PBO XML Format For Strain Data Version 1.0
Wednesday, September 28, 2005

1. Overview

Processed PBO borehole strainmeter (BSM) and laser strainmeter (LSM) data are available in eXtensible Markup Language (XML) format. The strainmeter XML format consists of two distinct sections, an instrument information section and a data section. The instrument information section contains the following sub-sections: station information, sensor information and processing information. The data section contains the strain measurements and time series corrections. The structure can be summarized as follows.

```
<strain_xml >
    <inst_info>
        <station_information>
        </station_information>
        <sensor_information>
        </sensor_information>
        <processing>
        </processing>
    </inst_info>
    <data>
    </data>
</strain_xml>
```

2. Instrument information

2.1 Station information

The station information section contains basic information about the site that is not expected to change. A user can view this part of the instrument information section to see quickly if it is the data set they are interested in. The following is an example of station information for a BSM at Hoko Falls. The elements are summarized in Table 1.

```
<station_information>
     <site_name>HokoFalls</site_name>
     <station_long>hokofalls_b004_makah_fishhatchery_sekiu_washington_2005_bsm</station_long>
     <station_short>HokoFallsBWA2005</station_short>
     <dot_number>B004</dot_number>
     <geocode>E4T1U2F6J0Q9</geocode>
     <itype>BSM_</itype>
     <model>GTSM21</model>
     <institution>PBO_UNAVCO</institution>
     <region>WA</region>
     <install_date>2005-06-15</install_date>
     <coordinate kind="station" ellipsoid="WGS84">
          <lat>48.201925</lat>
          <long>-124.427006</long>
          <height units="m">30</height>
     </coordinate>
     <minicluster_stations> </minicluster_stations>
     <time_zone>UTC</time_zone>
     <SEED>
          <site>B004</site>
```

<network>PB</network>
</SEED>
</station_information>

Table 1. Station Information Elements.

Element	Description
<site_name>	Site descriptive geographic name.
<station_long>	Station long name, up to 60 characters long.
<station_short>	Station's short name, a 16 character code.
<dot_number>	Four-character code that identifies the strainmeter.
<geocode>	Level-6 12-character GHAM code.
<itype>	4-character station type code: LSM_ Laser Strainmeter BSM_ Borehole Strainmeter
<model>	Strainmeter model e.g. GTSM
<institution>	Institution responsible for instrument e.g. PBO
<region>	PBO region 2-charcter code
<install_date>	Instrument installation date (YYYY-MM-DD).
<coordinate>	There are four kinds of coordinates: station center point of borehole strainmeter lsm_midpoint mid-point of laser strainmeter lsm_retro laser retro reflector coordinate lsm_interf Slaser interferometer coordinate The ellipsoid used is WGS84.
<lat>	Latitude.
<long>	Longitude.
<height units="m">	Height.
<minicluster_stations>	Contains the 4 character codes of other strainmeters in a minicluster.
<time_zone>	Time zone of dates and time in file (always UTC).
<SEED>	Strainmeter SEED code (http://www.iris.edu/manuals/SEED_chpt1.htm.)
<site>	SEED site code.
<network>	SEED network code, (PB for all PBO products).

2.2 Sensor Information

The sensor information section contains information about the sensors from which measurements have been used to create the processed data. For the BSMS there is at least one sensor response element for each gauge and the barometric pressure sensor. For the laser strainmeters there is at least one sensor response element for the strain measurement and for each of the optical anchors. Any time the sensor responses change a new sensor response element is created. The spans of time for which the responses are valid are given by the start and end time within the element. The sensor response element contents are summarized in Table 2. The following is an example of a sensor response element for one gauge within a Gladwin Tensor Strainmeter (GTSM) BSM.

```
<sensor_response>
        <sensor_start_date>2005-06-15T00:00:00</sensor_start_date>
        <sensor_end_date>Present</sensor_end_date>
        <sensor_type>Gladwin_BSM_component_1_</sensor_type>
        <sensor_code>E4T1U2F6J0Q9+BSM_+Gladwin_TSM_component_1_</sensor_code>
        <channel_code>Gladwin_BSM_component_1_+00086400</channel_code>
        <depth units="m">166.116</depth>
        <orientation direction="east_of_north" units="degrees">168.2</orientation>
        <sensor_volts_per_unit>0.0</sensor_volts_per_unit>
        <digitizer_counts_per_volt>0</digitizer_counts_per_volt>
        <scalefactor_units_per_count unit="nstrain"
                  kind="manufacturer">0.1</scalefactor_units_per_count>
        <voltage_input_to_logger></voltage_input_to_logger>
        <assigned_logger_bits>0</assigned_logger_bits>
        <datalogger_manufacturer>GTSM Technologies</datalogger_manufacturer>
        <datalogger_serial_number>PBO-05-000</datalogger_serial_number>
        <datalogger_model>GTSM21</datalogger_model>
        <sensor_serial_number>PBO-05-000</sensor_serial_number>
        <response>
              <real_poles> </real_poles>
              <imag_poles> </imag_poles>
              <real_zeros> </real_zeros>
              <imag_zeroes> </imag_zeroes>
        </response>
</sensor_response>
```

