



Abstract

Recently, many destructive earthquakes and tsunamis occurred in the world such as 2011 Tohoku earthquake in Japan, 2018 Palu earthquake/ tsunami at Sulawesi Island in Indonesia etc. Therefore, off shore real time monitoring systems around seismogenic zones are very important for early detection of earthquake and tsunamis. Furthermore, these system are also indispensable to understand crustal activities and phenomena as precursors. In Japan, Ocean floor network systems as DONET and S-NET already deployed for early warning and prediction researches. Recently, N-NET will be developed and deployed around western part of Nankai trough seismozenic zone in southwestern Japan.

In DONET system, DONET1 and DONET2 are focusing on the Nankai Trough seismogenic zone southwestern Japan, S-NET is focusing on off east Japan based on lessons learned from 2011 Tohoku earthquake. The system of N-NET will be developed as the hybrid system of DONET and S-NET. For disaster mitigation, not only real time data but also advanced simulation are indispensable. We developed the recurrence simulation of mega thrust earthquakes, data assimilation and real time inundation simulation using real time data in Nankai trough seismozenic zone. In this presentation, we explain Japanese ocean floor networks and advanced simulation researches.

1 Real time monitoring in Japan

In Japan, many real time monitoring systems have been developed such as Hi-NET, GEONET, DONET and S-NET etc.(Figure1). Hi-NET and GEONET are Earthquake and GNSS network systems in land, on the other hand, DONET and

S-NET are ocean floor network system for Earthquake and Tsunami monitoring system. Furthermore, N-NET is ocean floor network system in western part of Nankai Trough but it is under planning (Figure 2).

