

日本周辺海域の断層データベース・システムの構築

Construction of Database System on Offshore Faults around Japan

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JAMSTEC has performed the project for “Comprehensive Evaluation of Offshore Fault Information” sponsored by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) since FY2013. The project consists of three themes named “Sub-theme 1” gathering various kinds of existing geological/geophysical information and constructing offshore fault database system (DB), “Sub-theme 2” re-processing seismic data and interpreting offshore faults based on unified evaluation standard, and “Sub-theme 3” building offshore fault models conducted by NIED.

In Sub-theme 1, JAMSTEC has obtained or borrowed huge volumes of multi-channel seismic (MCS)/single-channel seismic (SCS) reflection data and ocean bottom seismometer (OBS) refraction data surveyed around Japan from various organizations including national research institutes and private enterprises, and has collected seismic velocity information, bathymetry data etc. After the quality check of these data, they are made into a database and unitary management of them are carried out. The final output of Sub-theme 1 is an offshore fault DB comprising the data sets of collected/re-processed seismic data and overall offshore fault information provided by Sub-theme 2 and Sub-theme 3. In Sub-theme 2, the past old-fashioned MCS data have been re-processed applying the latest sophisticated technology with de-multiple filtering and noise suppression for obtaining the high resolution profile of these seismic sections. Using the MCS/SCS data, offshore faults around Japan have been identified based on unified evaluation standard. Some geological horizons and a plate boundary have been also interpreted to model subsurface geometry and 3D velocity structure. The final output of Sub-theme 2 is to delineate the spatial distribution and continuity of identified faults on the high resolution bathymetric map such as a red relief image map, and to organize their features/parameters such as type, length, dipping direction, extension etc. after the seismic time–depth conversion using 3D velocity structure model. The 3D velocity structure has been modeled using collected OBS refraction data, velocity analysis results in MCS re-processing and some available published data. In Sub-theme 3, NIED has built the offshore fault models based on a fault information catalog completed by Sub-theme 2. The model validation for historical earthquake source faults with the magnitude over seven has been also conducted through ground motion and tsunami simulations.

This poster presentation focuses on the offshore fault DB constructed by Sub-theme 1 of the project. JAMSTEC has finished the clarification of faults in the Sea of Japan, and around the sea area of the Nansei Islands and Izu-Ogasawara Islands by FY2017. We are currently working on the interpretation of subsurface structure and fault distribution in the Nankai Trough area, and continue to register MCS/SCS reflection time/depth sectional figures, 3D velocity models, NIED’s fault models and their parameters

into the DB sequentially. The trial operation of the DB has been also done at the subcommittee of the Headquarters for Earthquake Research Promotion of MEXT. The DB is highly expected to become a useful tool that contribute to tsunami hazard evaluation and disaster management conducted by Japanese government and local authorities, and that improve the public awareness against disaster prevention.

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