Table 2. Sensor Response Elements.

Element	Description
<sensor_start_date>	Date at which the sensor responses became valid (YYYY-MM-DDTHH:MM:SS).
<sensor_end_date>	Date at which the sensor responses ceased to be valid. (YYYY-MM-DDTHH:MM:SS). The term “present” indicates the information is still valid.
<sensor_type>	24-character descriptive sensor code.
<sensor_code>	Station location geocode plus station type plus the descriptive sensor code.
<channel_code>	The sensor type plus the number of samples in a 24-hour period.

<depth units="m">	Depth of instrument (m).
<orientation direction="east_of_north" units="degrees">	Orientation (degrees East of North).
<sensor_volts_per_unit>	Number of volts per unit count.
<digitizer_counts_per_volt>	Number of counts per volt.
<scalefactor_units_per_count unit="nstrain" kind="manufacturer">	Scale factor supplied by the manufacturer. Determined from lab calibrations.
<voltage_input_to_logger>	Voltage range input to the datalogger.
<assigned_logger_bits>	Number of assigned logger bits.
<datalogger_manufacturer>	Datalogger manufacturer.
<datalogger_serial_number>	Datalogger serial number.
<datalogger_model>	Datalogger model.
<sensor_serial_number>	Sensor serial number.
<response>	Description of the poles and zeroes
<real_poles>	Real poles.
<imag_poles>	Imaginary poles.
<real_zeros>	Real zeroes.
<imag_zeroes>	Imaginary zeroes.

2.3 Processing Information

The information required to derive the areal and shear strain from the gauge data for the BSMs and linear strain from the LSMs are given in the processing section. Because different steps are taken to process LSM and BSM data this section of the XML file will have different elements for each instrument type.

The processing information section is divided into blocks of processing history information describing how the data were processed between start and end dates. There may be more than one processing history element within the processing section. For example if between 1st June 2005 and 1st July 2006 the BSM data were processed using a certain set of scale factors and then from 1 July 2006 onwards the same data were reprocessed with a different set of scale factors there would be two processing history elements; one describing the first set of scale factors and the second describing the second set.

Within each processing history element there are lsm_processing of bsm_processing elements. These elements describe how the data where processed between a start and end time within the time series. There may be one or more of these processing elements within one processing history element. The following is an example of the processing section for a borehole strainmeter.

```
s<processing>
    <bsm_processing_history>
        <processing_history_start>2005-06-15T00:00:00</processing_history_start>
        <processing_history_end>2006-12-15T00:00:00</processing_history_end>
        <bsm_processing>
            <timeseries_start_date>2005-06-15T00:00:00</timeseries_start_date>
            <timeseries_end_date>2006-03-15T00:00:00</timeseries_end_date>
            (processing information)
        </bsm_processing>
        <bsm_processing>
            <timeseries_start_date>2006-03-15T00:00:00</timeseries_start_date>
            <timeseries_end_date>2006-12-15T00:00:00t</timeseries_end_date>
            (processing information)
        </bsm_processing_history>
    </bsm_processing_history>
    <bsm_processing_history>
        <processing_history_start>2006-12-15T00:00:00</processing_history_start>
        <processing_history_end>present</processing_history_end>
        <bsm_processing>
            <timeseries_start_date>2005-06-15T00:00:00</timeseries_start_date>
            <timeseries_end_date>2006-03-15T00:00:00</timeseries_end_date>
            (processing information)
        </bsm_processing>
        <bsm_processing>
            <timeseries_start_date>2006-03-15T00:00:00</timeseries_start_date>
            <timeseries_end_date>present</timeseries_end_date>
            (processing information)
        </bsm_processing_history>
    </bsm_processing_history>
<processing>
```