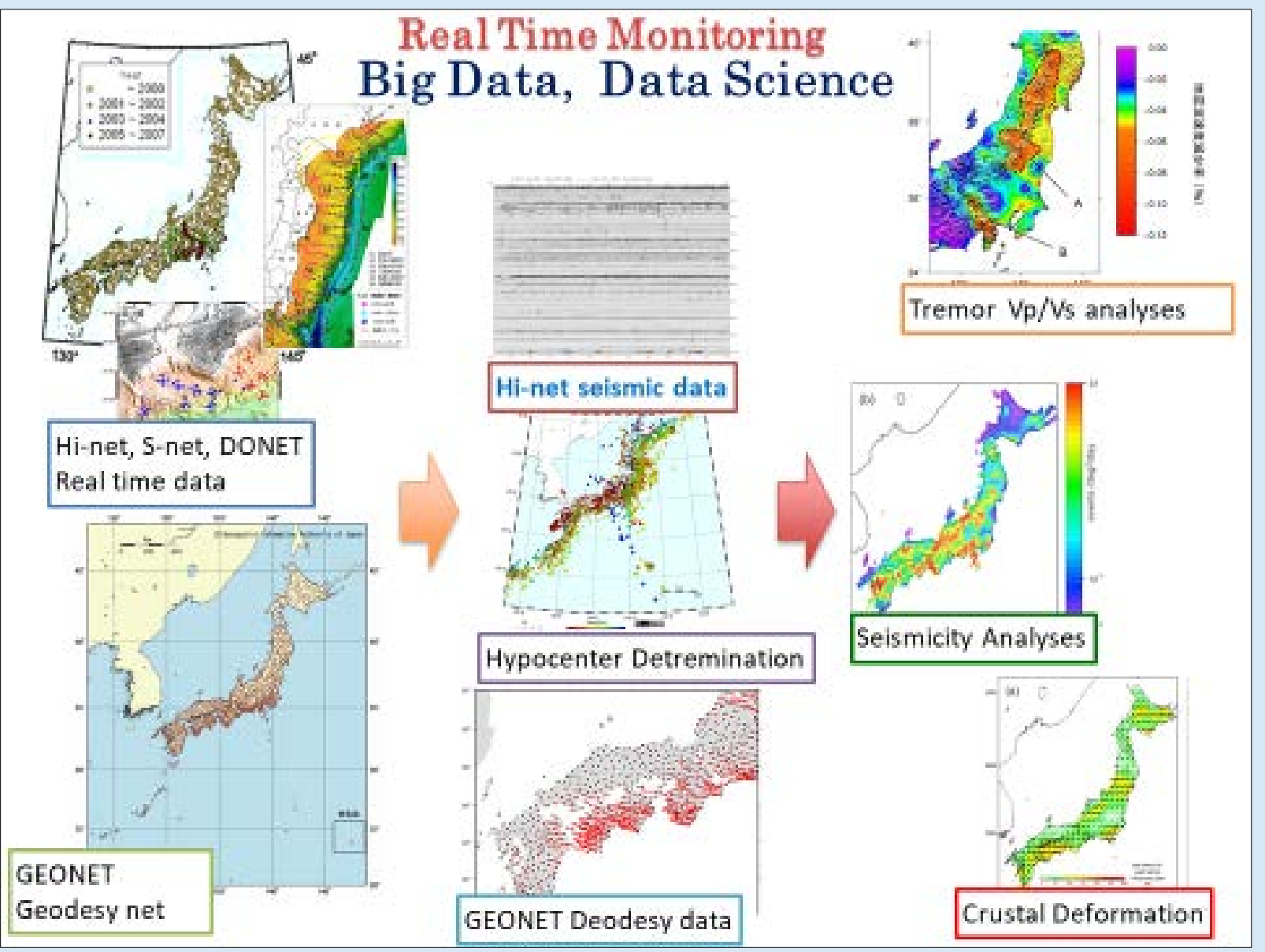


Figure 1: Real Time Monitoring System in Japan (Hi-NET, GEONET, DONET, S-NET etc.)

