

## HOKUDAN 2025: Active fault research for better preparedness for earthquakes

Preparedness is the key to mitigate earthquake disasters. We are not able to prevent or to predict an earthquake that may hit us at any moment. However, we are able to learn about the characteristics of the earthquake through the history and geology. Then we prepare for the hazard with the knowledge.

1995 Hyogo-ken Nambu earthquake and the Hanshin-Awaji earthquake disasters were so devastating because of the lack of the knowledge. The damaged areas in 1995 were not prepared well for the hazards owing to the lack of historic records and to the insufficient information on the geology of earthquakes. There was no historic record on very strong shaking in Kobe and in Awaji island. The Nojima fault on Awaji island, the surface rupture during the 1995 earthquake had been mapped but its earthquake potential was not investigated. Studies on active faults had advanced since 1980s, but the results were not well disseminated for preparedness. Strong motion seismology had waited for the 1995 earthquake to start the development.

The 1995 earthquake and disasters changed the science and the politics on earthquake hazards and disasters greatly. Long-term evaluation of earthquake sources, forecasts of earthquakes from known sources, and estimation of ground motion realized the probabilistic hazard maps of Japan in 2005. Preparedness based on forecasts became the key for disaster mitigation after 1995 disasters. In 30 years, scientists together with engineers, national and local governments, and practitioners in various specialities sought after safer society for earthquake hazards. Like in Japan, many areas in the world learned a lot from earthquake disasters in 1980s and 1990s have promoted earthquake safety.

However, unexpected hazards as pure surprises such as 2011 Tohoku, 2023 Kahramanmaras, and 2024 Noto Peninsula earthquakes attack unprepared areas and result in devastating disasters. Obviously, our knowledge on earthquakes, evaluation of hazards, and public dissemination are not sufficient. We need to study more on active faulting and its consequences and disseminate the information to establish and improve preparedness in earthquake prone areas. Hokudan 2025 will be an important opportunity to learn about recent disasters, frontiers of studies on active fault research, and ways to make our communities safer from earthquakes.