# 1980年伊豆半島東方沖地震に伴った地殻内地震波速度変化の研究

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# 2004 Fiscal Year Final Research Report Summary

## Study on seismic wave velocity changes in the crust associated with the 1980 Izu-Hanto-Toho-Oki Earthquake

Research Project

### Project/Area Number

15540409

### Research Category

Grant-in-Aid for Scientific Research (C)

### Allocation Type

Single-year Grants

### Section

一般

### Research Field

Solid earth and planetary physics

### Research Institution

Kanazawa University

### Principal Investigator

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### Project Period (FY)

**2003 – 2004**

### Keywords

seismic wave / velocity change / stress dependence / stress in the crust

### Research Abstract

An experiment to detect temporal velocity changes of seismic waves was conducted in 1979-1986 in Kanto and Tokai regions, Japan. Analyzing the travel times observed in the experiment, we have already found that stress variation generated by ocean tides and the tectonic stress accumulation gives rise to the temporal velocity changes in the crust. The Izu-Hanto-Toho-Oki earthquake took place in 1980 within the experiment area. It is supposed that the stress changes associated with the earthquake caused the velocity changes of seismic waves in the crust around the source. We detect the temporal variation of seismic wave velocities, after removing effects of the velocity changes caused by ocean tides and a secular stress accumulation in the crust from the observed travel times. We also investigate the spatial distribution of the stress sensitivity of seismic waves in the crust using the observed velocity changes related the tides, the tectonic stress, and the earthquake. We calculate apparent

sensitivities of the velocity to the stress using the observed velocity changes and the relevant stress changes along the wave paths. We compile also apparent stress sensitivities reported by many other researchers. The observed apparent stress sensitivity rapidly decreases with the base line length, which means that the stress sensitivity should sharply decreases with depth. The stress sensitivity is estimated to be about 1 (1/MPa) at the surface and decrease by one order of magnitude every few kilometers.

## Research Products (8 results)

All | 2005 | 2004 | 2003

All | Journal Article

- [Journal Article] Seismological evidence on characteristic time of crack healing in the shallow crust — 2005
- [Journal Article] Seismological evidence on characteristic time of crack healing in the shallow crust — 2005
- [Journal Article] Stress sensitivity of seismic wave velocity in the crust — 2004
- [Journal Article] Stress sensitivity of seismic wave velocity in the crust — 2004
- [Journal Article] 地震波速度変化と地殻内応力の測定 — 2003
- [Journal Article] Spatial variation in the crustal anisotropy and its temporal variation associated with the moderate size earthquake in the Tokai region, central Japan — 2003
- [Journal Article] Velocity changes of seismic waves and monitoring stress in the crust — 2003
- [Journal Article] Spatial variation in the crustal anisotropy and its temporal variation associated with the moderate size earthquake in the Tokai region, central Japan — 2003

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