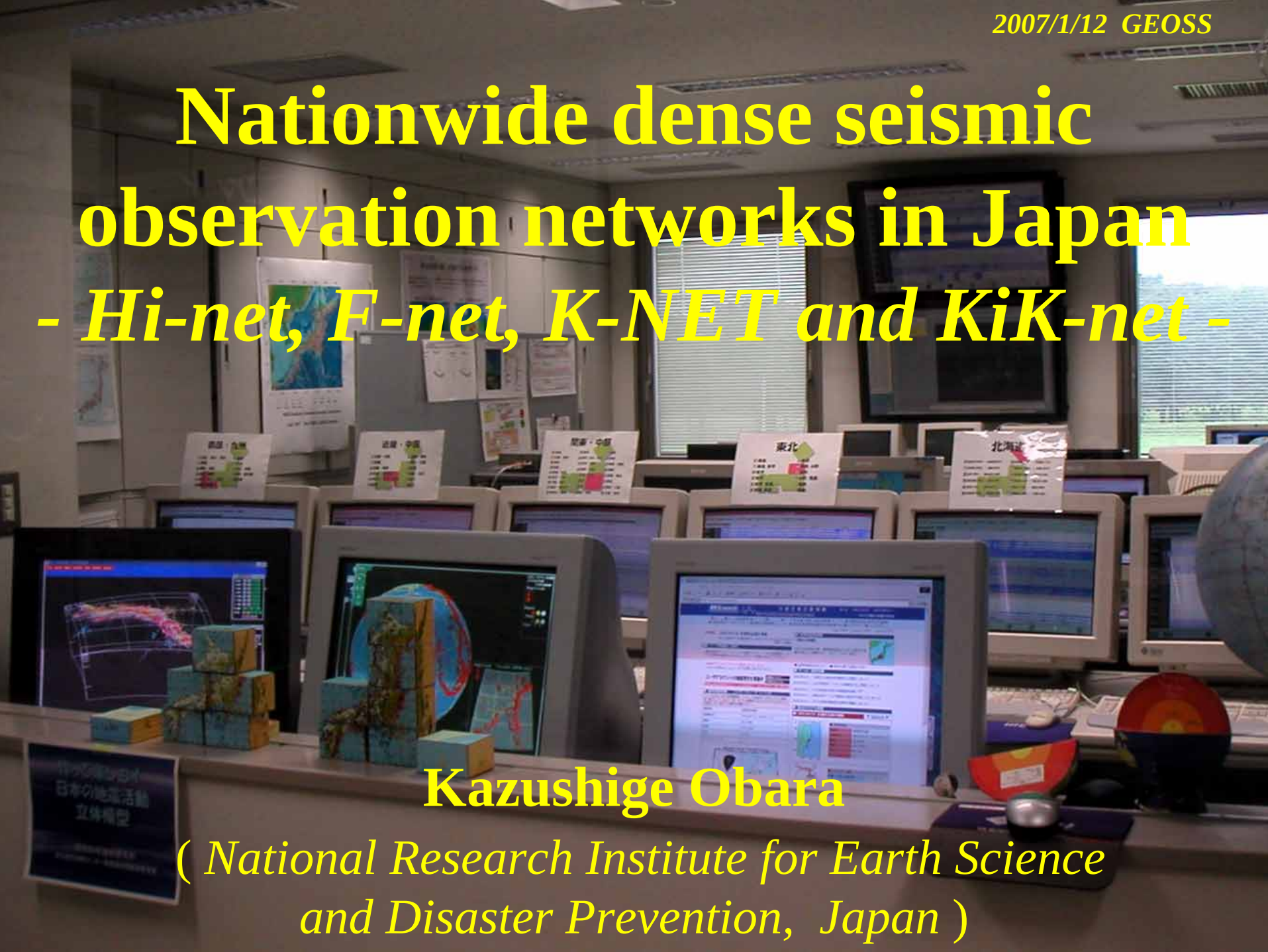
Nationwide dense seismic observation networks in Japan

- Hi-net, F-net, K-NET and KiK-net -



Kazushige Obara

(*National Research Institute for Earth Science and Disaster Prevention, Japan*)

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NIED
National Research Institute for Earth Science and Disaster Prevention

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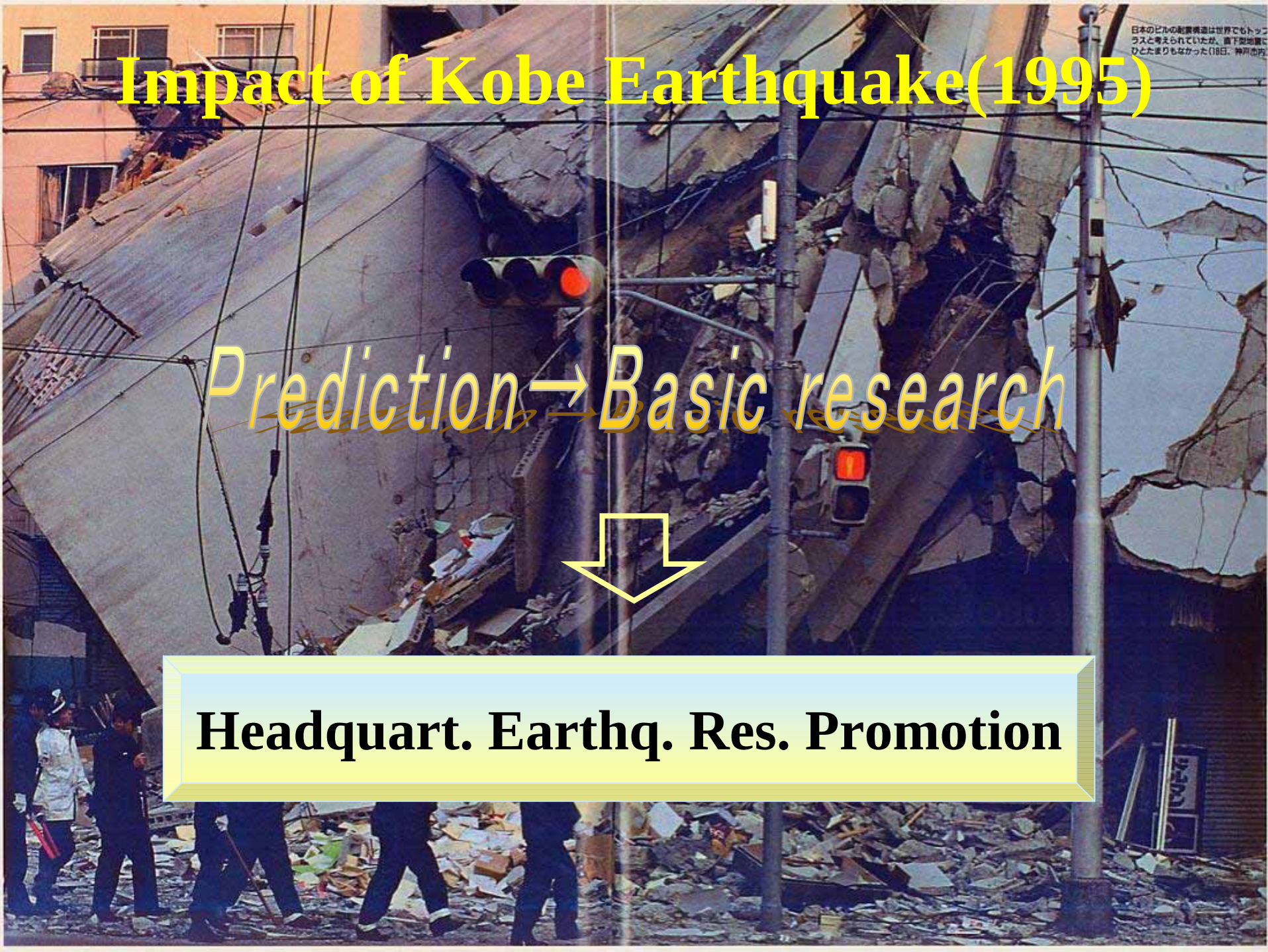
National Research Institute for Earth Science and Disaster Prevention

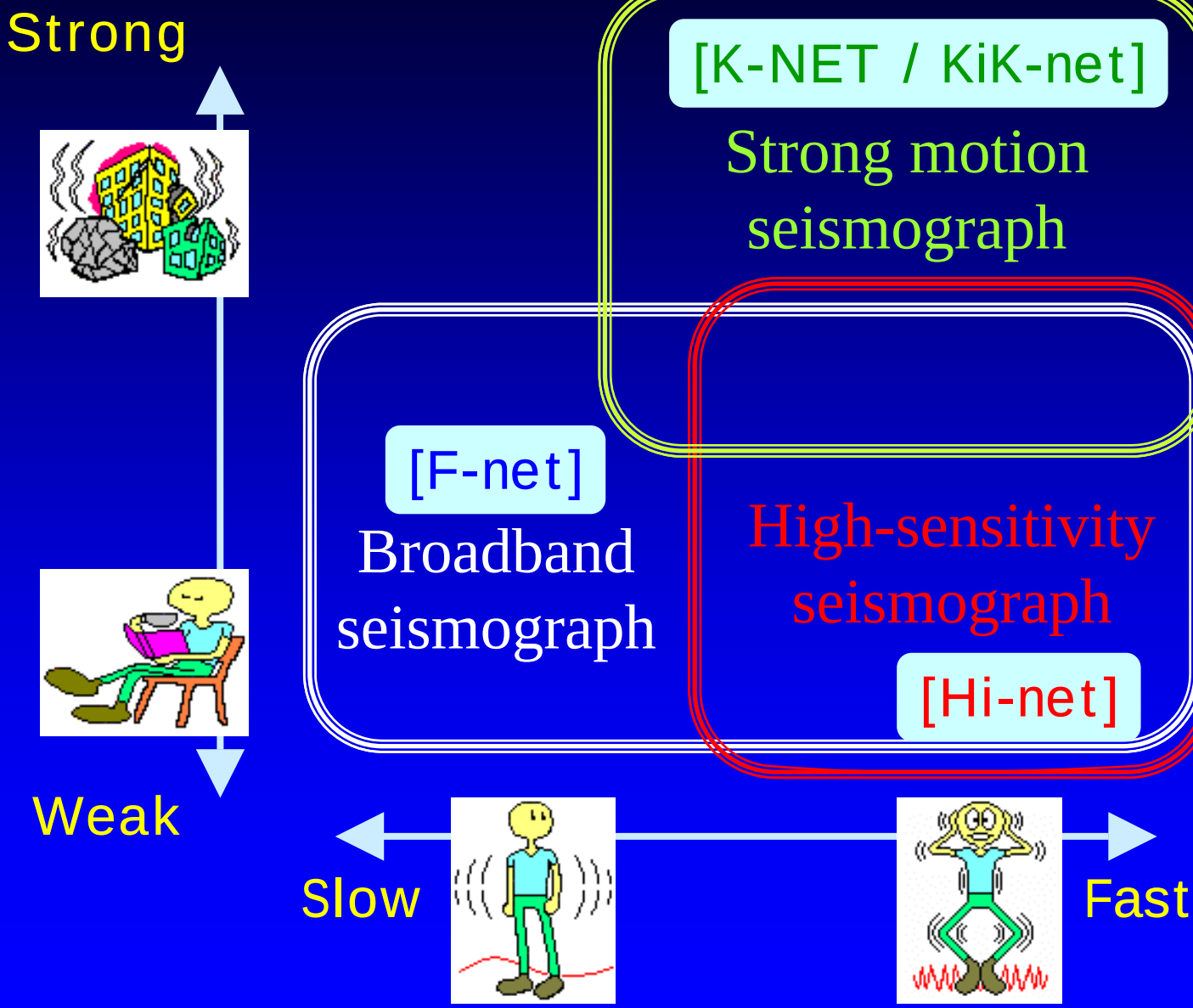

Impact of Kobe Earthquake(1995)
Prediction→Basic research
Headquart. Earthq. Res. Promotion

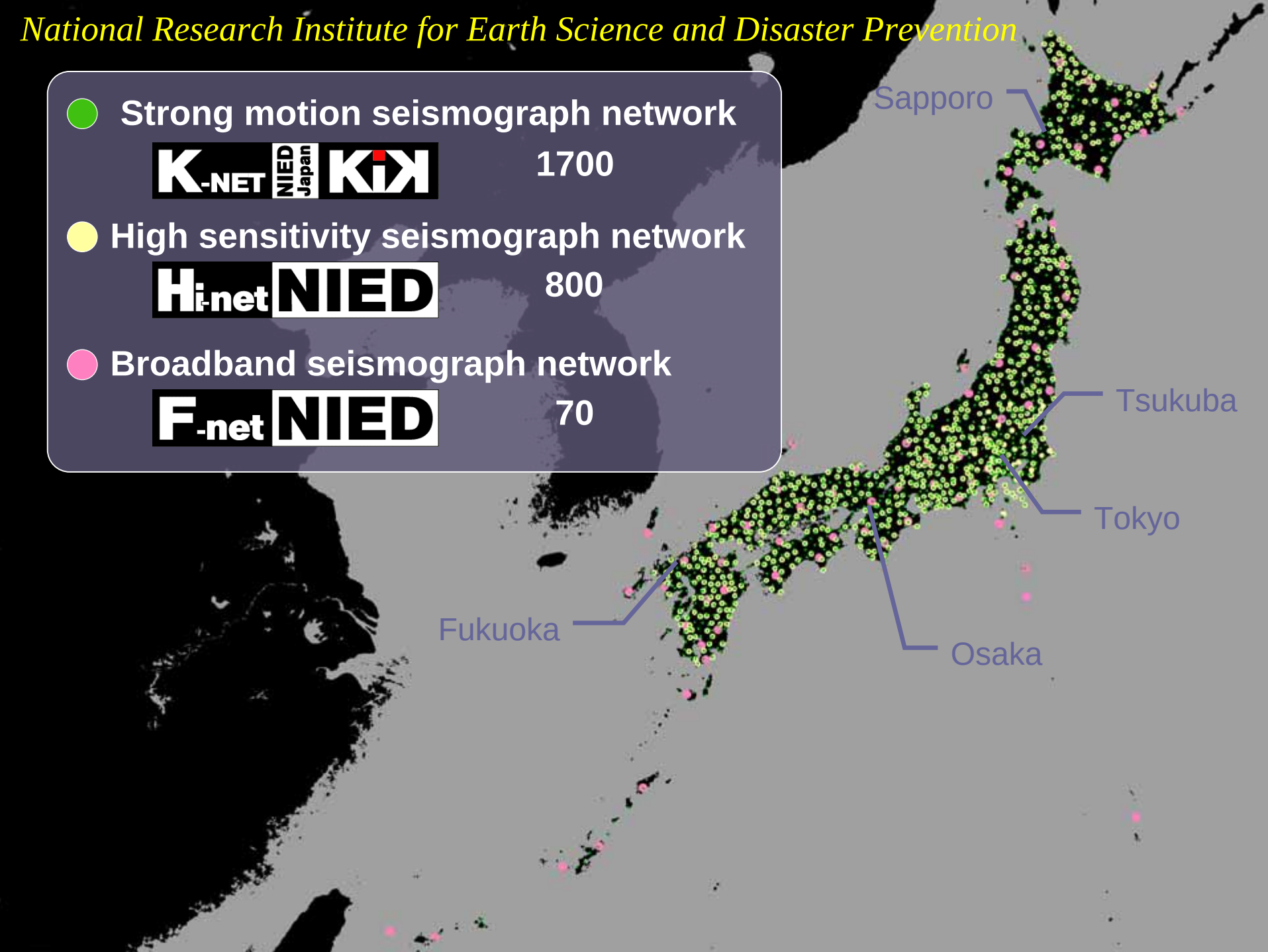
Basic research of earthquakes

KIBAN (= *'fundamental' or 'infrastructure'*) project

(1) Seismic network (2) GPS network (3) Active fault survey

Coverage of three kind seismographs




National Research Institute for Earth Science and Disaster Prevention
Strong motion seismograph network
K-NET NIED Japan KiK
1700
High sensitivity seismograph network
Hi-net NIED
800
Broadband seismograph network
F-net NIED
70
Sapporo
Tsukuba
Tokyo
Fukuoka
Osaka

