

Earth's Free Oscillations Excited by Sumatra Earthquake Observed with Laser Strainmeters in Kamioka

Satoshi Yoshii[1]; Shuzo Takemoto[2]; Yoichi Fukuda[1]; Toshihiro Higashi[3]; Hideaki Hayakawa[1]; Akito Araya[4]; Akiteru Takamori[5]; Wataru Morii[6]; Masatake Ohashi[7]

[1] Geophysics, Kyoto Univ.; [2] Kyoto Univ; [3] Dep. of Geophys., Kyoto Univ.; [4] ERI, Univ. Tokyo; [5] Earthq. Res. Inst., Univ. Tokyo; [6] RCEP, DPRI, Kyoto-Univ.; [7] ICRR, Tokyo univ.

We have installed a laser strainmeter system in a deep tunnel at kamioka, Gifu prefecture, Japan. It has been recording crustal deformation since June 11, 2003. It consists of three types of independent interferometers in the L-shaped vacuum pipes, each of which has a length of 100m. The laser source of strainmeters is a frequency-doubled YAG laser with a wavelength of 532nm. The laser frequency is locked onto an iodine absorption band of saturation spectroscopy and the stability of 2×10^{-13} is obtained. Consequently, quantitative measurement of crustal strains of the order of 10^{-13} can be obtained by employing the laser strainmeter system at Kamioka.

Though we don't have a long time series of the strain data after the Sumatra earthquake of December 2004 because of some troubles of the laser source, we roughly found some fundamental normal modes by performing spectrum analysis with Fourier transform method and Maximum entropy method. In this research, we discuss the results of comparing these spectra with those of Tokachi earthquake of 2003 at Kamioka and Sumatra earthquake at Matsushiro.