s2.3.1 BSM Processing Information

The following is an example of the processing information contained within one bsm_processing element. The elements are summarized in Table 3.

```
<bsm_processing>
    <timeseries_start_date>2005-06-15T00:00:00</timeseries_start_date>
    <timeseries_end_date>present</timeseries_end_date>
    <linearization>
        <linear_date>2005-06-29T00:00:00</linear_date>
        <g0_value>0.48391551</g0_value>
        <g1_value>0.49872537</g1_value>
        <g2_value>0.49840455</g2_value>
        <g3_value>0.49541471</g3_value>
    </linearization>
    <gauge_weightings>
        <gw0>1</gw0>
        <gw1>1</gw1>
        <gw2>1</gw2>
        <gw3>1</gw3>
    </gauge_weightings>
```

<orientation_matrix>
<o11>0.5</o11>
<o12>0.45818</o12>
<o13>-0.200177</o13>
<o21> 0.5 </o21>
<o22>-0.402449</o22>
<o23>-0.296706</o23>
<o31>0.5</o31>
<o32>-0.0557338</o32>
<o33>0.496884</o33>
<o41>0.5 </o41>
<o42>0.401409</o42>
<o43>0.298112</o43>
</orientation_matrix>
<areal_and_shear_factors>
<c_areal>1.5</c_areal>
<d_shear>3.0</d_shear>
</areal_and_shear_factors>
<topography></topography>
<atm_pressure unit="millibars_per_microstrain">
<apc_g0>-0.00187</apc_g0>
<apc_g1>-0.00188</apc_g1>
<apc_g2>-0.00265</apc_g2>
<apc_g3>-0.00211</apc_g3>
</atm_pressure>
<tidal_parameters>
<units phase="degrees" potential="local" lag="negative" amp="nanostrain"/>
<tide name="M2" period_hours="12.42" doodson="2 0 0 0 0 0">
<phz kind="gauge0">117.0</phz>
<amp kind="gauge0">10.9</amp
</tide>
<tide name="O1" period_hours="25.82" doodson="1 -1 0 0 0 0 ">
<phz kind="gauge0">50.6</phz>
<amp kind="gauge0">8.6</amp>
</tide>
…..
(repeat for each of the four gauges)
…..
</tidal_parameters>
<detrend_g0 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">
<F>-4.4</F>
<A1>-6.0034</A1>
<T1>-.54857</T1>
<M>-0.42909</M>
<A2>8.6</A2>
<T2>.0115</T2>
</detrend_g0>
<detrend_g1 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">
<F>-5.28055</F>
<A1>-4.673</A1>
<T1>-.409</T1>
<M>-0.020709</M>
<A2>6.9725</A2>
<T2>-0.017637</T2>