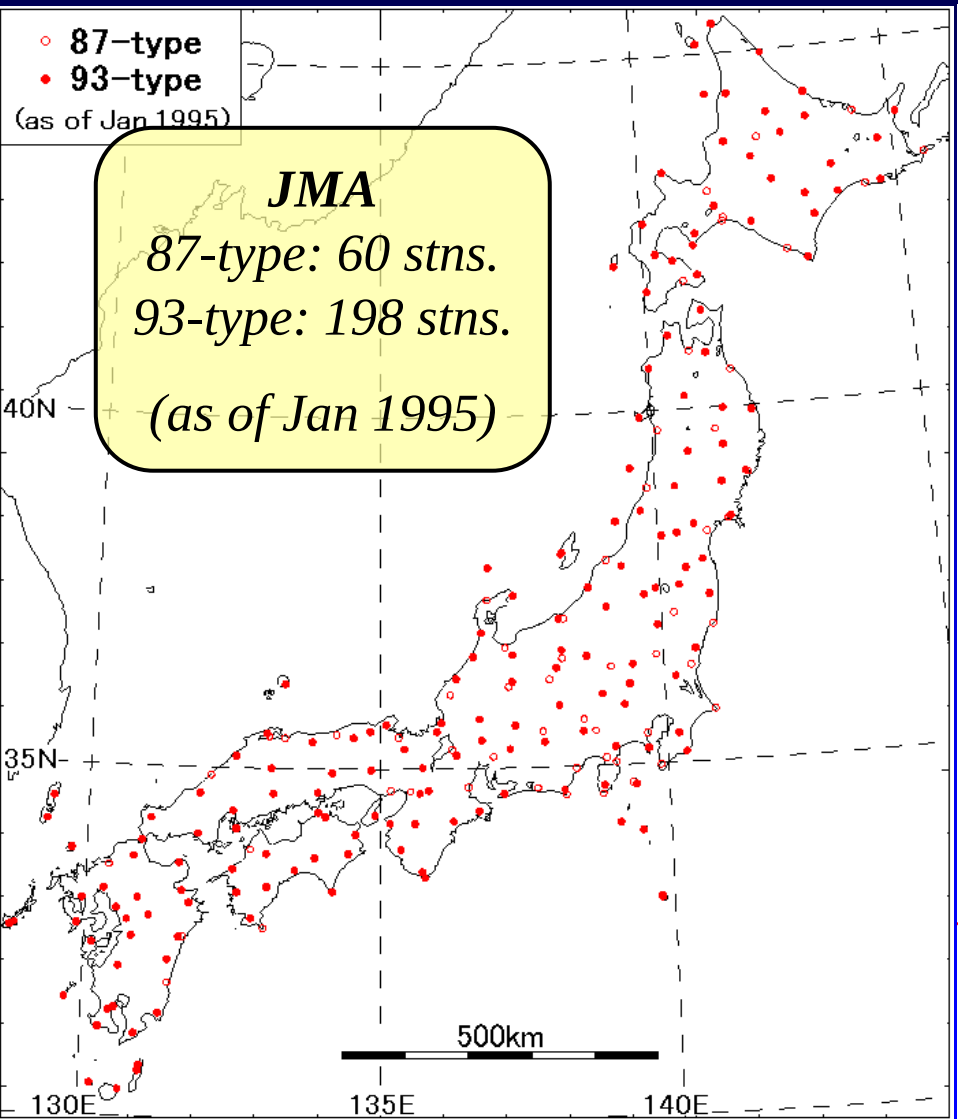
Strong-motion observation

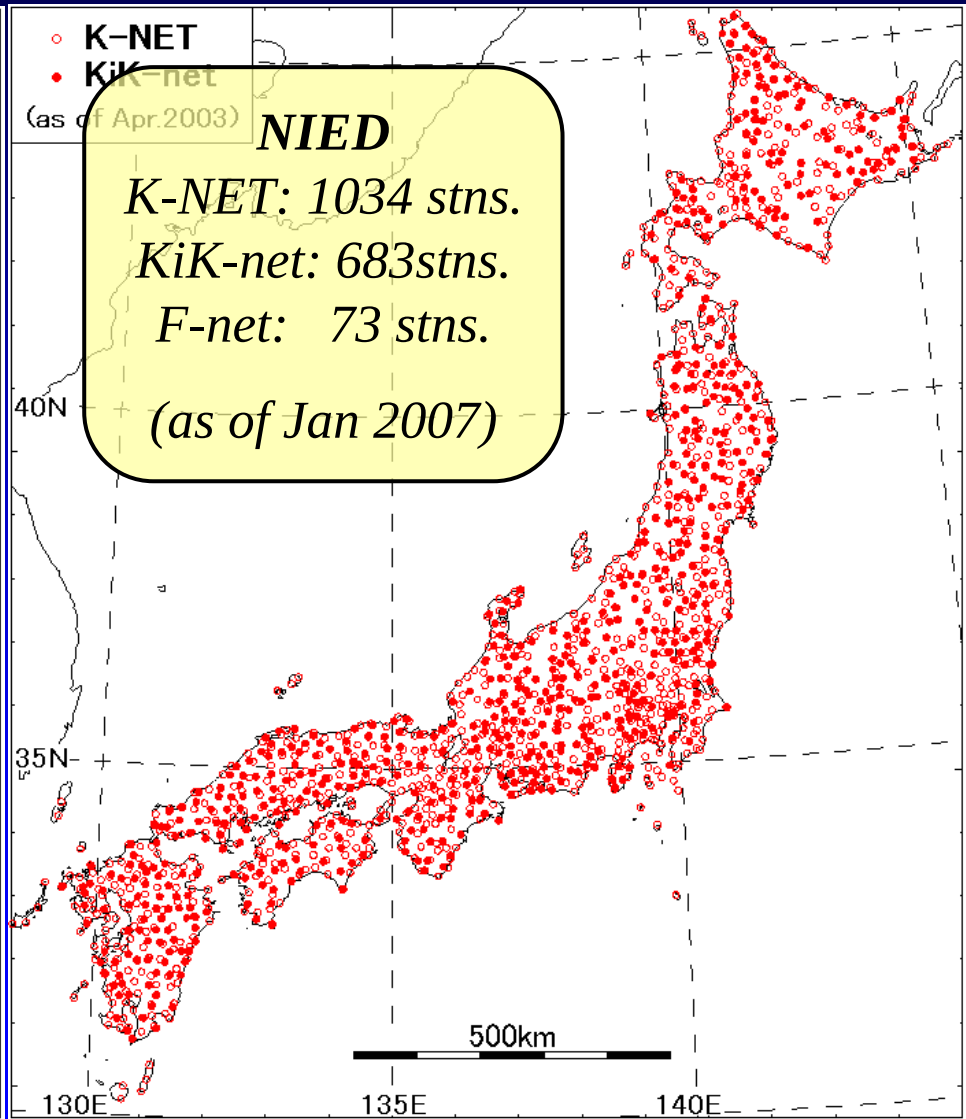
Strong-motion seismograph network

- before Kobe Eq. -

+

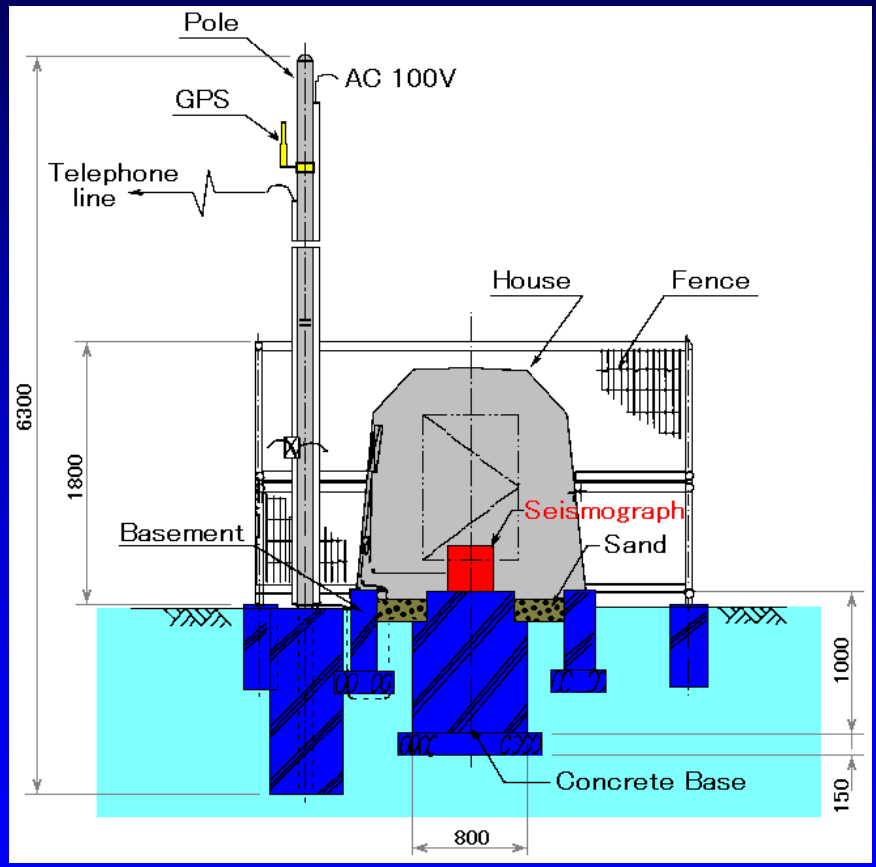
- after Kobe Eq. -



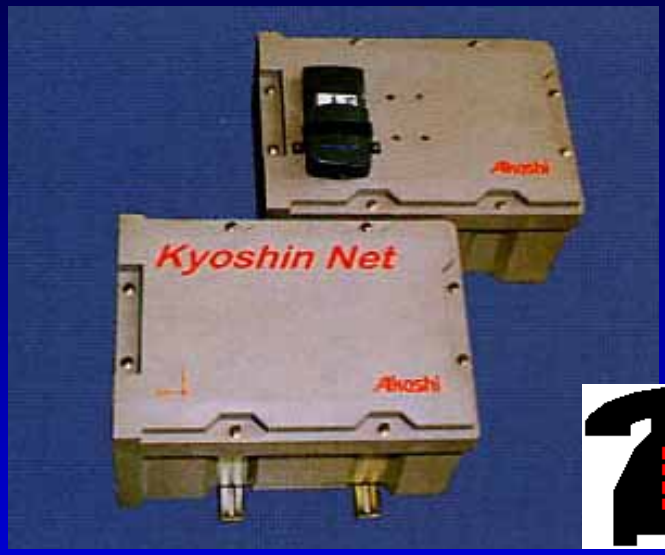


K-NET (Kyoshin network Japan) station

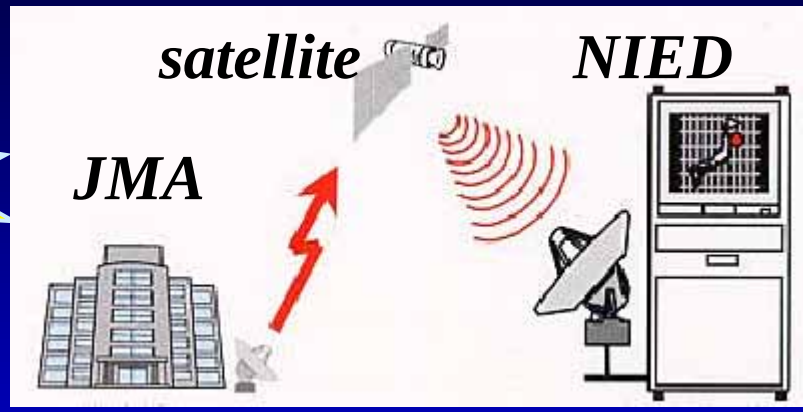
25km spacing, 1034 stations (as of April 2003)



K-NET: Sensor and Data acquisition (Dialup system)



Eq !



dial up

dial out

Resolution	
Acceleration	**< 0.1 mGal**
A/D converter	**24 bit**
Dynamic range	**±2G**
Sampling	**100 Hz**
Memory capacity	**8 Mbyte**

K-NET: Data service on web site

Top Page | Select an earthquake and Download data | Search for earthquakes and Download data | Search and Download data

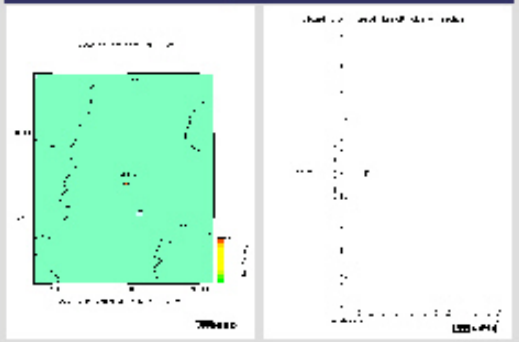
K-NET NIED

Kyoshin Network
K-NET Japanese

page access 60802
data download 3024219

Kyoshin Net (K-NET) is a system which sends strong-motion data on the Internet, data which are obtained from 1,000 observatories deployed all over Japan. The control center makes files with a common header including the source parameters determined by the Japan Meteorological Agency (JMA) for each event. Please use Netscape 4.X, or use Microsoft Internet Explorer 5.X or later. If your platform is the Macintosh, Netscape6.X is recomended.

Latest earthquake of K-NET



2002/10/04-13:05:00 (->detail)
36.20N 138.00E 010km M2.9

What's New

NEW (Oct.8th,2002) WWW/FTP service will be stopped due to construction.
(Jul.26,2002) Announcement of the K-NET Mirror Site#1 maintenance.
(Jul.4th,2002) WWW/FTP service will be stopped due to construction.
(May.15,2002) Announcement of the K-NET Mirror Site#1 maintenance.
(Apr.2th,2002) Site SIG007(OUMIHACHIMAN) has moved.
(Apr.05th,2002) Soil data of KMM014(ITSUKI) was modefied.
(Apr.2th,2002) Site KMM014(ITSUKI) has moved.
(Oct.23th,2001) Movement of Site
(Oct.12th,2001) It was changed about a period of construction. From 18:00 12th Oct. to 13:00 15th Oct., WWW/FTP service will be stopped due to construction.
(Oct.9th, 2001) From 17:00 12th Oct. to 20:00 13th Oct., WWW/FTP service will be stopped due to construction.

Old news are here.

