<u>CROSS TRACT SPEED</u> (kts)	<u>COG</u> (deg)	<u>SOG</u> (kts)
2006	351	4	7	4	717	stw1	0.2	-2.6	0	0
2006	351	4	7	5	717	stw1	0.2	-2.6	0	0
2006	351	4	7	6	717	stw1	0.2	-2.6	0	0
2006	351	4	7	7	717	stw1	0.2	-2.6	0	0

THSL: Seabird SBE21 Thermosalinograph & SBE38 Remote Temperature Probe; ([thsl_jday_raw](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>TEMP</u> (hex)	<u>COND</u> (hex)	<u>REMOTE TEMP</u> (hex)	<u>TEMP</u> (°C)	<u>COND</u> (Siemens/m)	<u>SALINITY</u> (PSU)	<u>REMOTE TEMP*</u> (°C)
2006	351	0	0	10	144	thsl	a98f	d23a	634463	25.12581	5.30064	34.85952	25.09459
2006	351	0	0	20	144	thsl	a990	d239	63466e	25.12643	5.30054	34.85829	25.09602
2006	351	0	0	30	144	thsl	a98d	d238	6345cc	25.12457	5.30043	34.85898	25.09558
2006	351	0	0	40	145	thsl	a98c	d237	634a65	25.12395	5.30033	34.85871	25.0988

*REMOTE TEMP is the sensor closest to uncontaminated scientific seawater intake

WINCH322: Dynacon Oceanographic Winch; ([winch322_jday_raw](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>RATE</u> (meters/min)	<u>WIRE OUT</u> (meters)	<u>TENSION</u> (lbs)
2006	353	4	47	46	901	w322	32	206.6	565
2006	353	4	47	47	893	w322	32	206.8	579
2006	353	4	47	48	369	w322	32	207.4	561
2006	353	4	47	50	67	w322	32	208.1	439

WINCH680: Dynacon Hydrographic Winch; ([winch680_jday_raw](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>RATE</u> (meters/min)	<u>WIRE OUT</u> (meters)	<u>TENSION</u> (lbs)
2006	335	7	33	25	793	w680	20	462.9	386
2006	335	7	33	26	367	w680	20	462.9	388
2006	335	7	33	27	212	w680	20	463.2	386
2006	335	7	33	28	21	w680	20	463.6	382

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WIND1: RM Young Anemometer; (wind10_jday_raw)

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	PORT WIND RELATIVE SPD (kts)	PORT WIND RELATIVE HDG (deg)	SOG (kts)	COG (deg)	POSMV HDG (deg)	WIND TRUE SPD (kts)	WIND TRUE HDG (deg)	STARBOARD WIND RELATIVE SPD (kts)	STARBOARD WIND RELATIVE HDG (deg)
2006	350	17	12	30	614	rwd1	6	167	0	230.6	250.9	6	57.9	7	177
2006	350	17	12	32	605	rwd1	5	161	0	230.1	250.9	5	51.9	6	168
2006	350	17	12	34	606	rwd1	5	166	0	195.8	251	5	57	6	179
2006	350	17	12	36	605	rwd1	6	159	0.1	141	251	6	49	6	168

XBT: Sippican MK21 eXpendable Bathymetric Temperature probe; (xbt_#####)

DEPTH(M)	TEMP	SOUND_VEL
0.6	25.14	1534.53*
1.3	25.13	1534.52*
1.9	25.11	1534.48*
2.6	25.1	1534.45*

KMLOG2 (Secondary backup of all raw data)

Same as CRUISEID_rawdata

PRELIM (Interim raw/processed data)

CRUISEID_adu5	- Raw ADU5 GPS data for entire cruise concatenated into one file
CRUISEID_barom	- Raw Barometric data for entire cruise concatenated into one file
CRUISEID_dpth	- Raw Depth data (from multibeam systems) for entire cruise concatenated into one file
CRUISEID_grav	- Raw Gravity data for entire cruise concatenated into one file
CRUISEID_pgps	- Raw PGPS GPS data for entire cruise concatenated into one file
CRUISEID_pos-mv	- Raw POS-MV GPS data for entire cruise concatenated into one file
CRUISEID_simrad	- Raw Simrad GPS data for entire cruise concatenated into one file
CRUISEID_spdhdg	- Speed and Heading data for entire cruise concatenated into one file
CRUISEID_wind1	- Raw wind data for entire cruise concatenated into one file

CRUISEID-finaldata (CORRECTED/PROCESSED)

CGRAV: Corrected Gravity Data – 1 minute; (CRUISEID_CGRAV)