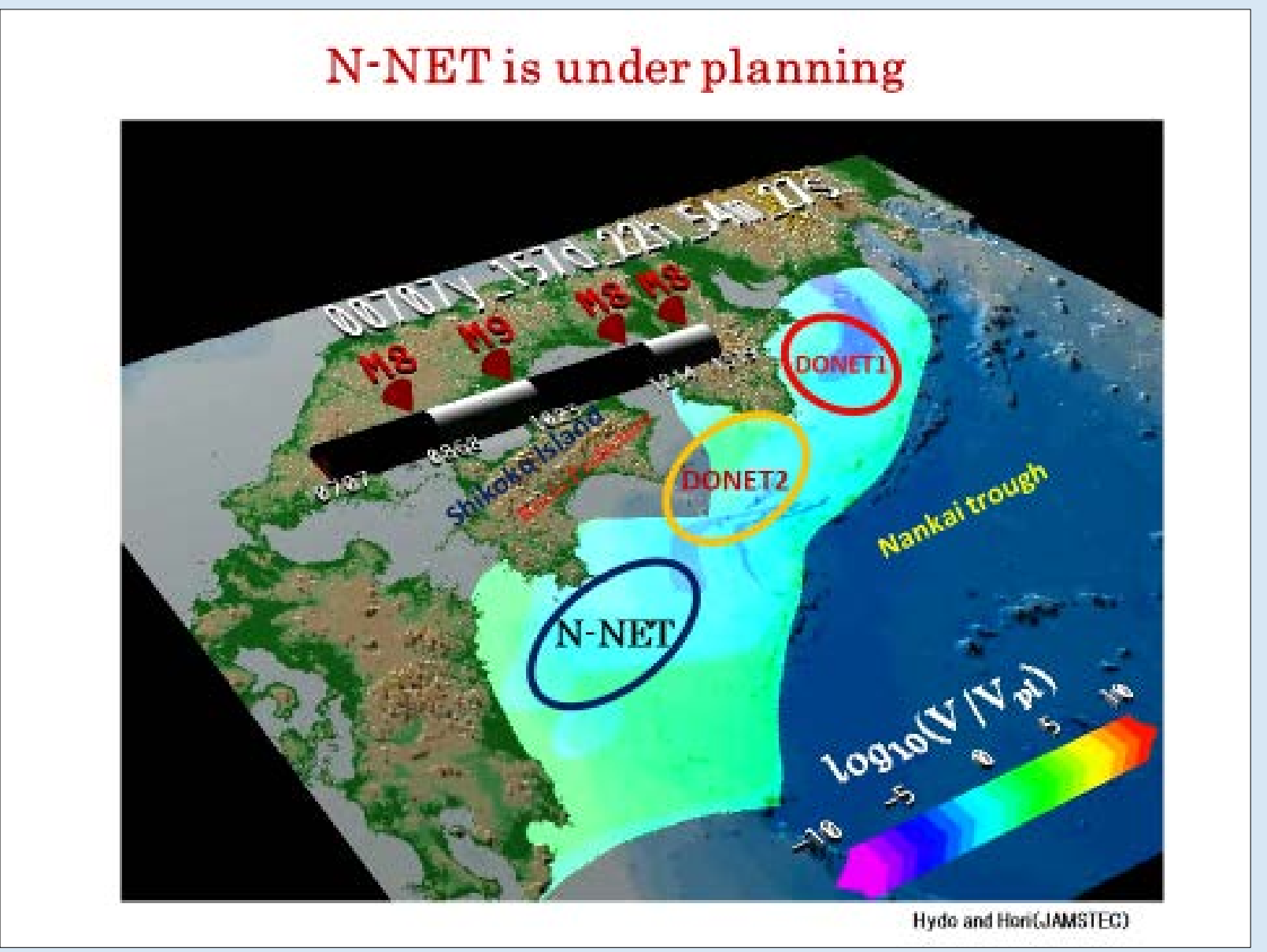


Figure 2: N-NET area it is under planning.

3 Summary

About real time monitoring systems in Japan, especially, after 1995 Kobe earthquake, land stations such as Hi-NET and GEONET have been extended, and after 2008, DONET has been

deployed, and after 2011 Tohoku earthquake, S-NET has been developed. Now, N-NET is developing around the western part of Nankai trough seismogenic zone.

2 Data application of real time monitoring for Earthquakes and Tsunamis.

In this poster, we will discuss about DONET data application (Figure 3). At the first, in the Nankai trough seismogenic zone, the early detection of Earthquakes and Tsunamis will be improved by DONET rather than land stations only (Figure 4). At second, we explain the real time Tsunami inundation simulation. This simulation is based on the DONET data and Tsunami simulation data base with over 1500 tsunami

scenarios (Figure 5). At the third, DONET data is very useful for the transition prediction if the M8 class Earthquake will occur at eastern or western part of the Nankai Trough or M7 class earthquake will occur in the Nankai trough (Figure 6) Therefore, the ocean floor real time monitoring system such as DONET is very important and significant for disaster mitigation on Earthquakes and Tsunamis.