Main Menu

Select an earthquake and Download data — Use this link if you know the origin time of an earthquake and want to download its data. You can also view and download a **hypocentral map** here. Please begin with this page.

Search for earthquakes and Download data — Use this link to search for earthquakes using the origin time, magnitude, epicenter location, etc.

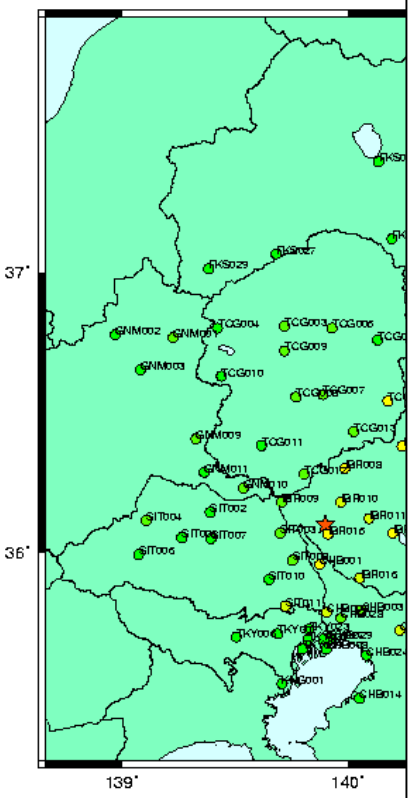
Search and Download data — Use this link to search for acceleration data independent of earthquakes, based on date and time, site location, site characteristics, maximum acceleration, epicentral distance, etc. The data can be compressed into a single tar file.