</detrend_g1>
<detrend_g2 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">
<F>4.64</F>
<A1>-7.6548</A1>
<T1>-0.40383</T1>
<M>0.059574</M>
<A2>-7.6533</A2>
<T2>-0.027437</T2>
</detrend_g2>
<detrend_g3 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">
<F>-1.0278</F>
<A1>3.3555</A1>
<T1>-0.060154</T1>
<M>-0.037414</M>
<A2>0</A2>
<T2>0</T2>
</detrend_g3>
<decimate_by_two_filter kind="acausal" number="30">
0.0983262 0.2977611 0.4086973 0.3138961 0.0494246
-0.1507778 -0.1123764 0.0376576 0.0996838 0.0154992
-0.0666489 -0.0346632 0.0322767 0.0399294 -0.0097461
-0.0341585 -0.0039241 0.0246776 0.0099725 -0.0157879
-0.0099098 0.0078510 0.0081126 -0.0026986 -0.0061424
0.0007108 0.0039659 -0.0006209 -0.0017117 0.0007240
</decimate_by_two_filter>
<decimate_by_three_filter kind="acausal" number="23">
0.0373766 0.1165151 0.2385729 0.3083302 0.2887327
0.1597948 0.0058244 -0.0973639 -0.1051034 -0.0358455
0.0359044 0.0632477 0.0302351 -0.0168856 -0.0356758
-0.0190635 0.0126188 0.0159705 0.0082144 -0.0087978
-0.0037289 -0.0017068 0.0028335
</decimate_by_three_filter>
<decimate_by_five_filter kind="acausal" number="34">
0.0218528 0.0458359 0.0908603 0.1359777 0.1830881
0.1993418 0.1957624 0.1561194 0.0994146 0.0346412
-0.0236544 -0.0580081 -0.0703257 -0.0555546
-0.0287709 0.0032613 0.0267938 0.0358952 0.0311186
0.0134283 -0.0028524 -0.0170042 -0.0176765
-0.0123123 -0.0036798 0.0057730 0.0059817 0.0083501
0.0000581 0.0005724 -0.0033127 0.0004411 -0.0030766
0.0016604
</decimate_by_five_filter>
</bsm_processing>

Table 3. BSM Processing Elements.

Element	Description
<timeseries_start_date>	Date within the time series at which the processing information becomes valid. (YYYY-MM-DDTHH:MM:SS)
<timeseries_end_date>	Date within the time series at which the processing information ceases to be valid. (YYYY-MM-DDTHH:MM:SS) The term "present" indicates the information is still valid.
<linearization>	Information on how the gauge readings are converted to linear strain.
<linear_date>	Date of reference point for linearization.
<g0_value>	Gauge-0 value used to linearize gauge 0 data.
<g1_value>	Gauge-1 value used to linearize gauge 1 data.
<g2_value>	Gauge-2 value used to linearize gauge 2 data.
<g3_value>	Gauge-3 value used to linearize gauge 3 data.
<gauge_weightings> <gw0> <gw1> <gw2> <gw3>	Gauge weights used to combine gauge data into areal and shear strain. The gauge weighting matrix is: $\begin{bmatrix} g_{w0} & 0 & 0 & 0 \\ 0 & g_{w1} & 0 & 0 \\ 0 & 0 & g_{w2} & 0 \\ 0 & 0 & 0 & g_{w3} \end{bmatrix}$
<orientation_matrix> <o11> <o12> <o13> <o21> <o22> <o23> <o31> <o32> <o33> <o41> <o42> <o43>	The gauge orientation matrix used to combine gauge data into areal and shear strain. The orientation matrix is: $\begin{bmatrix} o_{11} & o_{12} & o_{13} \\ o_{21} & o_{22} & o_{23} \\ o_{31} & o_{32} & o_{33} \\ o_{41} & o_{42} & o_{43} \end{bmatrix}$
<areal_and_shear_factors> <c_areal> <d_shear>	Scale factors used to create areal and shear strain. The values form the coupling matrix: $\begin{bmatrix} c & 0 & 0 \\ 0 & d & 0 \\ 0 & 0 & d \end{bmatrix}$ where c is the c_areal value and d is the d_shear value.
<topography>	Matrix describing the topographic effects.

<atm_pressure unit="millibars_per_microstrain">	Atmospheric Pressure Response coefficients. The atmospheric pressure correction for each gauge is calculated by multiplying the pressure by each gauge factor.
<apc_g0>	Response coefficient for gauge0.
<apc_g1>	Response coefficient for gauge1.
<apc_g2>	Response coefficient for gauge2.
<apc_g3>	Response coefficient for gauge3.
<tidal_parameters>	Parameters used to generate the tidal correction.
<units phase="degrees" potential="local" lag="negative" amp="nanostrain"/>	Describes the units and convention of the tidal calculations.
<tide name="M2" period_hours="12.42" doodson="2 0 0 0 0 0">	Contains the name, period in hours and Doodson numbers for each tide described. There is no upper limit on the number of tides described.
<phz kind="gauge0">	The phase of the tide with respect to the local potential. There are four kinds for the BSMs: gauge0, gauge1, gauge2, gauge3.
<amp kind="gauge0">	The amplitude of the tide. There are four kinds for the BSMs: gauge0, gauge1, gauge2, gauge3.
<detrend_g0 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">	Borehole curing and detrending information for gauge0. These elements contain the parameters used to generate the borehole effects. The model is the equation used to generate the correction. The variable “t’ is time in days since installation.
<F>	F in the borehole model equation.
<A1>	A1 in the borehole model equation.
<T1>	T1 in the borehole model equation.
<M>	M in the borehole model equation.
<A2>	A2 in the borehole model equation.
<T2>	T2 in the borehole model equation.
<detrend_g1 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">	Borehole curing and detrending information for gauge1.
<detrend_g2 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">	Borehole curing and detrending information for gauge2.
<detrend_g3 units="microstrain" model="F+A1*exp(T1*t)+M*t+A2*exp(T2*t)">	Borehole curing and detrending information for gauge3.