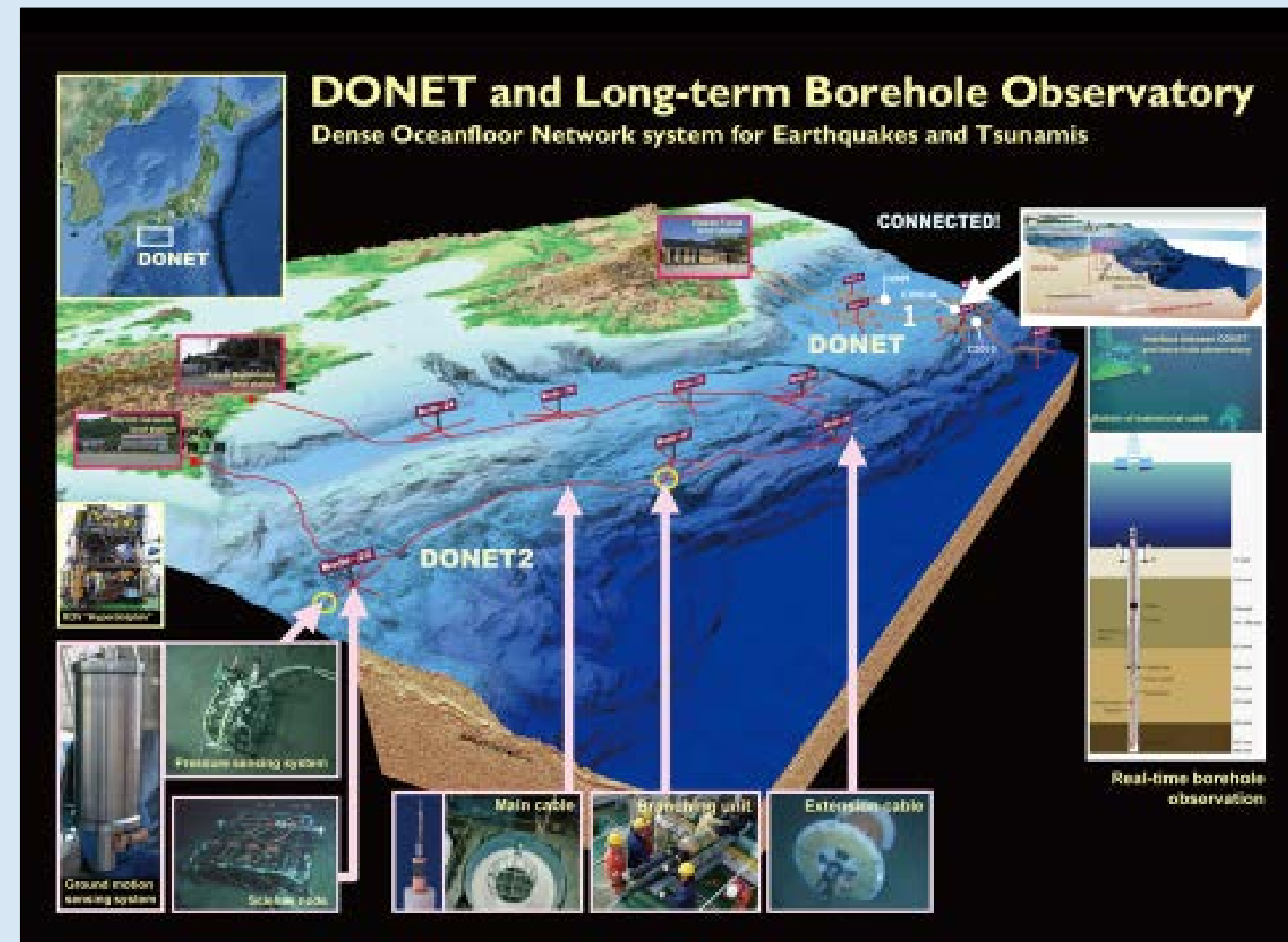


Figure 3: DONET array and sensors

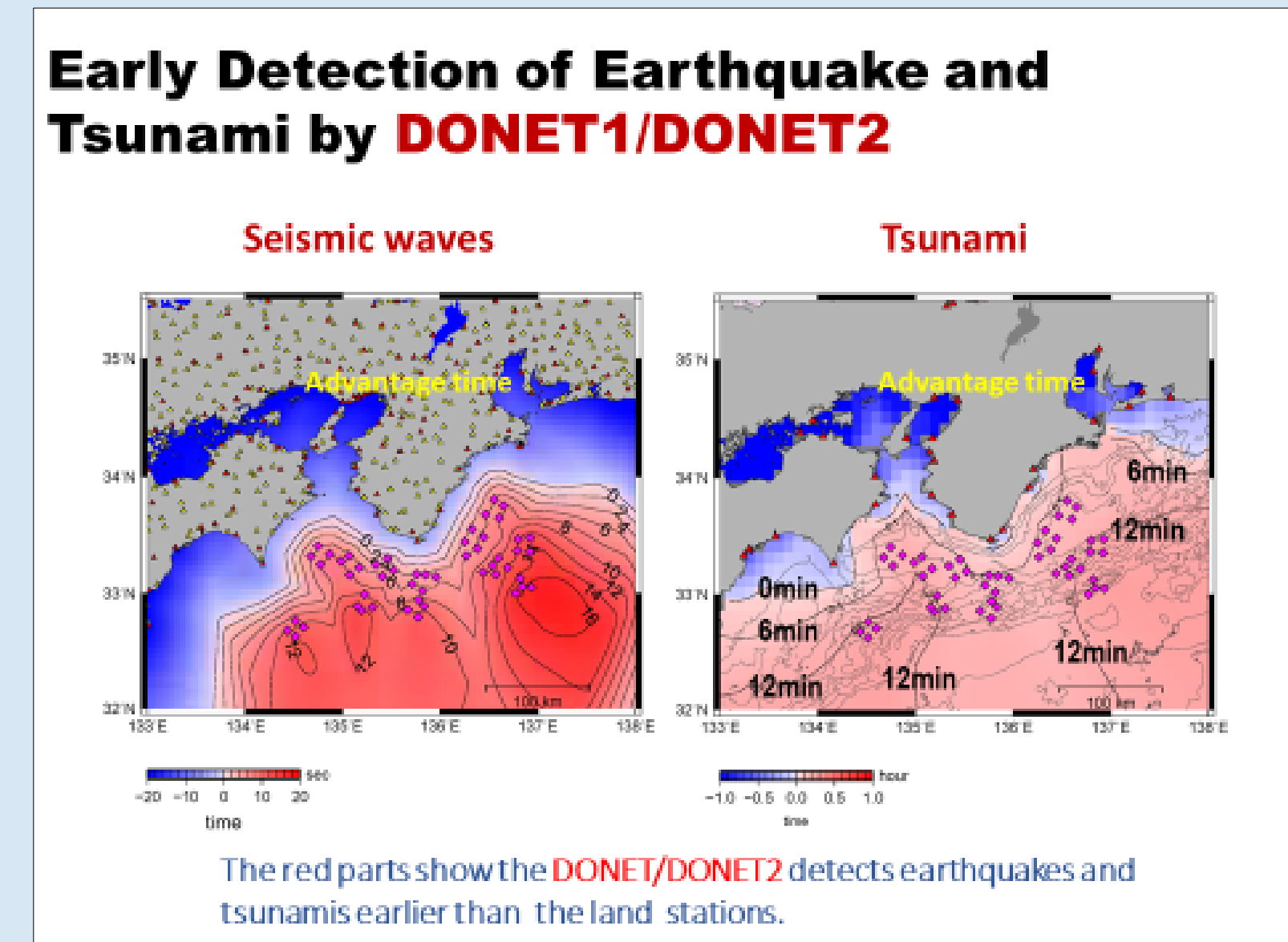


Figure 4: Estimate early detection time of Earthquakes and Tsunamis by DONET system

