INGV ANNALS OF GEOPHYSICS

Study of blind thrust faults underlying Tokyo and Osaka urban areas using a combination of high-resolution seismic reflection profiling and continuous coring

Y. Sugiyama, K. Mizuno, F. Nanayama, T. Sugai, H. Yokota, T. Hosoya, K. Miura, K. Takemura, N. Kitada

Abstract

We acquired high-resolution seismic reflection profiles and continuously cored boreholes to evaluate active flexures produced by major blind thrust fault systems within two densely populated Neogene-Quaternary sedimentary basins in Japan: the Fukaya Fault System near Tokyo in the Kanto Basin and the Uemachi Fault System in the Osaka Basin. The high-resolution seismic reflection survey made clear the length, geometry and growth history of fault-related folds, or flexures formed above the two blind thrusts. Continuously cored boreholes linked with high-resolution seismic profiles enabled us to estimate the uplift rate as defined by shallow stratigraphic horizons and constrain the age of the most recent growth of the flexures during earthquakes on the Fukaya and Uemachi fault systems. Even with the high quality of the data we collected, it is still not possible to exactly constrain the age of the most recent blind thrust earthquake recorded by flexure of these fault-related folds. Data presented in this paper form the basis for future efforts aimed at mechanical and kinematic models for fault growth to evaluate the activity of blind thrusts underlying urban areas.

Keywords

blind thrust;fault-related fold;flexure;high-resolution seismic reflection profiling;continuou scoring

Full Text:

PDF

References

DOI: https://doi.org/10.4401/ag-3446

Published by INGV, Istituto Nazionale di Geofisica e Vulcanologia - **ISSN:** 2037-416X

Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

K. Mizuno
Active Fault Research Center, Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology, Osaka, Japan

F. Nanayama
Active Fault Research Center, Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan

T. Sugai
Department of Natural Environmental Studies, University of Tokyo, Japan

H. Yokota
Hanshin Consultants Co. Ltd., Osaka, Japan

T. Hosoya
Chuo Kaihatsu Corporation, Tokyo, Japan

K. Miura
Kiso-jiban Consultants Co. Ltd., Chiba, Japan

K. Takemura
Institute for Geothermal Sciences, Kyoto University, Beppu, Japan

N. Kitada
Geo-Research Institute, Osaka, Japan

KEYWORDS

Central Italy Earthquake GPS Historical seismology Ionosphere Irpinia earthquake Italy Mt. Etna Seismic hazard Seismic hazard assessment Seismology UN/IDNDR earthquake earthquakes historical earthquakes ionosphere magnetic anomalies paleoseismology seismic hazard seismicity seismology