<decimate_by_two_filter kind="acausal" number="30">	Filter weights for the decimate by two filter used to reduce the data from 1 sps to 300 second interval.
<decimate_by_three_filter kind="acausal" number="23">	Filter weights for the decimate by three filter used to reduce the data from 1 sps to 300 second interval.
<decimate_by_five_filter kind="acausal" number="34">	Filter weights for the decimate by five filter used to reduce the data from 1 sps to 300 second interval.

2.3.2 LSM Processing Elements

The following is an example of the processing information contained within one lsm_processing element. Elements not described in Table 3 are summarized in Table 4.

```
<lsm_processing>
    <timeseries_start_date>2005-06-01T00:00:00</timeseries_start_date>
    <timeseries_end_date>Present</timeseries_end_date>
    <linear_strain factor="strain_per_count">1.95500E-10</linear_strain>
    <tidal_parameters>
        <units phase="degrees" potential="local" lag="negative" amp="nanostrain"/>
        <tide name="M2" period_hours="12.42" doodson="2 0 0 0 0 0">
            <phz kind="lsm">0.0</phz>
            <amp kind="lsm">0.0</amp>
        </tide>
        <tide name="O1" period_hours="25.82" doodson="1 -1 0 0 0 0 ">
            <phz kind="lsm">0.0</phz>
            <amp kind="lsm">0.0</amp>
        </tide>
    </tidal_parameters>
    <optical_anchor_retroreflector_scalefactor> 1.0 </optical_anchor_retroreflector_scalefactor>
    <optical_anchor_interferometer_scalefactor> 1.0 </optical_anchor_interferometer_scalefactor>
    <laser_frequency_correction_scalefactor> 1.0 </laser_frequency_correction_scalefactor>
    <decimate_by_two_filter kind="acausal" number="30">
        0.0983262 0.2977611 0.4086973 0.3138961 0.0494246
        -0.1507778 -0.1123764 0.0376576 0.0996838 0.0154992
        -0.0666489 -0.0346632 0.0322767 0.0399294 -0.0097461
        -0.0341585 -0.0039241 0.0246776 0.0099725 -0.0157879
        -0.0099098 0.0078510 0.0081126 -0.0026986 -0.0061424
        0.0007108 0.0039659 -0.0006209 -0.0017117 0.0007240
    </decimate_by_two_filter>
    <decimate_by_three_filter kind="acausal" number="23">
        0.0373766 0.1165151 0.2385729 0.3083302 0.2887327
        0.1597948 0.0058244 -0.0973639 -0.1051034 -0.0358455
        0.0359044 0.0632477 0.0302351 -0.0168856 -0.0356758
        -0.0190635 0.0126188 0.0159705 0.0082144 -0.0087978
        -0.0037289 -0.0017068 0.0028335
    </decimate_by_three_filter>
    <decimate_by_five_filter kind="acausal" number="34">
        0.0218528 0.0458359 0.0908603 0.1359777 0.1830881
```

```
        0.1993418 0.1957624 0.1561194 0.0994146 0.0346412
        -0.0236544 -0.0580081 -0.0703257 -0.0555546
        -0.0287709 0.0032613 0.0267938 0.0358952 0.0311186
        0.0134283 -0.0028524 -0.0170042 -0.0176765
        -0.0123123 -0.0036798 0.0057730 0.0059817 0.0083501
        0.0000581 0.0005724 -0.0033127 0.0004411 -0.0030766
        0.0016604
    </decimate_by_five_filter>
</lsm_processing>
```