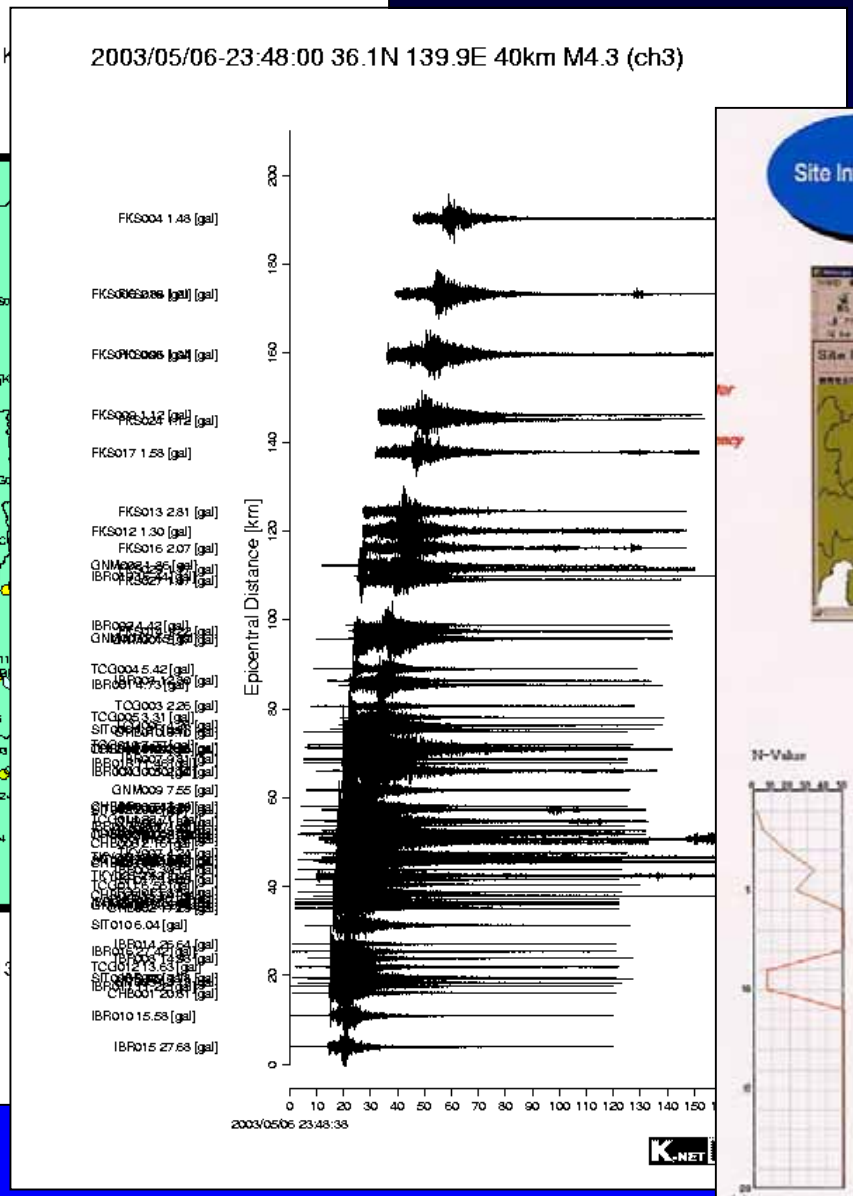
Information

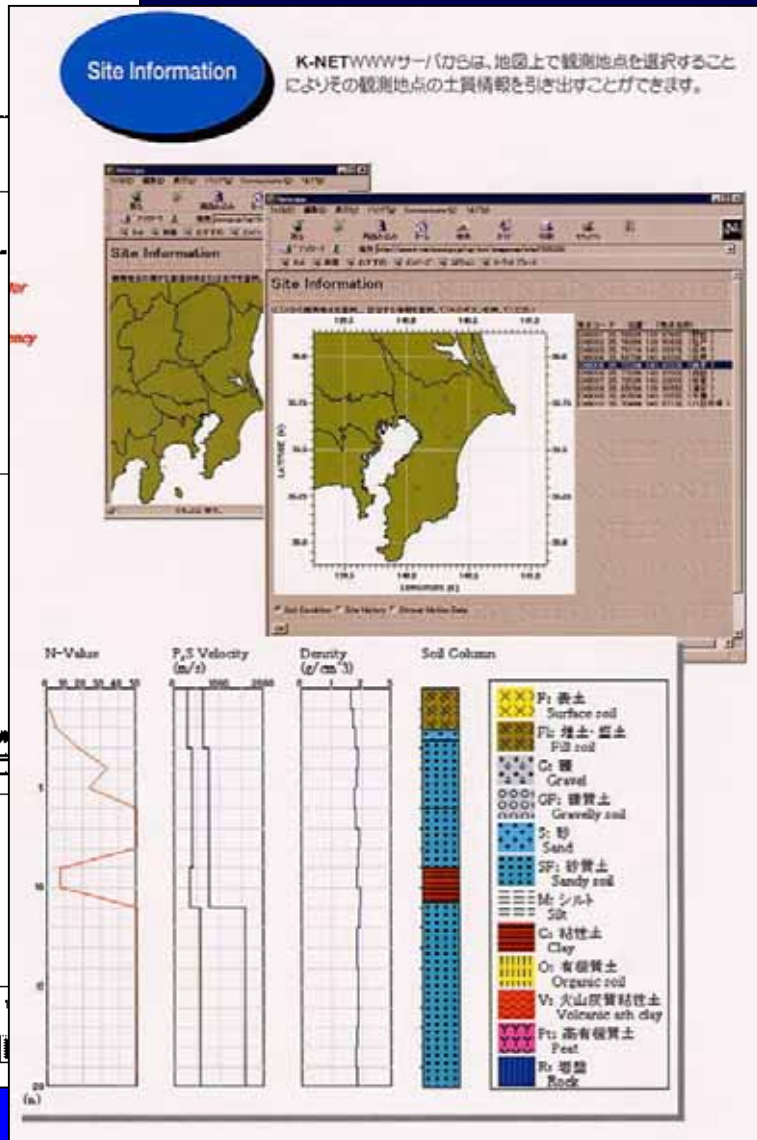
Acceleration map

Paste up of the records

Site conditions



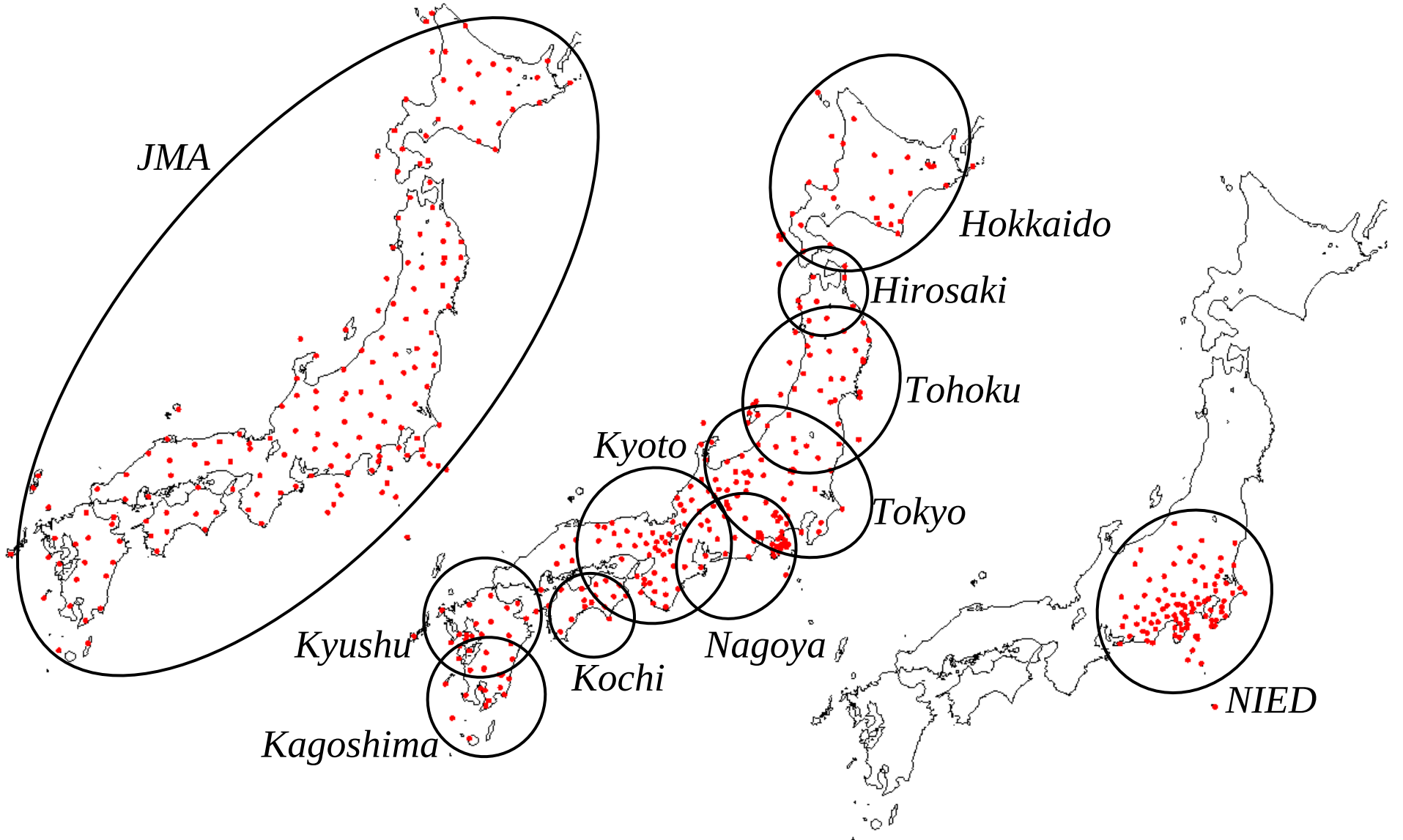




High sensitivity observation

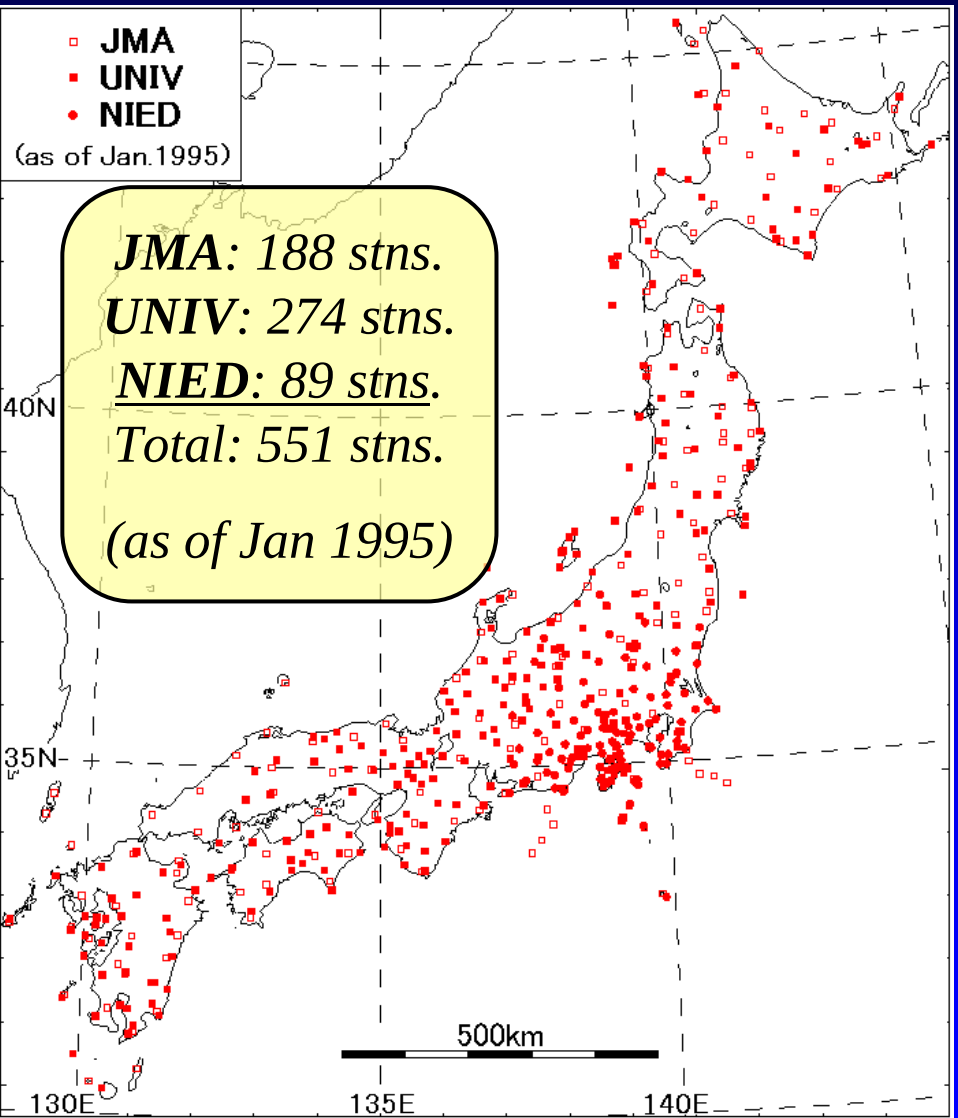
- before 1995 Kobe earthquake -

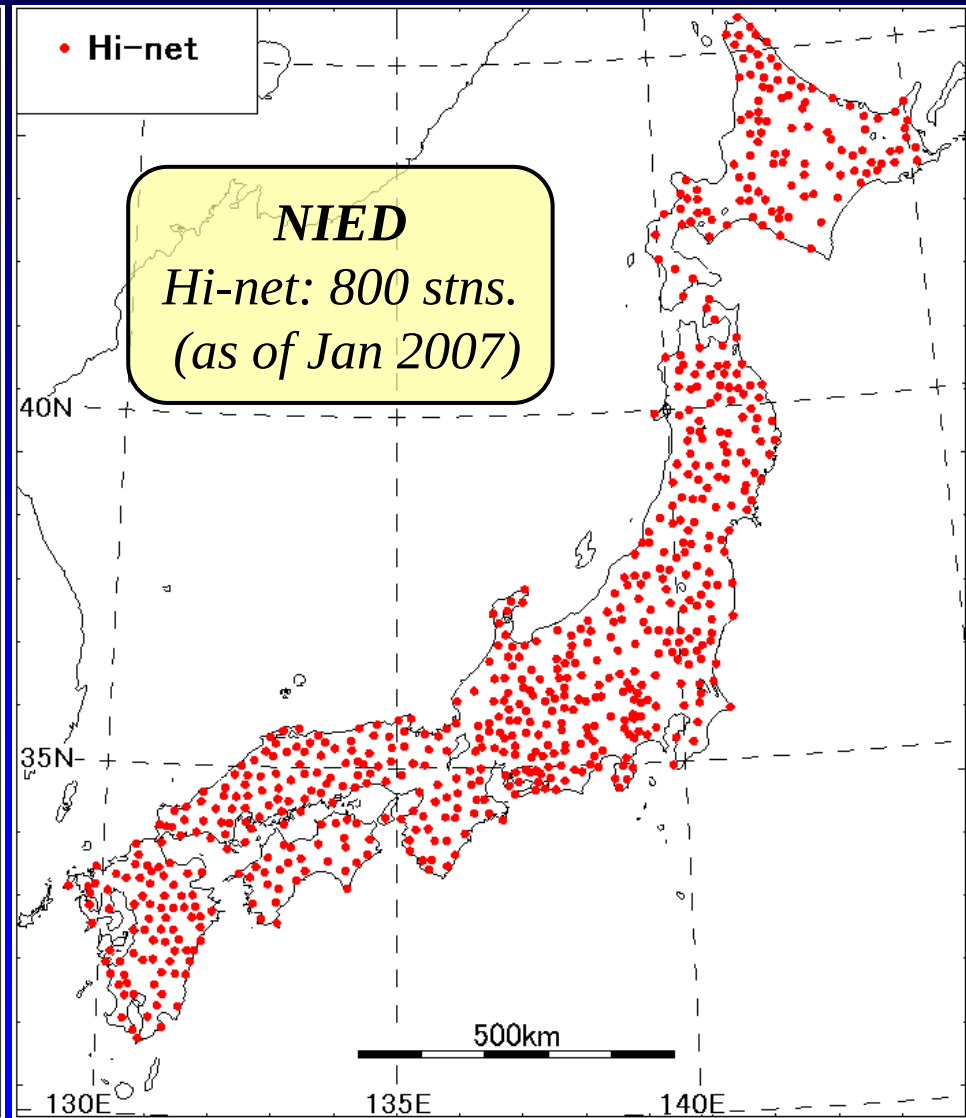
JMA:188 stations *UNIV:274 stations* *NIED:89 stations*



High sensitivity seismograph network

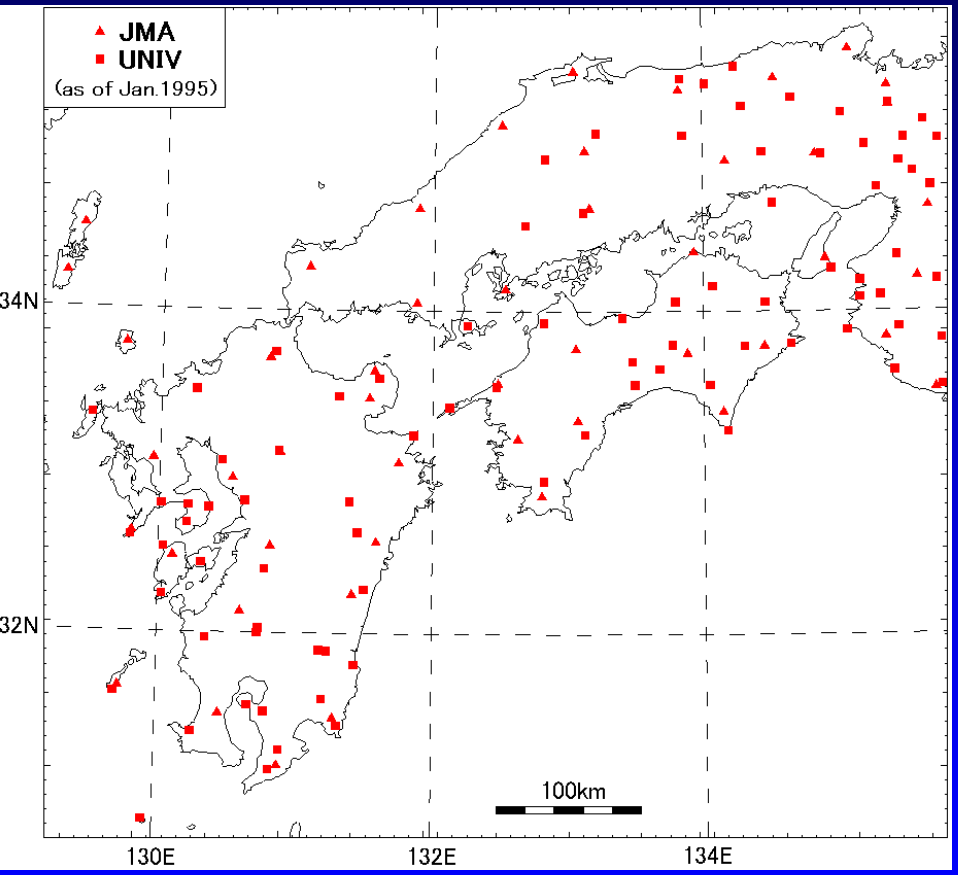
- before Kobe Eq. - + - after Kobe Eq. -



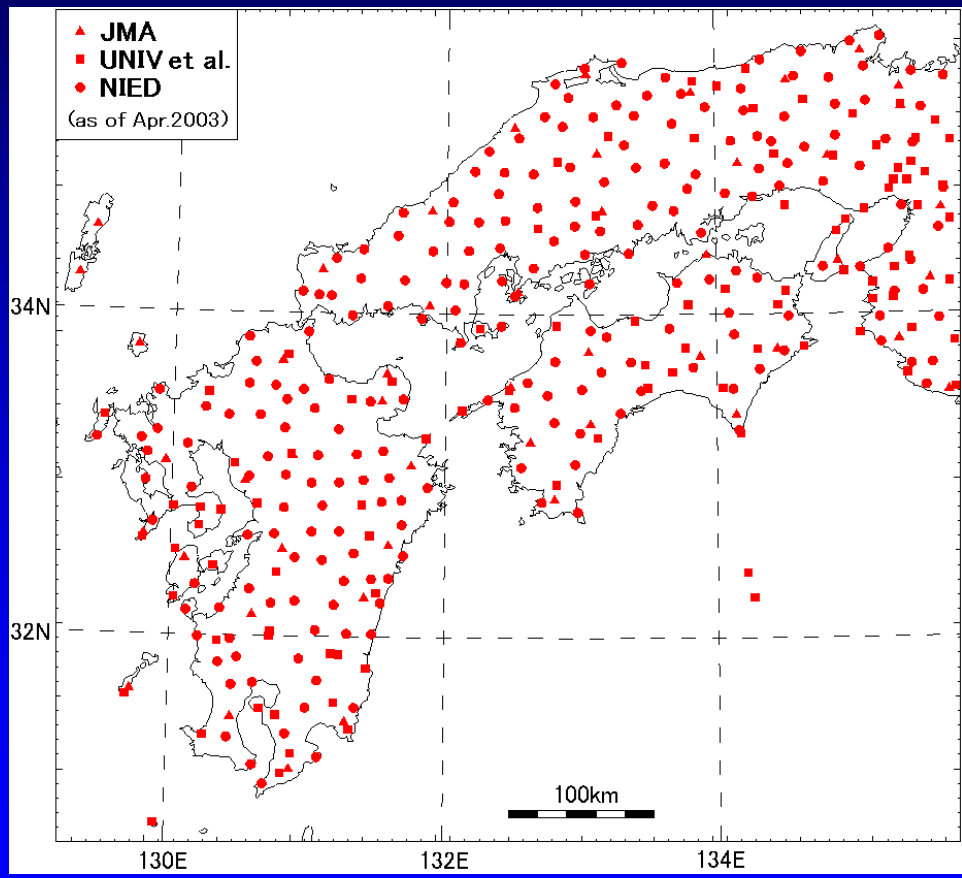


Change in the distribution of high sensitivity seismic stations in west Japan

- before Kobe Eq. -



- after Kobe Eq. -



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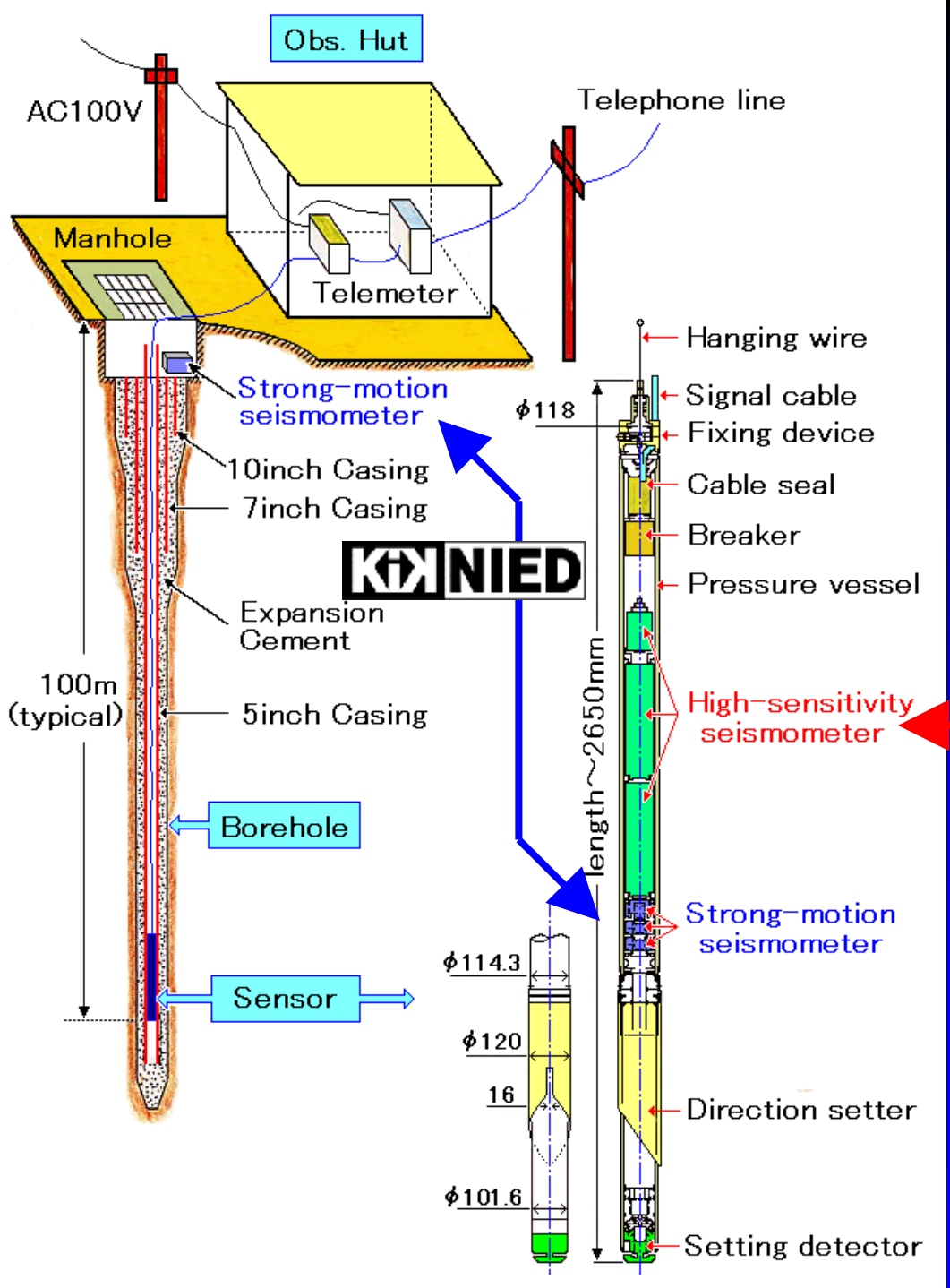