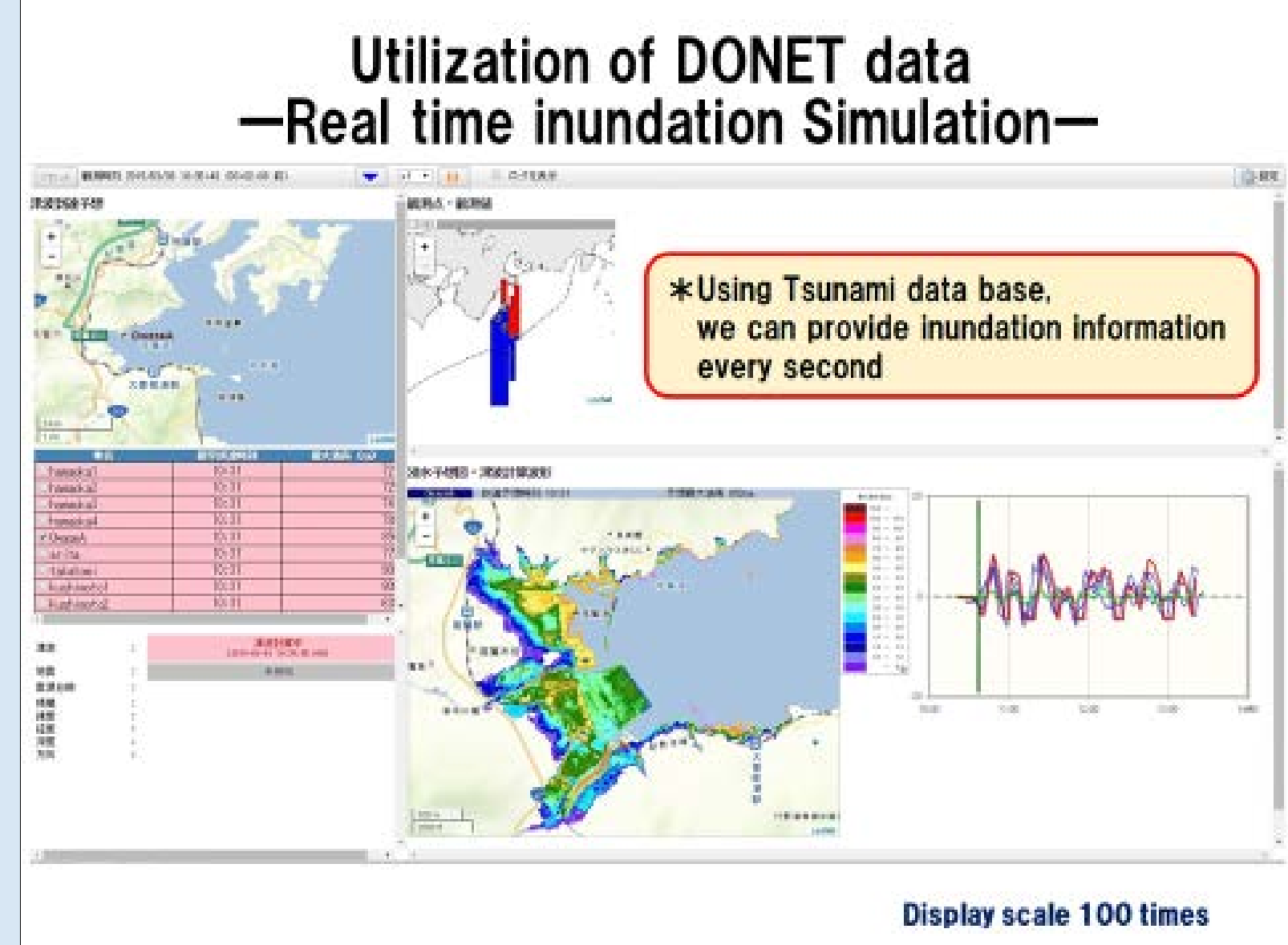


Figure 5: The example of Real Time Inundation simulation using DONET data and Tsunami simulation data base.

