

PBO STRAINMETER PRODUCTS

Data Rates and Formats

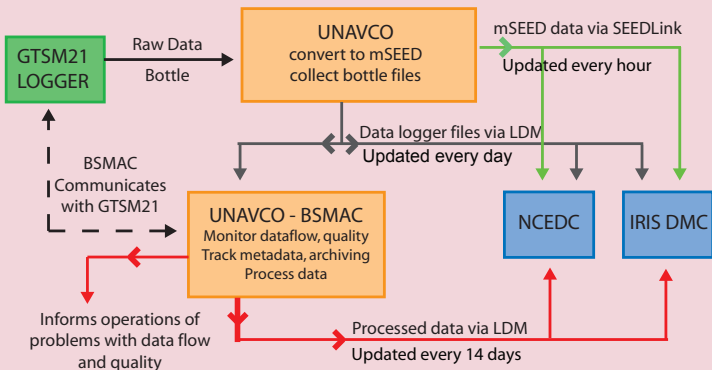
Type	Rate	Format	Frequency
Strain	1, 20 sps	Bottle SEED	Hourly
	1/600 sps	Bottle SEED ASCII	Daily
Environmental Barometer	1/300 sps	Bottle SEED ASCII	Daily
	1 sps	SEED	Streaming*
Seismic	1, 100 sps	SEED	Streaming
Pore pressure	1/300 sps	ASCII	Daily
Tiltmeter	1 sps	ASCII	Daily

* some stations

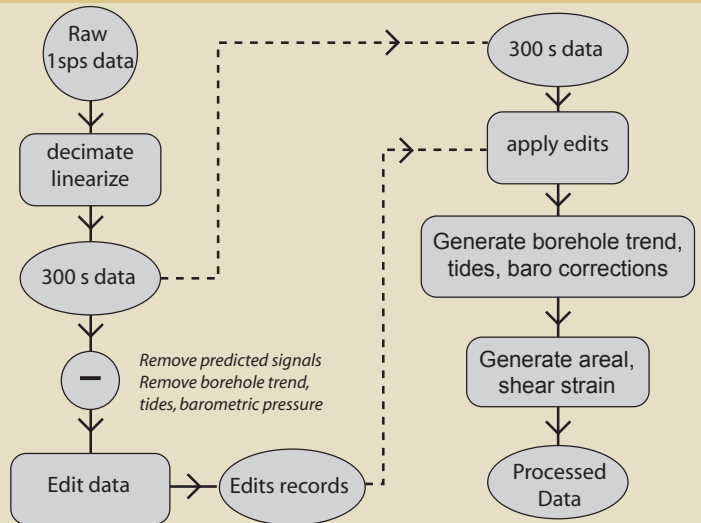
SEED Codes

Network Code	PB
Station Code	4 character B-number, e.g, B004
Channel code	3 character code
1. Rate	
R= low frequency (<= 600 s interval) , L=1 sps, B=20 sps	
2. Measurement	
S=strain, K=temperature, E=voltage, D=pressure, R=rainfall	
3.orientation or location	
1=CH0, 2=CH1, 3=CH2, 4=CH3, O=outside, D=downhole	
Location Code	2 character code describing sensor location
TO	measurement made at strainmeter
TS	measurement made at surface
TP	measurement made at pore pressure sensor

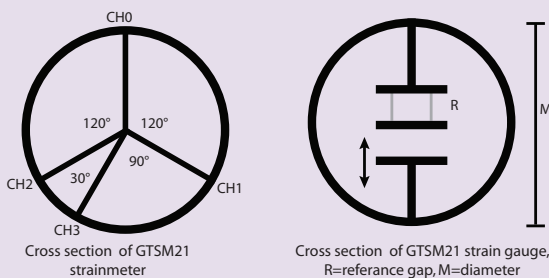
Data Flow



Level 2 Strainmeter Processing Steps



GTSM21 Strainmeter



The linear gauge strain, u_t , at time t , is calculated with respect to a fixed raw data point (d_0).

$$u_t = \left(\frac{d_t / (1e+8)}{1 - (d_t / 1e+8)} - \frac{d_0 / (1e+8)}{1 - (d_0 / 1e+8)} \right) * \frac{R}{M}$$

d_t , raw value at time t , R reference gap (0.01 or 0.02 cm), M diameter (0.087 m)