Hi-net station

High sensitivity seismograph network

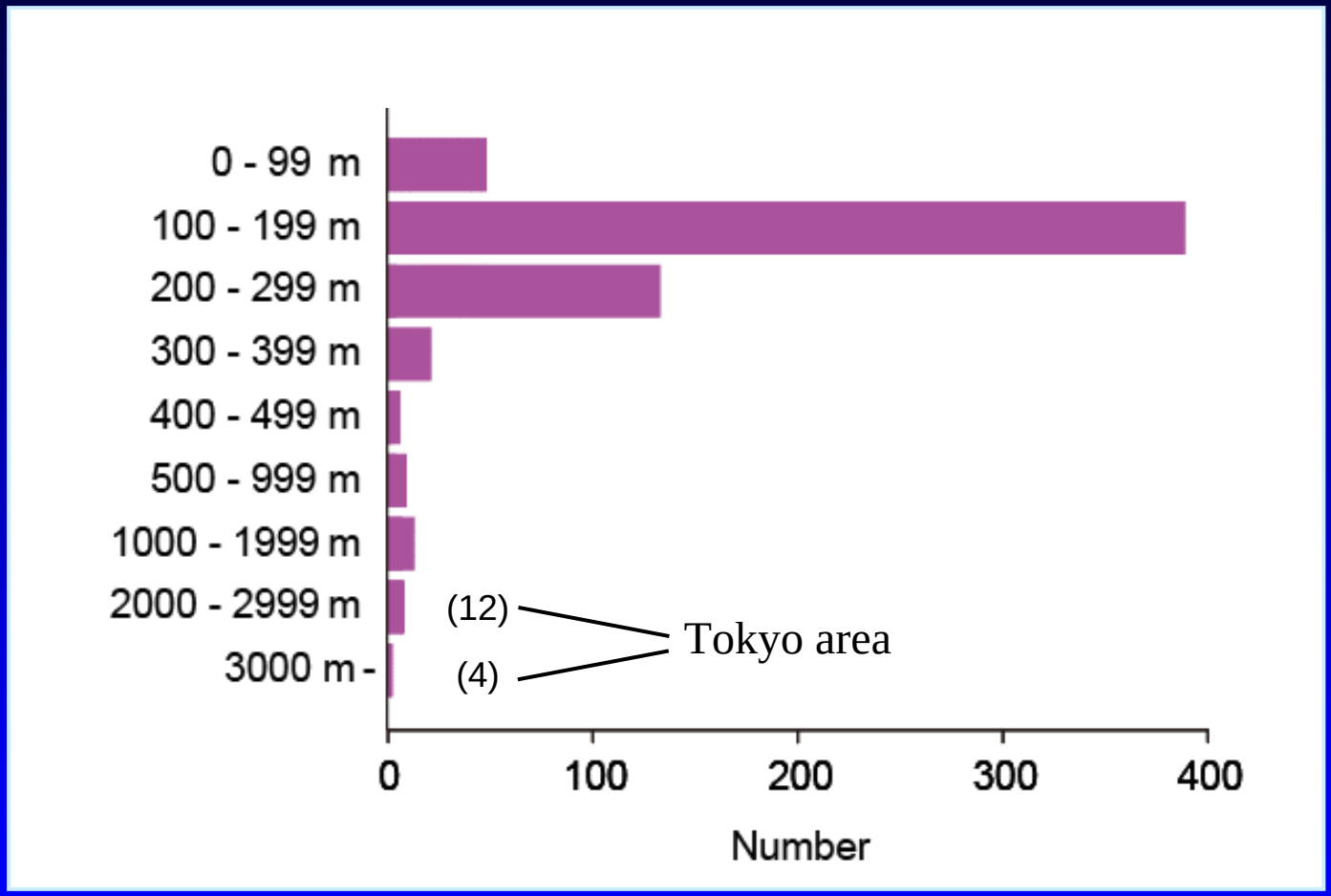
800 borehole stations

KiK-net

KIBAN Kyoshin network

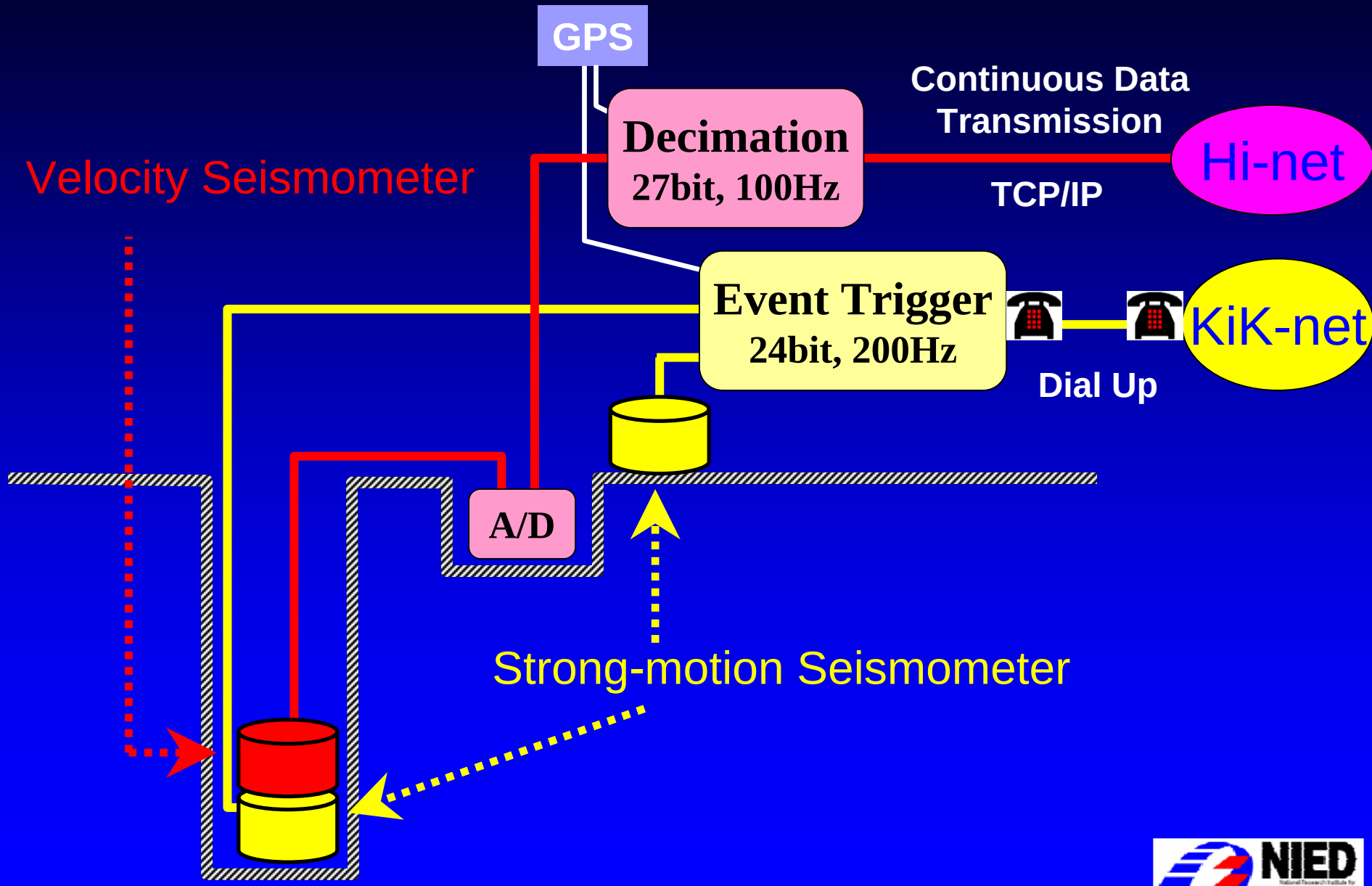
Hi-net

Depth of borehole

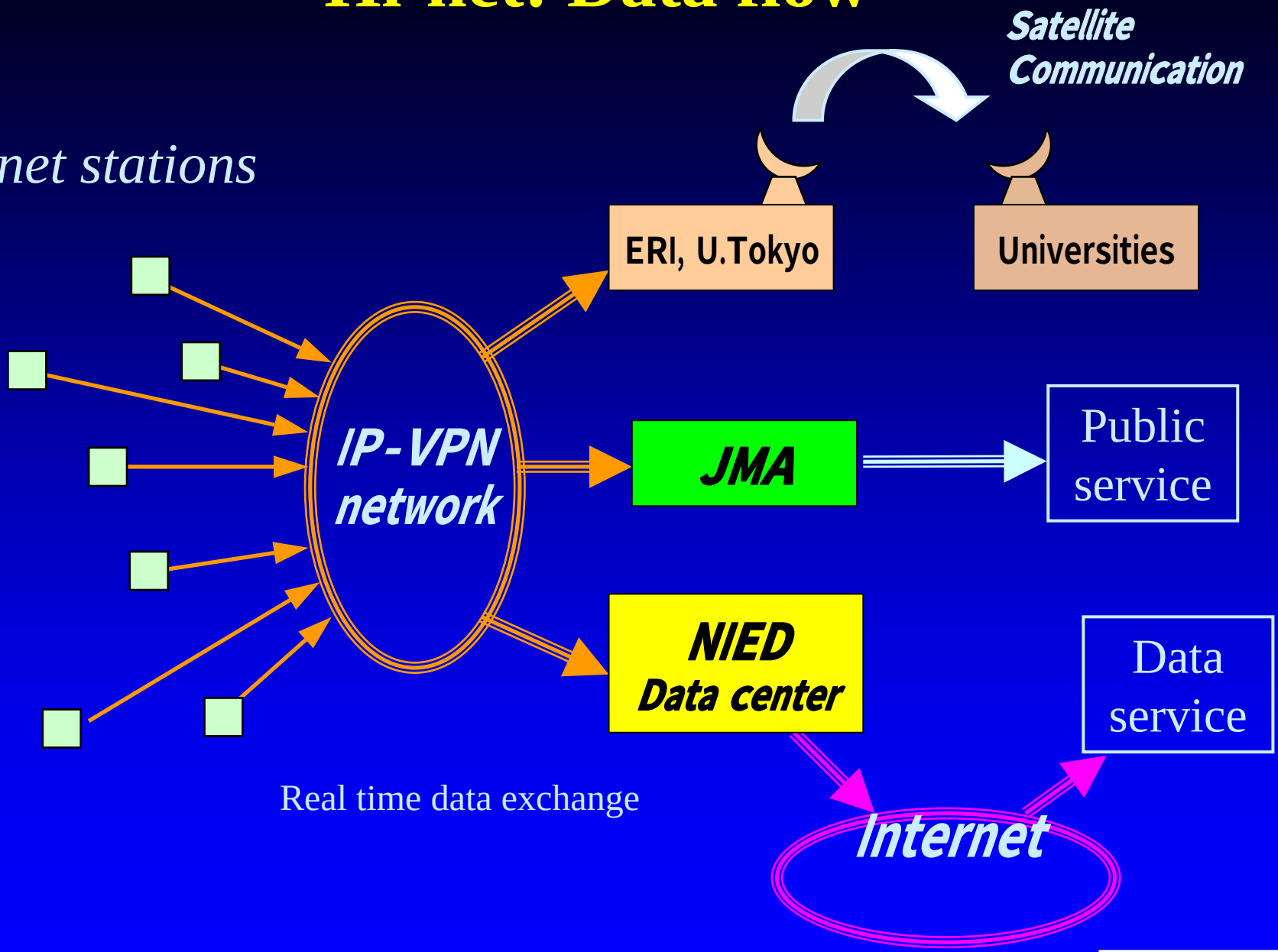


Control factor: Thickness of sediment layer
Cultural noise
Budget

Hi-net/KiK-net: Sensor and Data acquisition

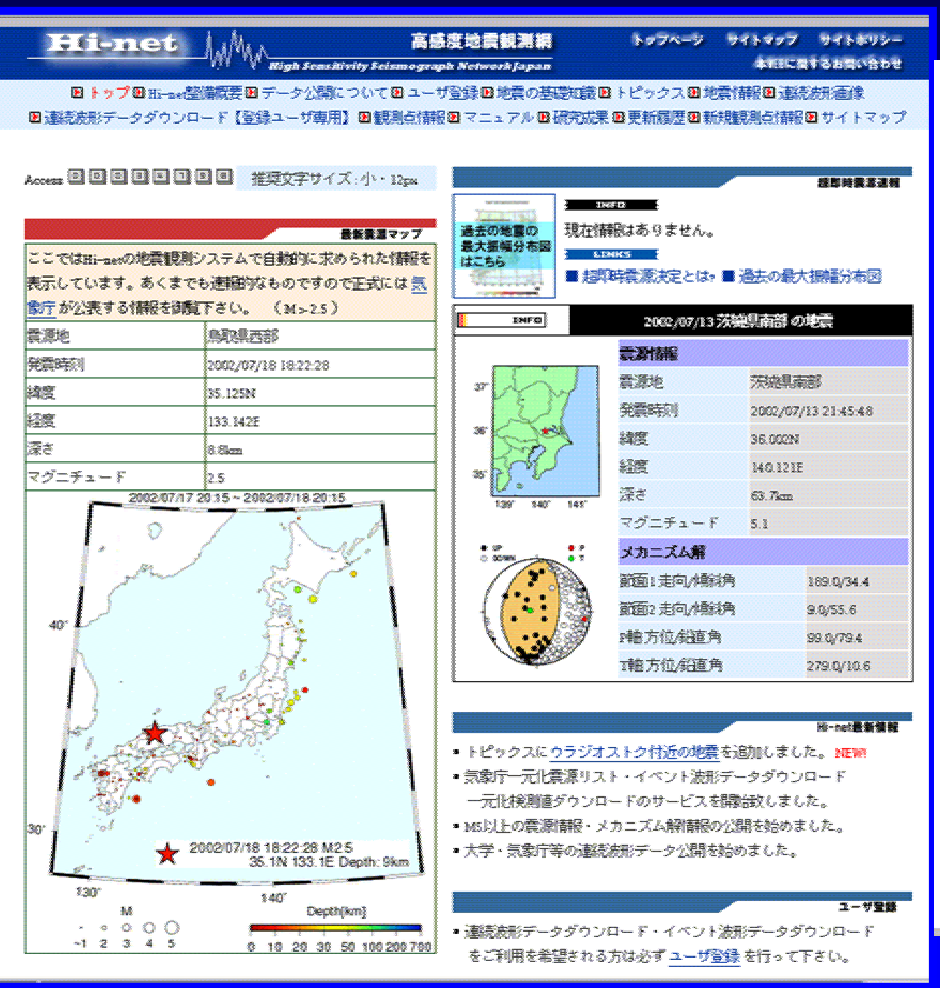


Hi-net: Data flow

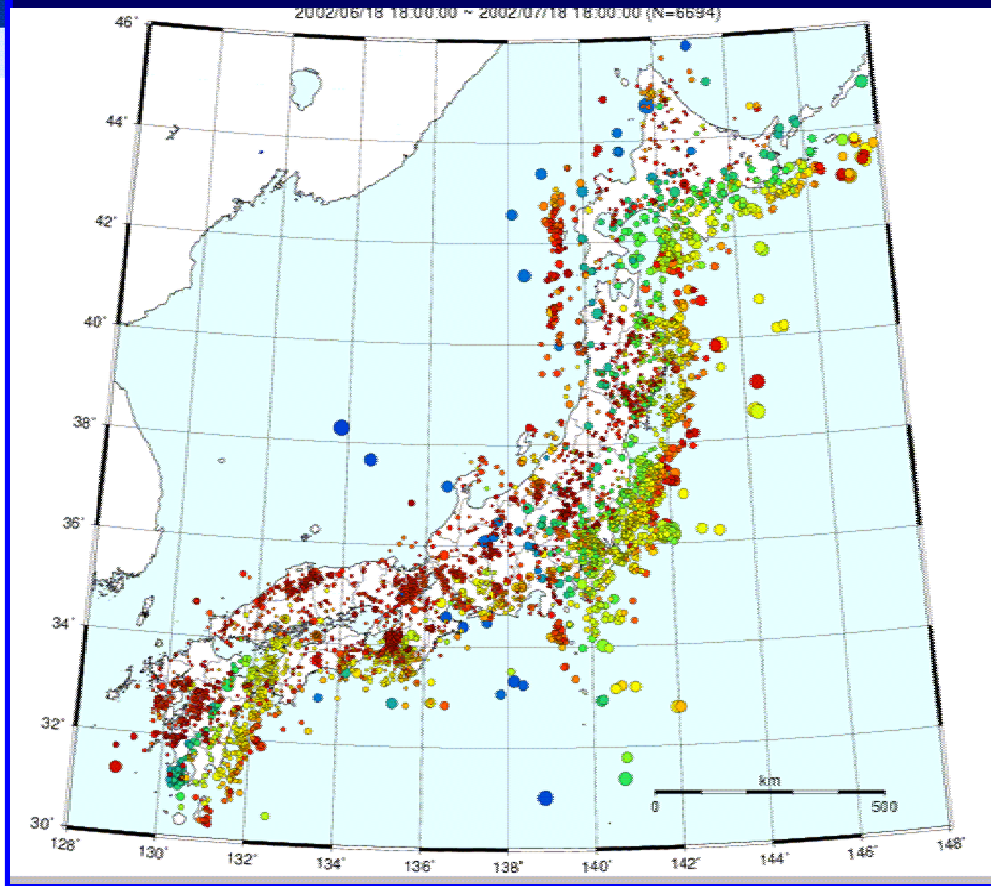


Hi-net: Data service on web site

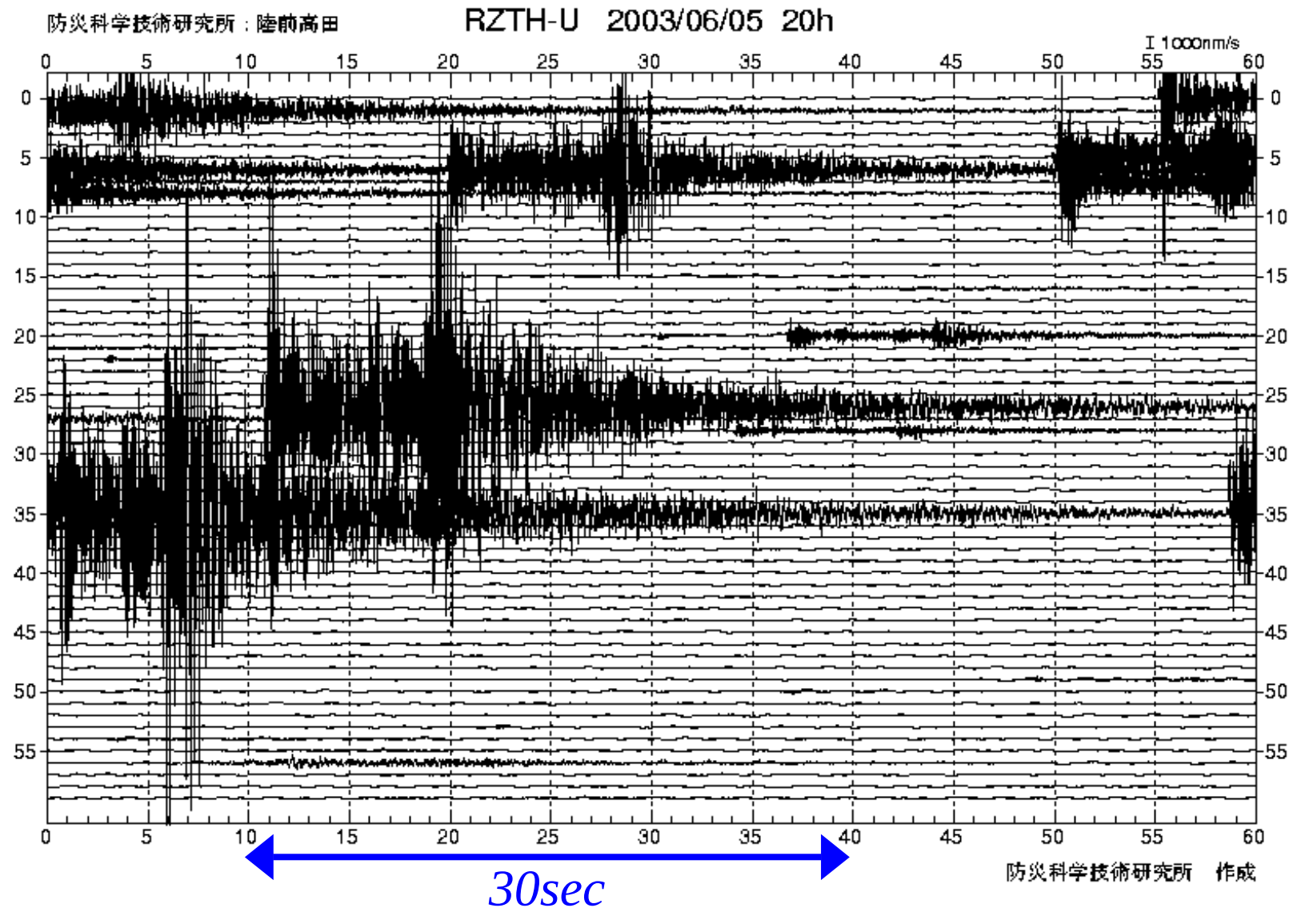
Quick information