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	DIAL(g) (mgals)	FAA (mgals)	Eotvos (mgals)	OBSERVED GRAVITY (mgals)
2006	320	17	39	30	0	cgrv	6992.7	205.6	0	978923
2006	320	17	40	0	0	cgrv	6992.7	205.6	-0.1	978923.1
2006	320	17	40	30	0	cgrv	6992.8	205.7	0	978923.1
2006	320	17	41	0	0	cgrv	6992.8	205.7	0	978923.2

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DPTH: *Depth, selecting for most accurate multibeam system given depth range (EM1002= 20m-800m; EM120=700m-7000m); (CRUISEID_DPTH)*

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	EM120 DEPTH (m)	EM1002 DEPTH (m)
2006	321	19	17	16	681	dpth	4744.62	0
2006	321	19	17	31	419	dpth	4741.73	0
2006	321	19	17	46	973	dpth	4744.53	0
2006	321	19	18	2	26	dpth	4745.93	0

FIXPOS: *Output of 'avgfix' program, for fixing gps to thsl & fluoro data; CODE: *gpo=Pos-mv; *gpy=PGPS; *gpa =ADU5; (CRUISEID_FIXPOS)*

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	LATITUDE (deg)	LONGITUDE (deg)	EL	HDOP	SPEED (kts)	HDG (deg)	#SATs	QUAL	AVG # FIXES
2006	320	17	39	50	0	*gpo	21.31542	-157.887	1	1.2	0	90	6	1	3+3
2006	320	17	40	0	0	*gpo	21.31542	-157.887	1	1.2	0.01	338.13	6	1	3+3
2006	320	17	40	10	0	*gpo	21.31542	-157.887	1	1.1	0	229.35	7	1	3+3
2006	320	17	40	20	0	*gpo	21.31542	-157.887	1	1.1	0	179.74	7	1	3+3

FLUORO WFIX: *Fluorometer data matched with GPS; (CRUISEID_FLUORO_WFIX)*

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	LATITUDE (deg)	LONGITUDE (deg)	RAW HEX	RAW ANALOG
2006	322	16	23	23	0	flor	22.35287	-158.115	0.086	0.1
2006	322	16	23	24	0	flor	22.35282	-158.115	0.07	0.1
2006	322	16	23	25	0	flor	22.35276	-158.116	0.061	0.1
2006	322	16	23	26	0	flor	22.3527	-158.116	0.055	0.1

NAV: *Master navigation file, generally derived from POS/MV data; (CRUISEID_NAV)*

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	LATITUDE (deg)	LONGITUDE (deg)
2006	320	17	39	0	0	*nav	21.31542	-157.887
2006	320	17	39	10	0	*nav	21.31542	-157.887
2006	320	17	39	20	0	*nav	21.31542	-157.887
2006	320	17	39	30	0	*nav	21.31542	-157.887

SH: *Speed and Heading, derived from ship's gyro and magnetic speed log (STW); (CRUISEID_SH)*

YEAR	JDAY	HR	MIN	SEC	MSEC	CODE	SPEED (kts)	HEADING (deg)
2006	322	18	23	0	0	sphd	7.34	195.5
2006	322	18	23	10	0	sphd	7.41	195.7
2006	322	18	23	20	0	sphd	7.52	195.8
2006	322	18	23	30	0	sphd	7.46	195.5

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THSL_WFIX: Thermosalinograph data matched with GPS; ([CRUISEID_THSL_WFIX](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>LATITUDE</u> (deg)	<u>LONGITUDE</u> (deg)	<u>TEMP</u> (°C)	<u>COND</u> (Siemens/m)	<u>SALINITY</u> (PSU)	<u>REMOTE TEMP*</u> (°C)
2006	320	19	37	30	0	thsl	21.24665	-158.095	27.13551	5.51874	34.91502	27.14373
2006	320	19	37	40	0	thsl	21.24664	-158.096	27.13924	5.5196	34.91833	27.13936
2006	320	19	37	50	0	thsl	21.24664	-158.096	27.14049	5.51998	34.92011	27.13127
2006	320	19	38	0	0	thsl	21.24663	-158.097	27.14173	5.52045	34.92257	27.13563

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WINDIT: True Wind data, instantaneous; ([CRUISEID_WINDIT](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>WIND SPEED</u> (kts)	<u>WIND DIRECTION</u> (deg)
2006	320	17	38	21	811	twnd	4.1	65.9
2006	320	17	38	23	801	twnd	4.1	66.9
2006	320	17	38	25	799	twnd	4.1	61.2
2006	320	17	38	27	803	twnd	5.1	53.3