Web Pages

PBO Web Page	http://pboweb.unavco.org/
PBO Strainmeter Page	http://pboweb.unavco.org/strain_data
PBO Status Maps	http://pboweb.unavco.org/shared/scripts/gmap/
Plotting Tools	http://pboweb.unavco.org/plotting/src/bsm_plots/plot_page.php
BSM Home Pages	http://pboweb.unavco.org/shared/scripts/stations/?checkkey=B001
BSM Documentation	http://pboweb.unavco.org/?pageid=101
PBO Seismic Pages	http://wiggles.unavco.org/index.php
UNAVCO Web Page	http://www.unavco.org/

Bottle Filename Convention

● Contents of Archived GTSM21 Bottle Tars

BBBB= B-number, YYYY = year, DDD = day of year

BBBB.YYYYDDD.Day tar 10-min strain for each gauge
8 environmental channels
30 state of health channels

BBBB.YYYYDDD_01.tar 24 1-hour long files of 1-sps data per gauge

BBBB.YYYYDDD_20.tar 1440 1-min long files of 20-sps data per gauge

● Bottle filename format

NN= 2 digit year, HH = hour, MM = min, CHX = channel (CH0, CH1, CH2 or CH3)

BBBBNNDDDDCH0 10 minute CH0 strain file, 24 hours long

BBBBNNDDDDHHCH0 1 sps CH0 strain file, 1 hour long

BBBBNNDDDDHHMMCH0_20 20-sps CH0 strain file, 60 seconds long

PBO BOREHOLE STRAINMETER INSTRUMENTATION

Network	B-number	16-Character code	Install date	Longitude	Latitude	Elevation	Tiltmeter	Accelerometer	Pore Pressure	Barometer	Colocated
Anza, California											
	B081	keenwi081bcs2006	2006-06-16	33.7112	-116.7142	1467.00		o	o		
	B082	pathfi082bcs2006	2006-06-10	33.5982	-116.5960	1374.84		o	o		B089
	B084	pinyon084bcs2006	2006-09-15	33.6116	-116.4564	1271.00		o	o		
	B086	santar086bcs2006	2006-06-17	33.5574	-116.5310	1392.02		o			
	B087	fordra087bcs2006	2006-06-17	33.4955	-116.6027	1139.00		o			
	B088	skyoks088bcs2007	2007-01-28	33.3749	-116.6205	1403.87		o			
	B089	pathfi089bcs2006	2006-08-28	33.5999	-116.5961	1362.00		o			B082
	B093	trippf093bcs2007	2007-09-20	33.5937	-116.7638	1244.00		o			
Mendocino, California											
	B045	rdcrst045bcn2008	2008-09-17	40.4360	-123.9965	29.40					
	B933	mckeem933bcn2008	2008-09-12	40.0600	-123.9690	268.10					
	B934	legget934bcn2008	2008-09-26	39.8639	-123.7168	330.00					
	B935	dinsmr935bcn2008	2008-10-28	40.4787	-123.5732	696.70					
Mojave, California											
	B916	marips916bcs2008	2008-03-13	36.1925	-117.6685	1859.90				o	
	B917	tonyso917bcs2008	2008-07-14	35.3892	-117.2587	1125.90				o	
	B918	mtsprn918bcs2008	2008-06-21	35.9357	-117.6017	1042.60				o	
	B921	randsb921bcs2008	2008-06-03	35.5865	-117.4622	694.50				o	
Mt. St. Helens, Washington											
	B201	coldwt201bwa2007	2007-09-12	46.3033	-122.2648	990.00	o				
	B202	windyr202bwa2007	2007-07-25	46.2447	-122.1367	1218.60	o				
	B203	quarry203bwa2007	2007-07-18	46.1690	-122.3337	814.40	o				
	B204	marble204bwa2007	2007-08-01	46.1360	-122.1690	784.20	o				
Pacific North West, Washington, Oregon, N. California											
	B001	golbeck01bwa2005	2005-06-29	48.0431	-123.1314	237.00			o	o	
	B003	floequarybwa2005	2005-06-21	48.0624	-124.1409	284.66			o	o	
	B004	hokofallsbwa2005	2005-06-15	48.2019	-124.4270	30.00			o	o	
	B005	shoresnw1bwa2005	2005-07-19	48.0595	-123.5033	302.70			o	o	B006 B007
	B006	shoresne2bwa2005	2005-07-28	48.0588	-123.5008	302.00					B005 B007
	B007	shoresso3bwa2005	2005-07-23	48.0576	-123.5041	293.00					B005 B006
	B013	pnycrk013bwa2007	2007-01-05	47.8130	-122.9108	75.30					B943