Epicentral distribution



Continuous record of UD-component

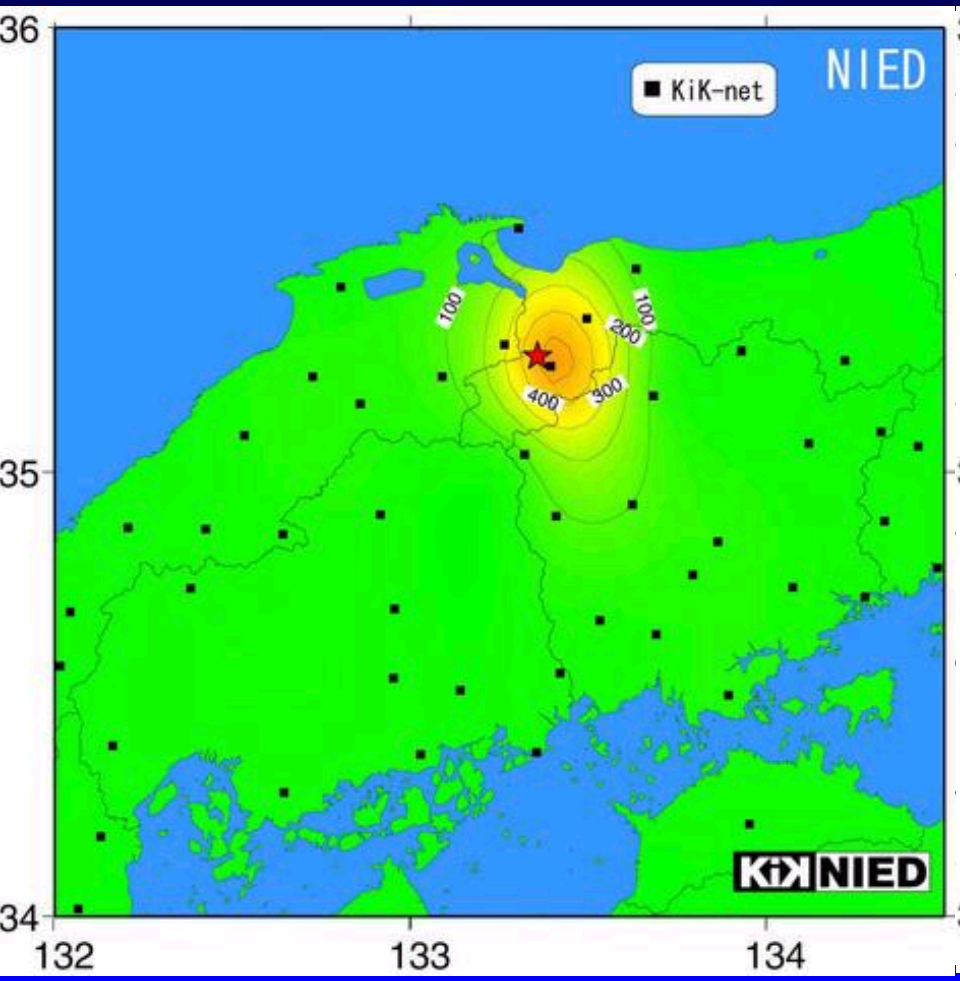


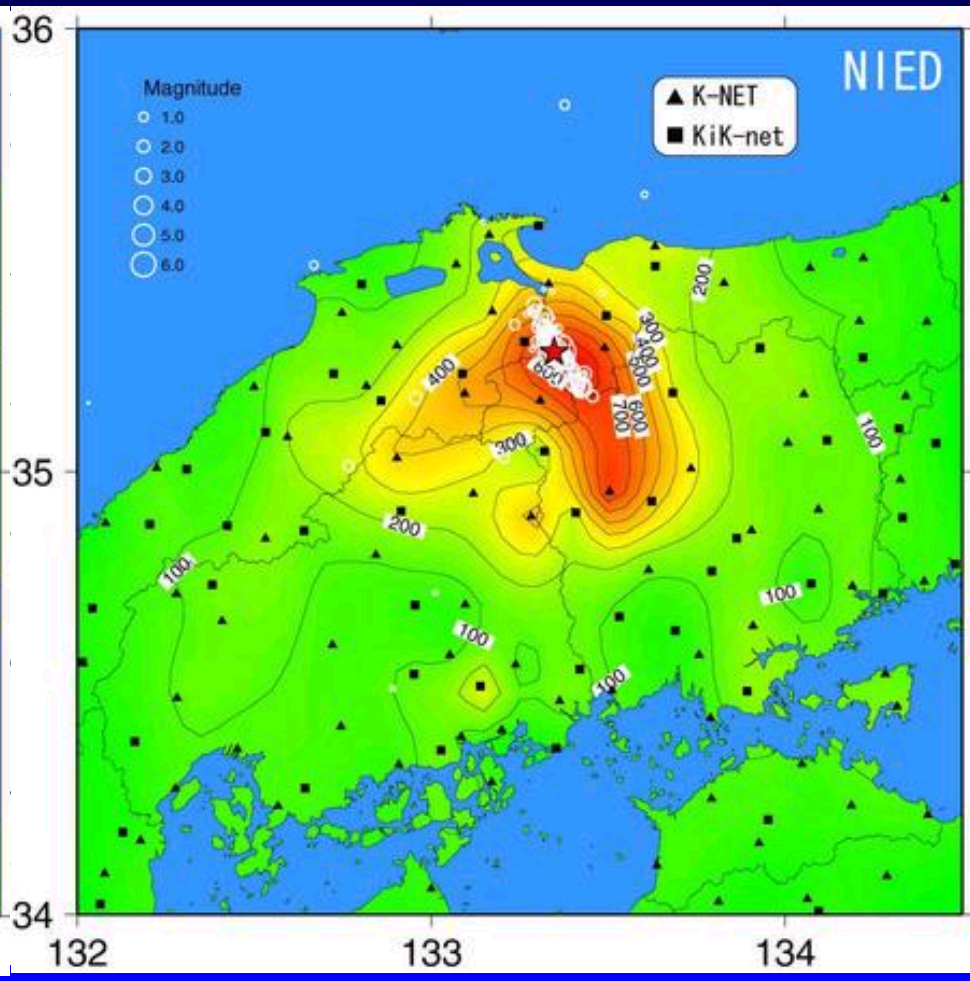
KiK-net: Data service on web site

Western Tottori earthquake (M7.3) of Oct.6, 2000

At depth of 100-200m

Ground surface



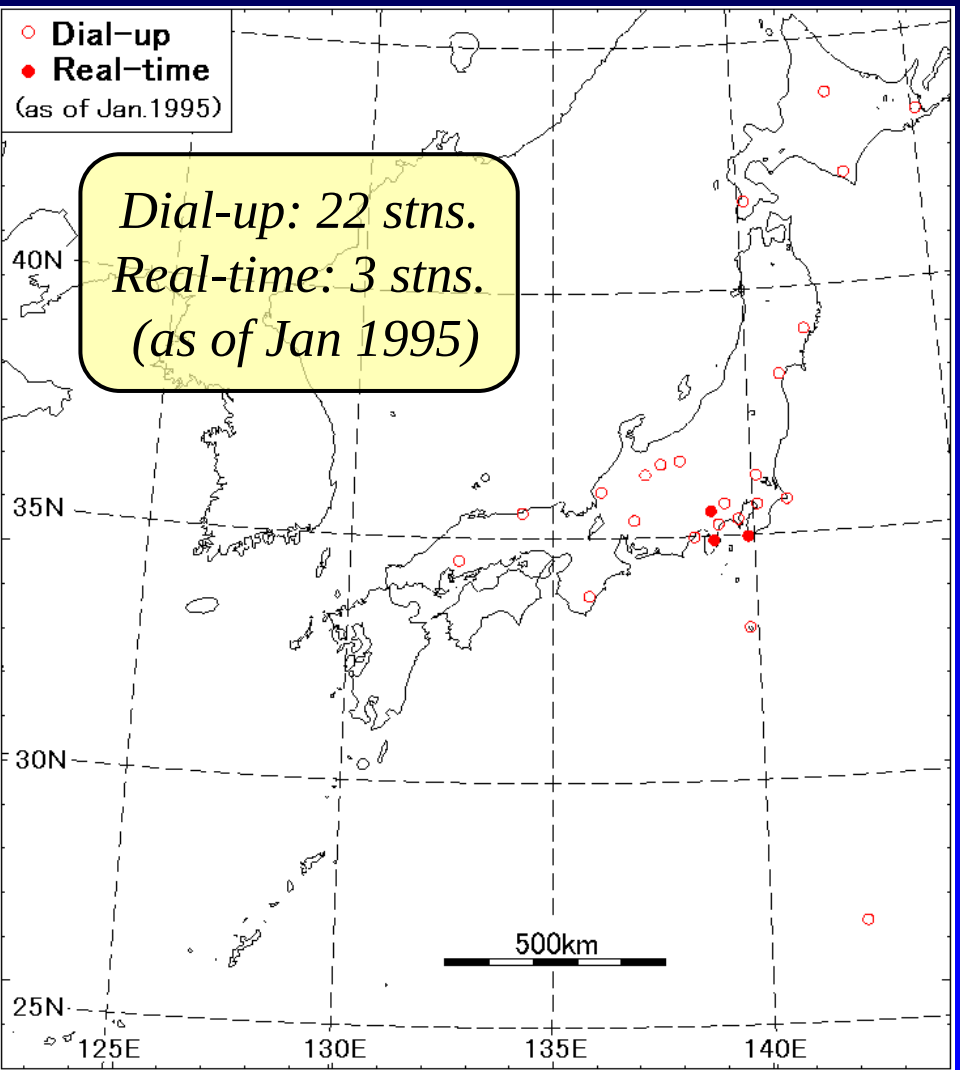


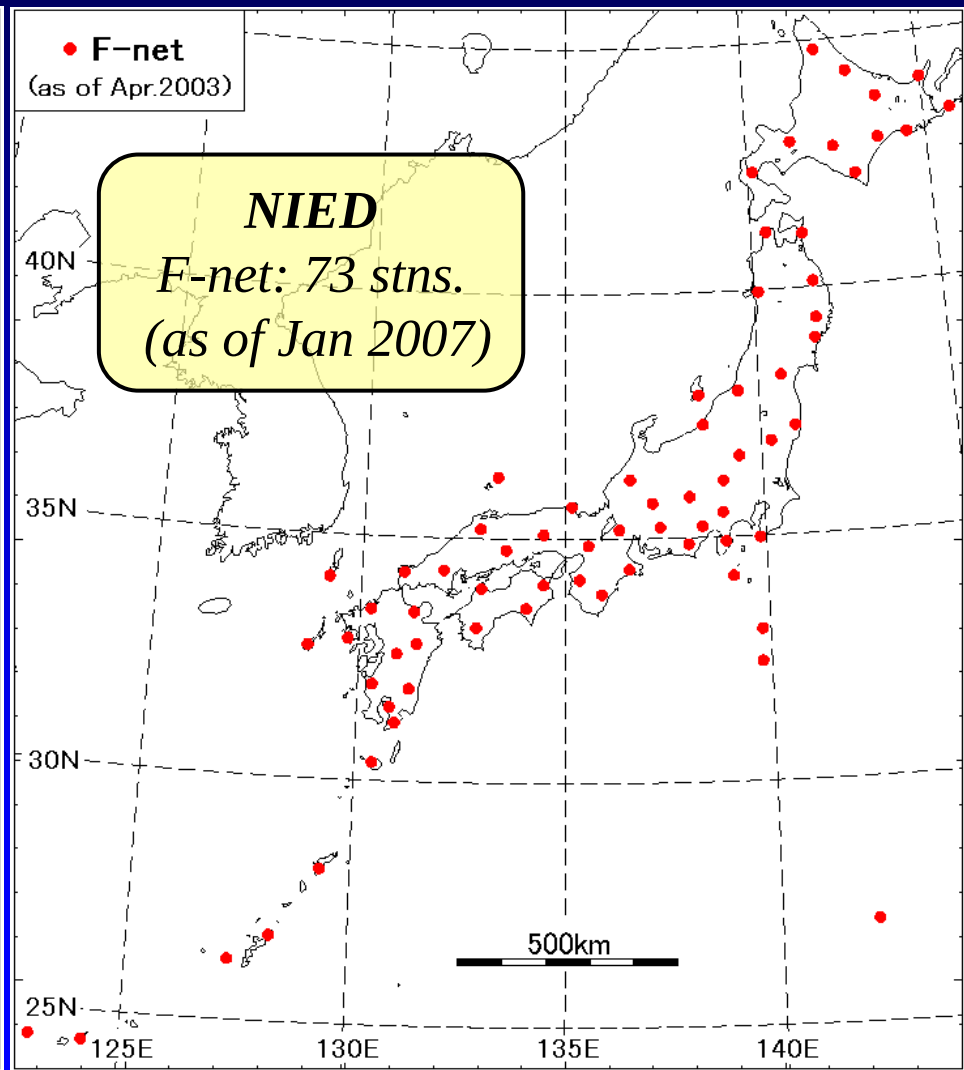
Broadband observation

Broadband seismograph network

- before Kobe Eq. -

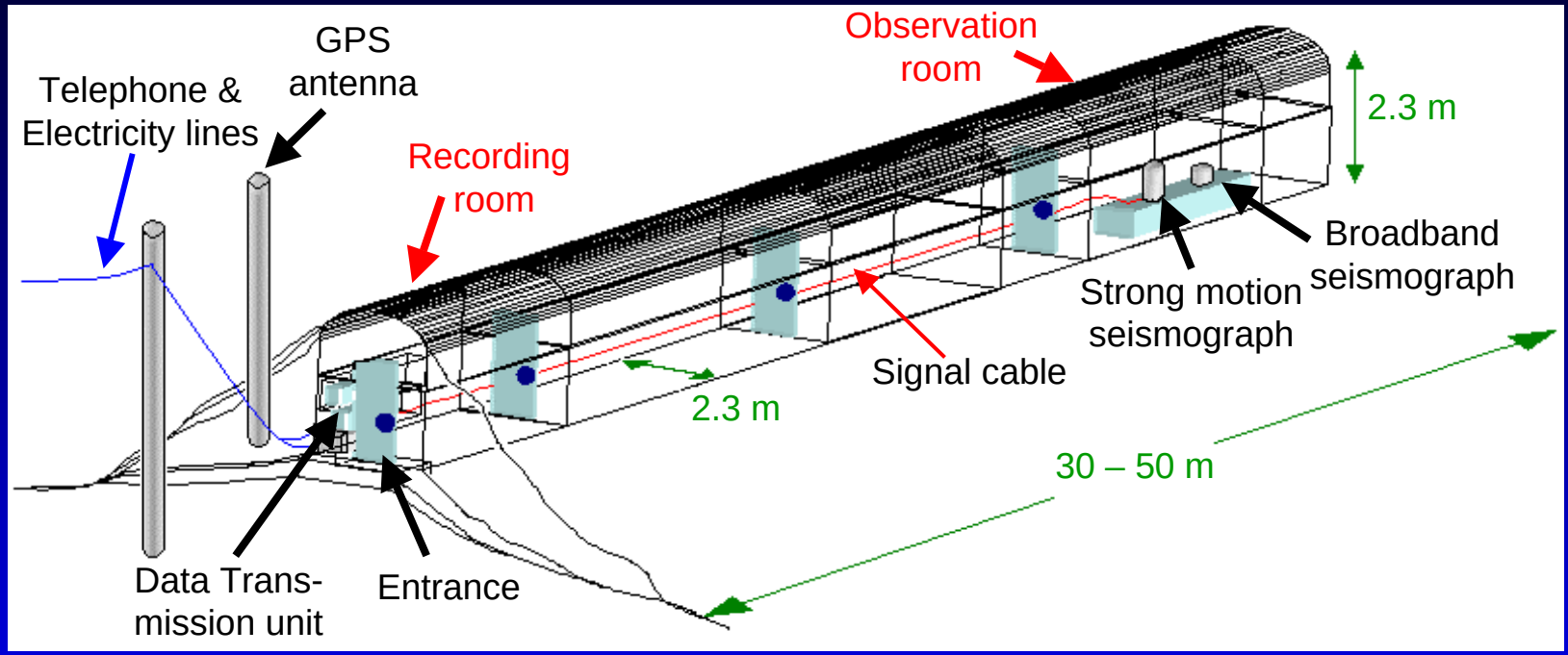
- after Kobe Eq. -



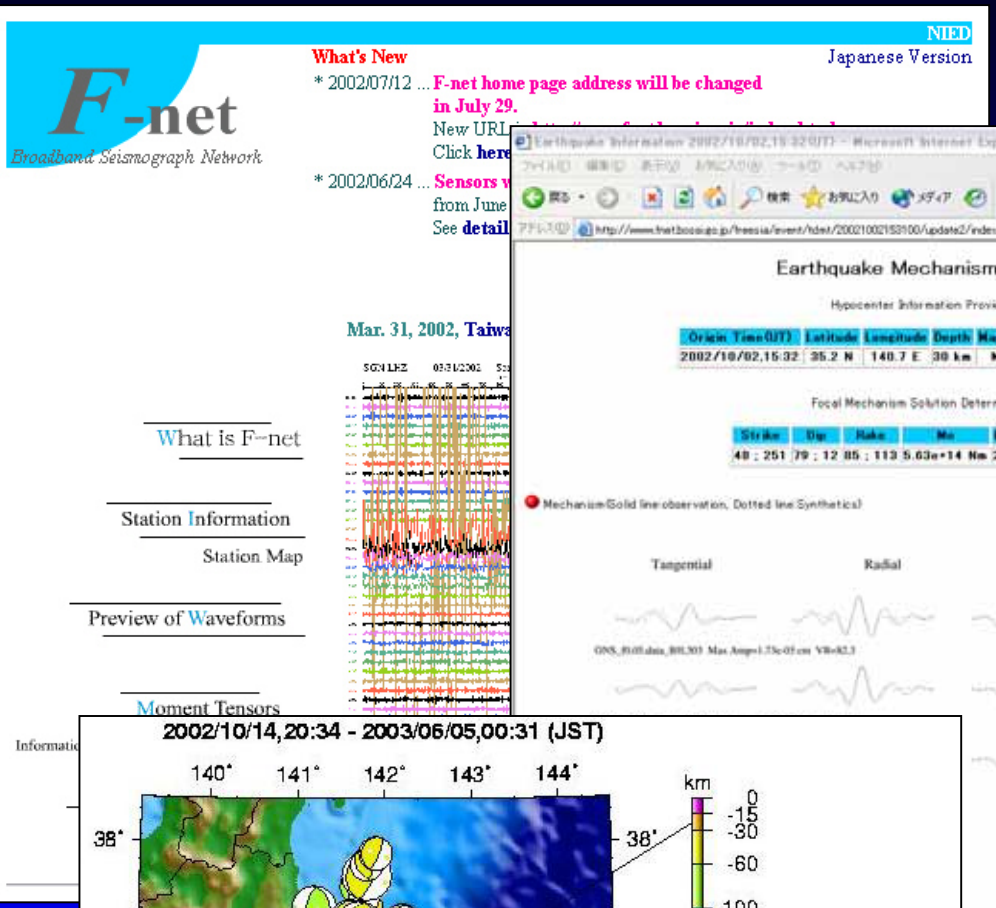


