

【Grant-in-Aid for Scientific Research (S)】
Integrated Disciplines (Complex Systems)



Title of Project : Urgency Evaluation of the Nankai Great Earthquake and Tsunami by Scientific Ocean Drilling

Gaku Kimura
(The University of Tokyo, Graduate School of Science, Professor)

Research Project Number : 15H05717 Researcher Number : 80153188

Research Area : Complex Systems (Social/Safety system science)

Keyword : Seismic hazard, Tsunami

【Purpose and Background of the Research】

Our scientific objective is to quantitatively evaluate the urgent state of the great subduction-zone earthquake in the Nankai Trough off SW Japan, which is a site where great subduction-zone earthquakes have repeatedly occurred more than 1,300 years, lost tremendous amount of lives and properties, and the hazard risk to occur in 30 years is high. To realize our goal, our strategy consists of the following three tactics.

(1) quantify the in-situ stress state and pore fluid pressure of the hanging wall of the plate boundary fault and the fault itself (2) evaluate the effective strength of the plate boundary fault together with fault structure, and (3) continuous and repeating observation of the physical properties and state of the plate boundary fault by seismic study. Integrating these researches, we will quantitatively evaluate the urgency status of the coming Nankai earthquake and tsunami.

【Research Methods】

(1) To obtain the stress and effective stress, we conduct logging of the drilling borehole, anelastic stress measurement for the core sample, and their integrations for the seismic reflection survey.

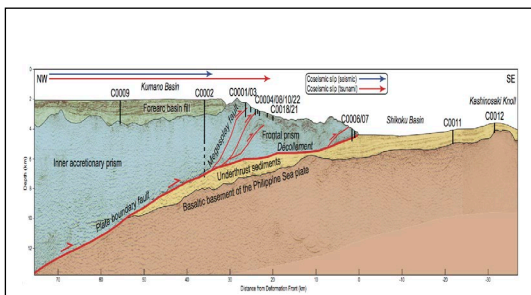


Figure 1 seismic reflection profile and its interpretation with drilling sites of the Nankai Trough off the Kii Peninsula, SW Japan

(2) To obtain effective strength of the plate boundary fault, friction experiments for the plate boundary fault and hanging wall are conducted under the in-situ condition and their results will be compared with in-situ stress state.

(3) To obtain the space-temporal change in effective

stress condition in the hanging wall and plate boundary fault, we conduct 3D vertical seismic reflection experiment in the borehole and repeat surrounding seismic reflection survey around the borehole observatories.

【Expected Research Achievements and Scientific Significance】

Achievement of the goal will pave a road of new science and technology to quantitatively evaluate the urgency of the subduction zone earthquake and tsunami. Its societal relevance for the hazard risk management is clear. The research is conducted under the collaboration with International Ocean Discovery Program (IODP), and will suggest a new Japanese international initiative for the science and technology in this field.

【Publications Relevant to the Project】

• Kimura, G., Hamahashi, M., et al., (2013), J.

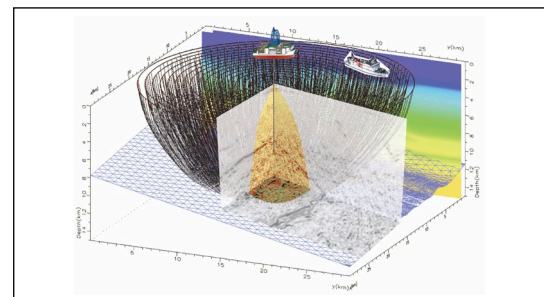


Figure 2 Surrounding 3D vertical seismic reflection survey around seismometer array in the borehole Struct. Geol., 52, 136–147.

• Accretionary prism and seismogenic zone of the great earthquakes, 2009, Kimura G. and Kinoshita M. Eds, Tokyo Univ. Press, 281pp.

【Term of Project】 FY2015-2019

【Budget Allocation】 153,500 Thousand Yen

【Homepage Address and Other Contact Information】

<http://www-solid.eps.s.u-tokyo.ac.jp/~gaku/>
gaku@eps.s.u-tokyo.ac.jp