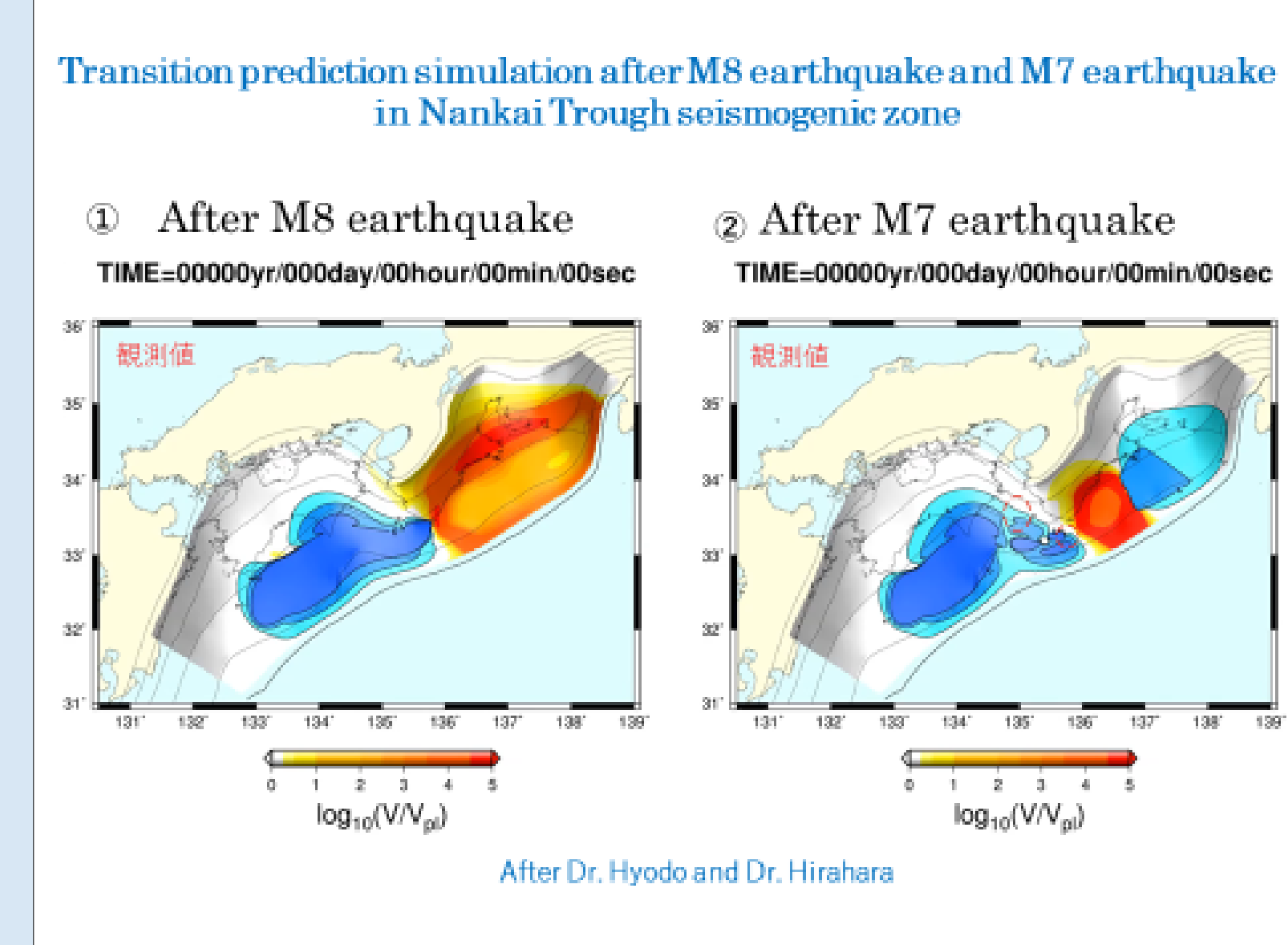


Figure6: The simulation image of transition prediction if 8 or M7 class earthquake occur in the Nankai trough seismogenic zone.

These systems have been expected for advanced EEW and prediction researches etc. So, furthermore, we have to develop real time monitoring systems and their applications in

Earthquake and Tsunami prone countries for disaster mitigation with international collaborations Including CTBTO.