WINDT1: True Wind data, 1 minutes averages; ([CRUISEID_WINDT1](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>WIND SPEED</u> (kts)	<u>WIND DIRECTION</u> (deg)
2006	320	17	41	0	0	twnd	4.28	58.7
2006	320	17	42	0	0	twnd	3.13	52
2006	320	17	43	0	0	twnd	2.91	59.9
2006	320	17	44	0	0	twnd	3.38	57.6

WINDT5: True Wind data, 5-minute averages; ([CRUISEID_WINDT5](#))

<u>YEAR</u>	<u>JDAY</u>	<u>HR</u>	<u>MIN</u>	<u>SEC</u>	<u>MSEC</u>	<u>CODE</u>	<u>WIND SPEED</u> (kts)	<u>WIND DIRECTION</u> (deg)
2006	320	17	55	0	0	twnd	4.75	53
2006	320	18	0	0	0	twnd	5.31	56.2
2006	320	18	5	0	0	twnd	5.51	58.5
2006	320	18	10	0	0	twnd	5.77	59.8

Calculations

To convert milliVoltages to scientific units, follow the procedures below:

PAR – Photosynthetically Available Radiation

- Use raw PAR value and divide by 1000 to convert to Volts.
- Divide voltage by
 - 6.38 volts/($\mu\text{E}/\text{cm}^2\text{ sec}$) <<--- use this for $\mu\text{Einstein}/\text{cm}^2\text{ sec}$
 - $1.06\text{e-}17$ volts/(quanta/ $\text{cm}^2\text{ sec}$) <<--- use this for quanta/ $\text{cm}^2\text{ sec}$
 - Example: 1394 millivolts
 - $1394\text{ millivolts} \div 1000 = 1.394\text{ volts}$
 - $1.394\text{ volts} \div 6.38\text{ volts}/(\mu\text{E}/\text{cm}^2\text{ sec}) = 2.184 \times 10^{-1}\ \mu\text{E}/\text{cm}^2\text{ sec}$ **OR**
 - $1.394\text{ volts} \div 1.06 \times 10^{-17}\text{ volts}/(\text{quanta}/\text{cm}^2\text{ sec}) = 1.315 \times 10^{17}\text{ quanta}/\text{cm}^2\text{ sec}$

PIR - Precisions Infrared radiation

Can be calculated in two different ways: Simplified and Precise. The Simplified and Precise method should be fairly close in agreement.

- Simplified Method:
 - Use raw PIRb value, convert to microvolts and divide by the instrument's sensitivity as defined in the Calibration Sheet; outputs in watts/ meter⁻²
 - Example: -0.145 millivolts
 - Sensitivity = $3.84 \times 10^{-6}\text{ volts/watts meter}^{-2}$
 - $(-0.145\text{ millivolts} \div 1000) \div 3.84 \times 10^{-6}\text{ volts/watts meter}^{-2} = -37.76\text{ watts/ meter}^{-2}$
- Precise method:
 - The more precise method is to include in the calculations the temperature of the sensor's casing, several constants, etc.
 - $R_{in} = R_{net} + R_{out} = \text{PIRb} / S + s \cdot T_c^{**4}$
 - $s = \text{Stefan Boltzmann Constant} = 5.6704 \times 10^{-8}\text{ Wm}^{-2}\text{ K}^{-4}$
 - T_c - case temperature, is determined by measuring resistance across pins D&E and using relationship $T = 1 / \{ (C1 + C2 * \text{Ln}(R) + C3*(\text{Ln}(R))^3)$
 - T is absolute temperature (Kelvin)
 - R is measured resistance of YSI thermistor in ohms
 - Ln = natural logarithm and values of constants are C1 = 0.0010295; C2 = 0.0002391 ; C3 = 0.0000001568
 - To obtain temperatures in degs C, subtract 273.15 from calculated temperature

PSP – Precision Spectral Pyranometer

- Use raw PSP value (millivolts), divide by 1000 to convert to volts, then divide by the "sensitivity" value (See Sensor's Calibration Sheet for sensitivity value).
- Typical Epply PSP data in literature suggests a raw low level voltage ranging from 0 to ~12mV depending on sensor calibration & radiation level.
 - Example: $8.462\text{ mv} = 8.462 \times 10^{-3}\text{ volts}$
 - Sensitivity = $8.63 \times 10^{-6}\text{ volts/watts meter}^{-2}$
 - $8.462 \times 10^{-3}\text{ volts} \div 8.63 \times 10^{-6}\text{ volts/watts meter}^{-2} = 981\text{ watts/ meter}^{-2}$