

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

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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 decrease 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 ▾
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- [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 ▾

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-15540409/155404092004kenkyu_seika_hokoku

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