Table 4. LSM Processing Elements

Element	Description
<phz kind="lsm">	The phase of the tide with respect to the local potential. There is one kind for the LSMs, lsm.
<amp kind="lsm">	The amplitude of the tide. There is one kind for the LSMs, lsm .
<linear_strain factor="strain_per_count">	Strain per unit count.
<optical_anchor_retroreflector_scalefactor>	Scale factor applied to the retro reflector optical anchor measurements to create the optical anchor correction.
<optical_anchor_interferometer_scalefactor>	Scale factor applied to the interferometer optical anchor measurements to create the optical anchor correction.
<laser_frequency_correction_scalefactor>	Laser frequency correction scale factor.

3. Data

The data are contained in observation (<obs>) elements. In the LSM XML files there is one observation element for each sample point. For the BSM XML files there are seven observation elements for each sample point, one for each of: gauge0, gauge1, gauge2, gauge3, Eee+Enn, Eee-Enn and 2Ene.

3.1 BSM Observation Elements

An example of borehole strainmeter observation element follows. The elements are described in Table 5.

```
<obs strain="gauge2">
    <date>2005-09-25T23:50:00</date>
    <doy>267</doy>
    <MJD>53638.993056<MJD>
    <s>    10.2632</s>
    <s_q>g</s_q>
    <tc>   0.0185</tc>
    <dtc>  10.2500</dtc>
    <apc>  -0.0091</apc>
    <apc_q>i</apc_q>
    <v>2005270201116</v>
```

```
    <level>2a</level>
</obs>
```

Table 5. BSM Observation Elements.

Element	Description
<obs strain="gauge2">	Observation element. There are seven kinds for the BSM: gauge0 linearized strain data from gauge0. gauge1 linearized strain data from gauge1. gauge2 linearized strain data from gauge2. gauge3 linearized strain data from gauge3. Eee+Enn areal strain computed using data from the 4 gauges. Eee-Enn gamma1 shear strain computed using data from the 4 gauges. 2Ene gamma2 shear strain computed using data from the 4 gauges.
<date>	Date of observation (YYYY-MM-DDTHH:MM:SS).
<doy>	Day of year (1 .. 366).
<MJD>	Modified Julian Date.
<s>	Strain (microstrain).
<s_q>	Quality of strain value. The possible quality flags are: g good: the data is of good quality. m missing: there is no strain measurement for the sample time. b bad: the data is thought to not be a true measure of the strain, e.g., it is known that engineers where working at the strainmeter at that time. i interpolated: the value has been determined through linear interpolation. p imputed: the value has been generated using a combination of a linearly interpolated value and a predicted value, e.g., linearly interpolated strain + predicted earth tides.
<tc>	Tidal correction.
<dtc>	Detrend correction.
<apc>	Atmospheric pressure correction.
<apc_q>	Atmospheric pressure correction quality flag. The same flags are used as for the strain quality element.
<v>	Version. A version number that uniquely identifies the XLM file. It reflects the date and time of the file creation (YYYYDDDHHMMSS).
<level>	Processing level, 2a or 2b.

3.2 LSM Observation Elements

An example of an LSM observation element follows. Elements not already described in Table 5 are described in Table 6.

```xml
<obs strain="lsm">
    <date>2005-05-30T00:00:00</date>
    <doy> 150</doy>
    <MJD>53520.000000</MJD>
    <s> 26.0</s>
    <s_q>g</s_q>
    <tc> 62.7</tc>
    <oaic> 43.0</oaic>
    <oaic_q>g</oaic_q>
    <oarc> 314.0</oarc>
    <oarc_q>g</oarc_q>
    <v>20050829174853</v>
    <level>2a</level>
</obs>
```


Table 6. LSM Observation Elements.

Element	Description
<obs strain="lsm">	Observation element. There is one kind for the LSM: lsm linear strain
<oaic>	Optical anchor interferometer-end correction.
<oaic_q>	Quality flag for the optical anchor interferometer-end correction. Possible values are as listing for strain in Table 5.
<oarc>	Optical anchor retro reflector-end correction.
<oarc_q>	Quality flag for the optical anchor retro reflector-end correction. Possible values are as listing for strain in Table 5.