F-net station (Full-range seismograph network)

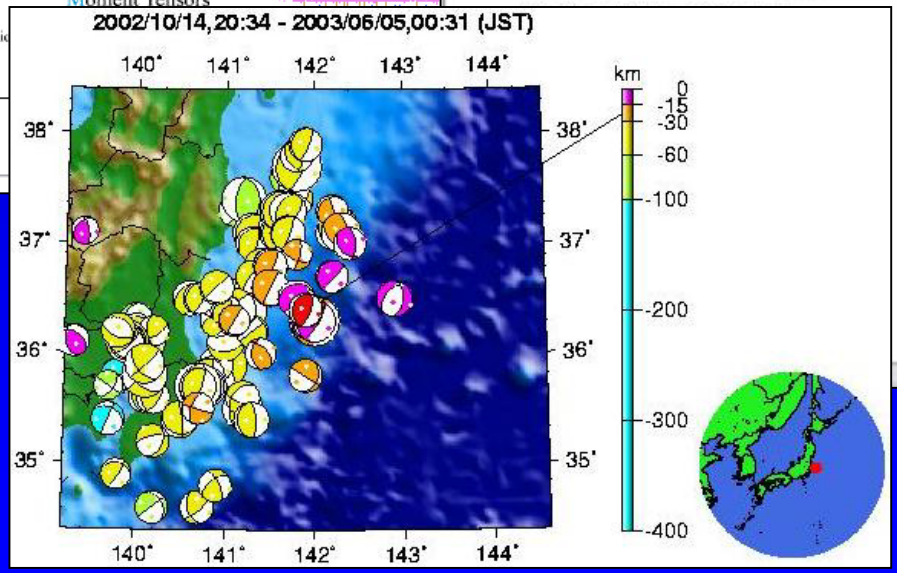
100km spacing, 100 stations are planned



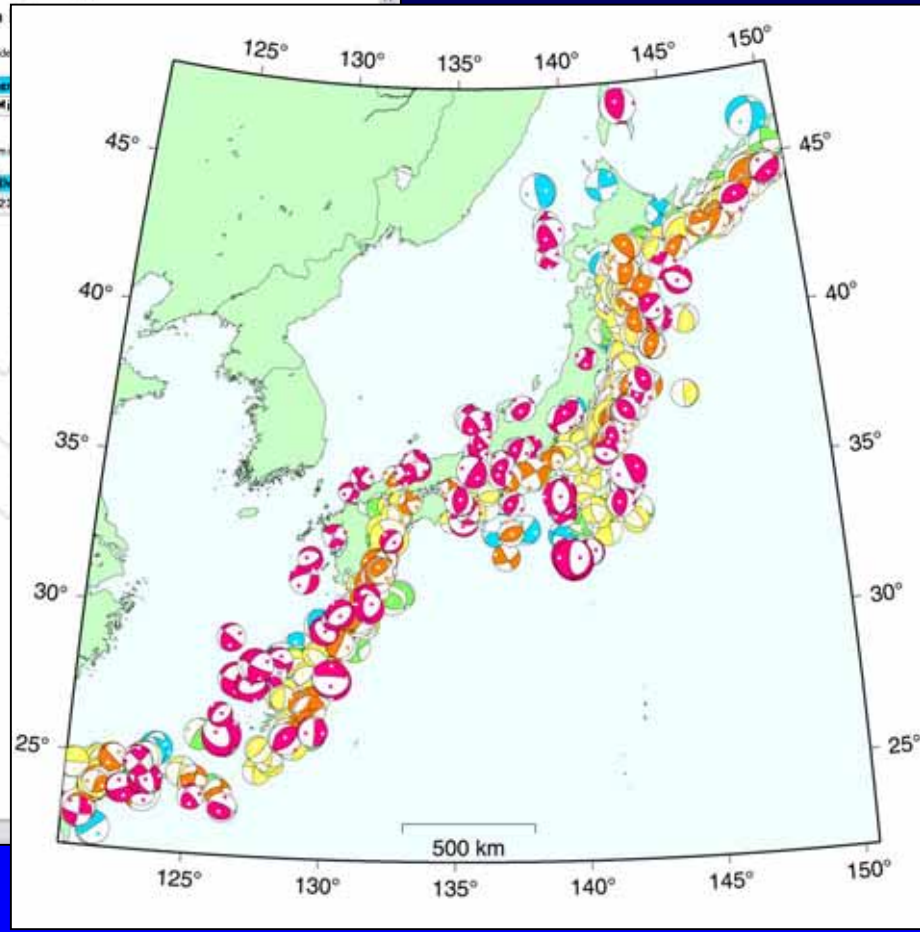
F-NET: Data service on web site



CMT solution



CMT map



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1. Overview of recent Japan seismic network

1-1. Impact of KOBE Earthquake (Jan. 17, 1995)

1-2. Earthquake research plan by Japanese government

1-3. K-NET: Strong motion observation network

1-4. Hi-net (KiK-net): High sensitivity seismograph network with two sets of strong motion seismometer

