

Strainmeter and Tiltmeter Instrumentation

General

- D. C. Agnew (1986). Strainmeters and tiltmeters, *Rev. Geophys.*, **24**, 579–624.
Exhaustive, and exhausting, coverage of this class of instrumentation as of 1986 (not that much has changed since then in instrument design). Does show any data or discuss data processing.
- D. C. Agnew (1987). The continuous measurement of crustal deformation, *Methods in Experimental Physics*, **24B**, 409-439
A condensed version of the above.

Borehole Strainmeters

- I. S. Sacks, S. Suyehiro, D. W. Evertson, and Y. Yamagishi (1971). Sacks-Evertson strainmeter, its installation in Japan and some preliminary results concerning strain steps, *Pap. Meteor. Geophys.*, **22**, 195–207
Description of the original Sacks-Evertson dilatometer; note that some of the methods used have changed since that time.
- M. T. Gladwin (1984). High precision multi-component borehole deformation monitoring *Rev. Sci. Instrum.*, **55**, 2011–2016
Included in your packet of information.
- S. Sakata and H. Sato (1986). Borehole-type tiltmeter and three-component strainmeter for earthquake prediction *J. Phys. Earth*, **34**, S129–S140
Describes the 3-component hydraulic strainmeter, as used in the mini-PBO.

Laser Strainmeters

- J. Berger and R. H. Lovberg (1969). *A laser earth strain meter Rev. Sci. Instr.*, **40** 1569-1575
- J. Berger and R. Lovberg (1970). Earth strain measurements with a laser interferometer *Science*, **170**, 296–303
The original papers on this instrument.
- F. Wyatt, K. Beckstrom, and J. Berger (1982). The optical anchor – a geophysical strainmeter *Bull. Seismol. Soc. Am.*, **72**, 1707–1715
- M. A. Zumberge and F. K. Wyatt (1998). Optical fiber interferometers for referencing surface benchmarks to depth *Pure Appl. Geophys.*, **152**, 221-246
The original paper on this system, and its extension to optical fibers.
- D. C. Agnew and F. K. Wyatt (2003). Long-base laser strainmeters: a review, *SIO Technical Report*, **2**, <http://repositories.cdlib.org/sio/techreport/2/>
Another exhaustive description, of the instruments, their operation and design, and results from those installed at the time.

Long-Base Tiltmeters

- J. Beavan and R. Bilham (1977). Thermally induced errors in fluid tube tiltmeters, *J. Geophys. Res.*, **82**, 5699–5704
- R. Bilham, R. Plumb and J. Beavan (1979). Design considerations in an ultra-stable, long baseline tiltmeter – Results from a laser tiltmeter. Pp 235–254 of *Terrestrial and Space Techniques in Earthquake Prediction Research*, ed by A. Vogel. (Friedrich Vieweg, Wiesbaden, Germany)