	B014	quintl014bwa2008	2008-03-04	47.5133	-123.8125	64.70				o	
	B017	fliinkm017bwa2007	2007-07-11	46.9960	-123.5575	33.90					
	B018	delphi018bor2006	2006-01-21	46.9795	-123.0203	10.00				o	
	B019	waldrf019bwa2008	2008-05-12	46.6527	-123.6518	9.00					
	B020	wirkla020bwa2008	2008-03-30	46.3827	-123.8445	31.20					
	B022	seaside22bor2006	2006-02-02	45.9546	-123.9310	10.00			o	o	
	B023	cataln023bor2008	2008-05-16	46.1112	-123.0787	177.40					
	B024	kuntza024bor2006	2006-02-22	45.6378	-123.8558	37.70					
	B026	roosbc026bor2007	2007-02-24	45.3094	-123.8230	232.00					
	B027	lester027bor2007	2007-04-12	44.4973	-122.9622	216.00					B027 B028
	B028	lester028bor2007	2007-03-19	44.4937	-122.9638	140.00					
	B030	pattrs030bor2007	2007-10-22	43.9713	-122.7717	263.60					
	B031	hergrt031bor2007	2007-11-30	43.6651	-123.3964	688.50					B032
	B032	hergrt032bor2007	2007-12-02	43.6680	-123.3923	63.80					B031
	B033	vanvlk033bor2007	2007-12-13	43.2917	-123.1245	312.10					
	B035	grants035bor2006	2006-03-19	42.5035	-123.3834	370.00				o	B036
	B036	grants036bor2007	2007-05-08	42.5058	-123.3817	315.30					B035
	B039	cofft039bcn2007	2007-10-15	41.4667	-122.4847	923.90					
	B040	yorkmn040bcn2007	2007-10-12	41.8308	-122.4205	819.50					
	B941	kapows941bwa2008	2008-03-18	46.9868	-122.2190	151.00					
	B943	pnycrk943bwa2008	2008-02-26	47.8132	-122.9113	84.20					B013
Parkfield, California											
	B072	goldhl072bcn2007	2007-08-27	35.8310	-120.3450	397.70					B078
	B073	varian073bcs2006	2006-10-18	35.9467	-120.4717	535.28			o		
	B075	flengt075bcs2006	2006-10-13	35.9292	-120.5153	583.00					
	B076	donnal076bcs2006	2006-10-13	35.9398	-120.4248	445.00			o		
	B078	goldhl078bcs2006	2006-10-12	35.8377	-120.3452	386.80			o		B072
	B079	jackcn079bcs2006	2006-10-13	35.7157	-120.2057	1362.00			o		
	B900	blacka900bcn2007	2007-08-22	35.6860	-120.0030	219.50					
	B901	indspr901bcn2007	2007-09-26	35.6897	-120.1420	275.30					
San Francisco, California											
	B054	sibley054bcn2008	2008-08-21	37.8602	-122.1995	405.60				o	
	B057	lucasv057bcn2008	2008-06-10	38.0273	-122.5655	14.40				o	
San Juan Bautista, California											
	B058	sjgrad058bcn2007	2007-05-17	36.7995	-121.5808	114.20			o		
	B065	gabiln065bcn2007	2007-06-22	36.7437	-121.4742	643.00					
	B066	rockrd066bcn2007	2007-06-07	36.8575	-121.5922	67.00					
	B067	stoney067bcn2007	2007-06-12	36.7650	-121.5655	126.20			o		
Vancouver Island, Canada											
	B009	pacgeosi1bbc2005	2005-09-14	48.6487	-123.4512	15.00				o	B010 B011
	B010	pacgeosi2bbc2005	2005-09-26	48.6502	-123.4513	5.00			o		B009 B011
	B011	pacgeosi3bbc2005	2005-09-13	48.6495	-123.4482	22.00			o		B009 B010
	B012	ucluelet1bbc2005	2005-09-22	48.9246	-125.5420	13.00			o	o	
	B926	cowich926bbc2007	2007-11-12	48.8202	-124.1312	191.60				o	
	B927	albern927bbc2007	2007-12-06	49.2188	-124.8144	98.70				o	
	B928	bamfld928bbc2007	2007-11-28	48.8337	-125.1345	9.50				o	
Yellowstone, Wyoming											
	B205	norris205bwy2008	2008-07-16	44.7135	-110.6782	2295.90	o			o	
	B206	canyon206bwy2008	2008-06-27	44.7177	-110.5117	2399.50	o				
	B207	madisn207bwy2007	2007-10-17	44.6190	-110.8485	2182.00	o			o	
	B208	lakejn208bwy2007	2007-10-31	44.5602	-110.4015	2405.80	o				
	B944	grantt944bwy2008	2008-08-06	44.3897	-110.5438	2364.60	o				