1-5. F-net: Broadband seismograph network

2. Recent significant result : Slow earthquakes

2-1. Shallow very low frequency earthquake

2-2. Nonvolcanic deep low-frequency tremor

2-3. Short-term slow slip event

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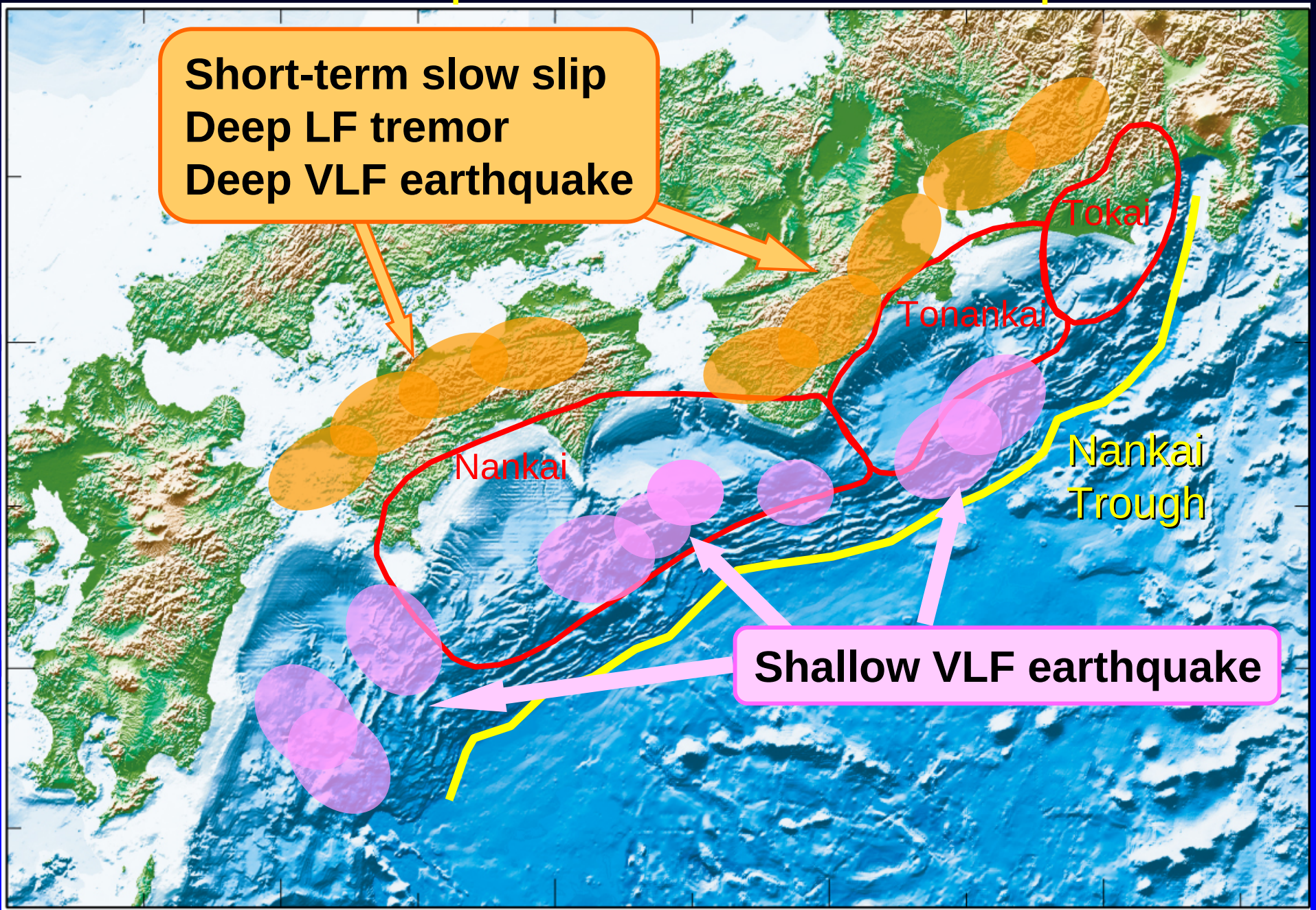
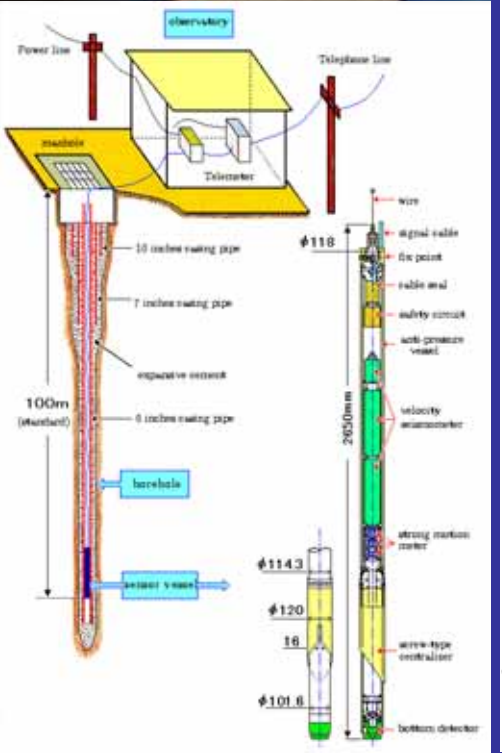
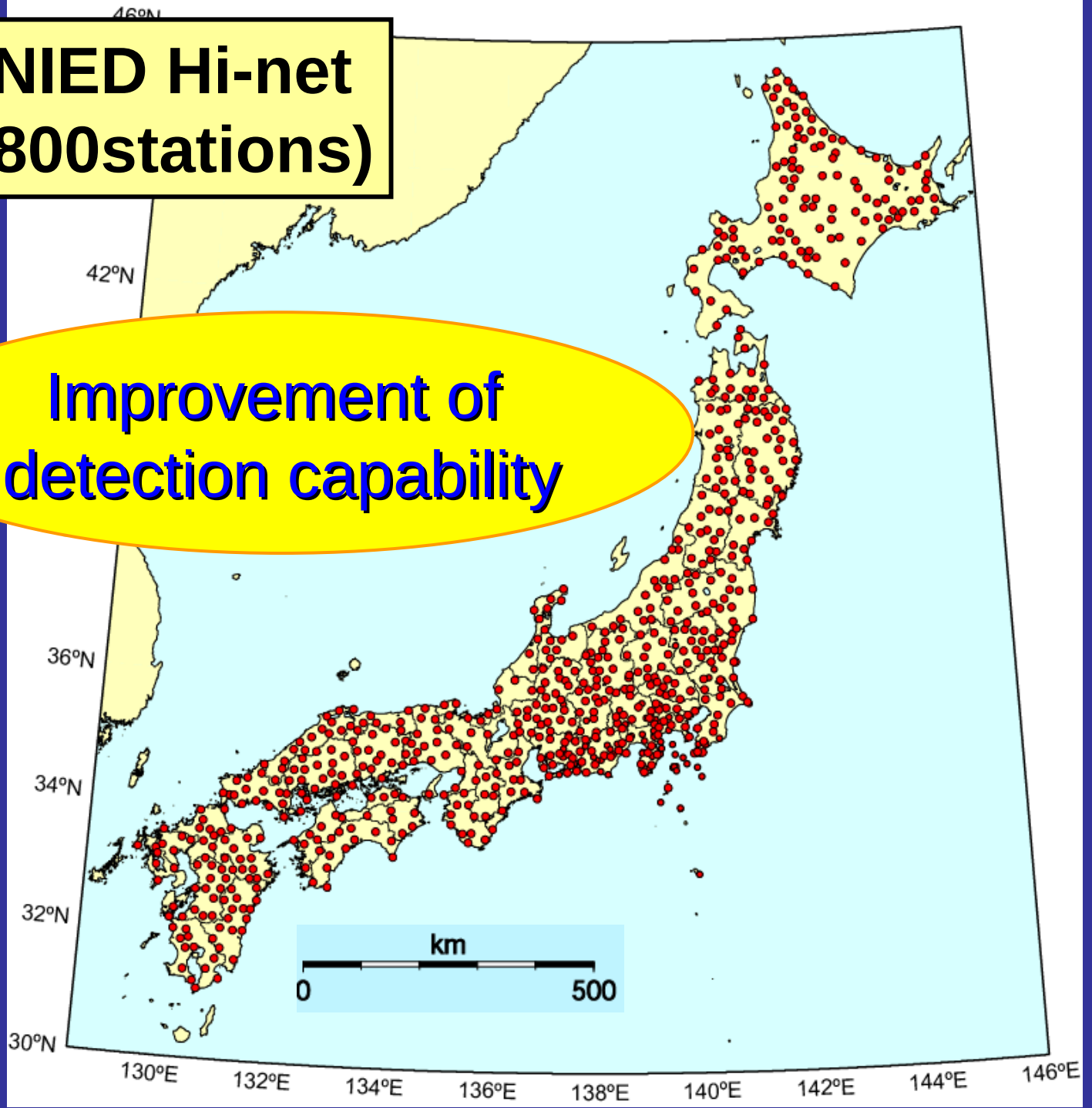
Slow earthquakes in southwest Japan



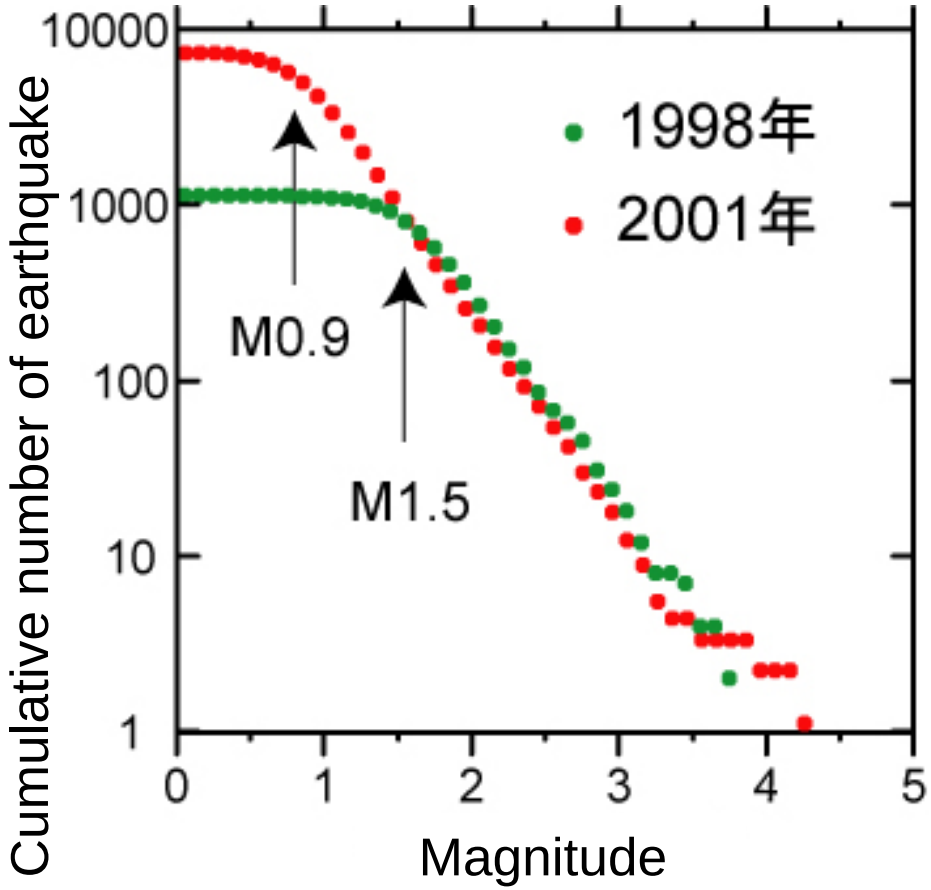
NIED Hi-net (800stations)

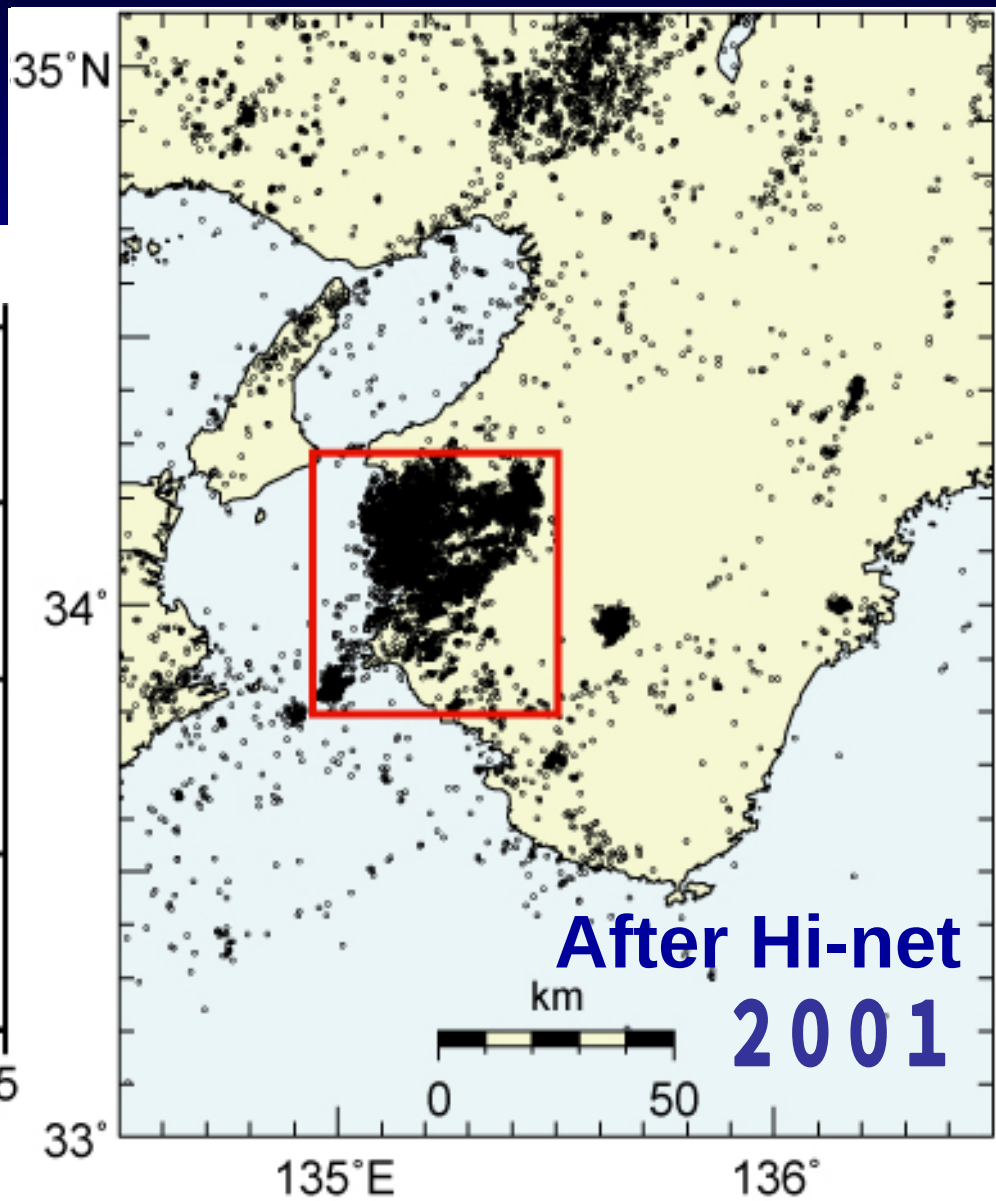


Improvement of detection capability

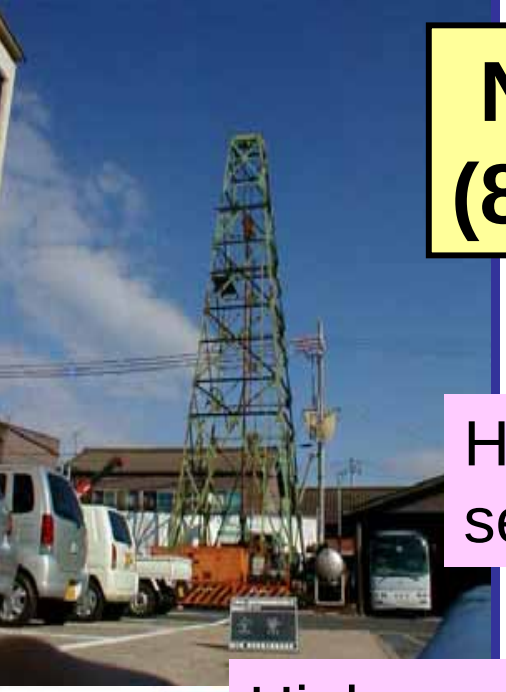


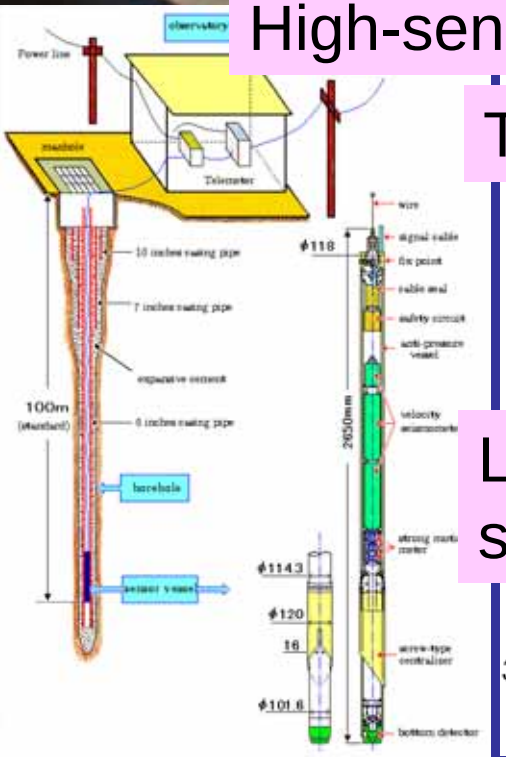
Improvement of microearthquake detection capability

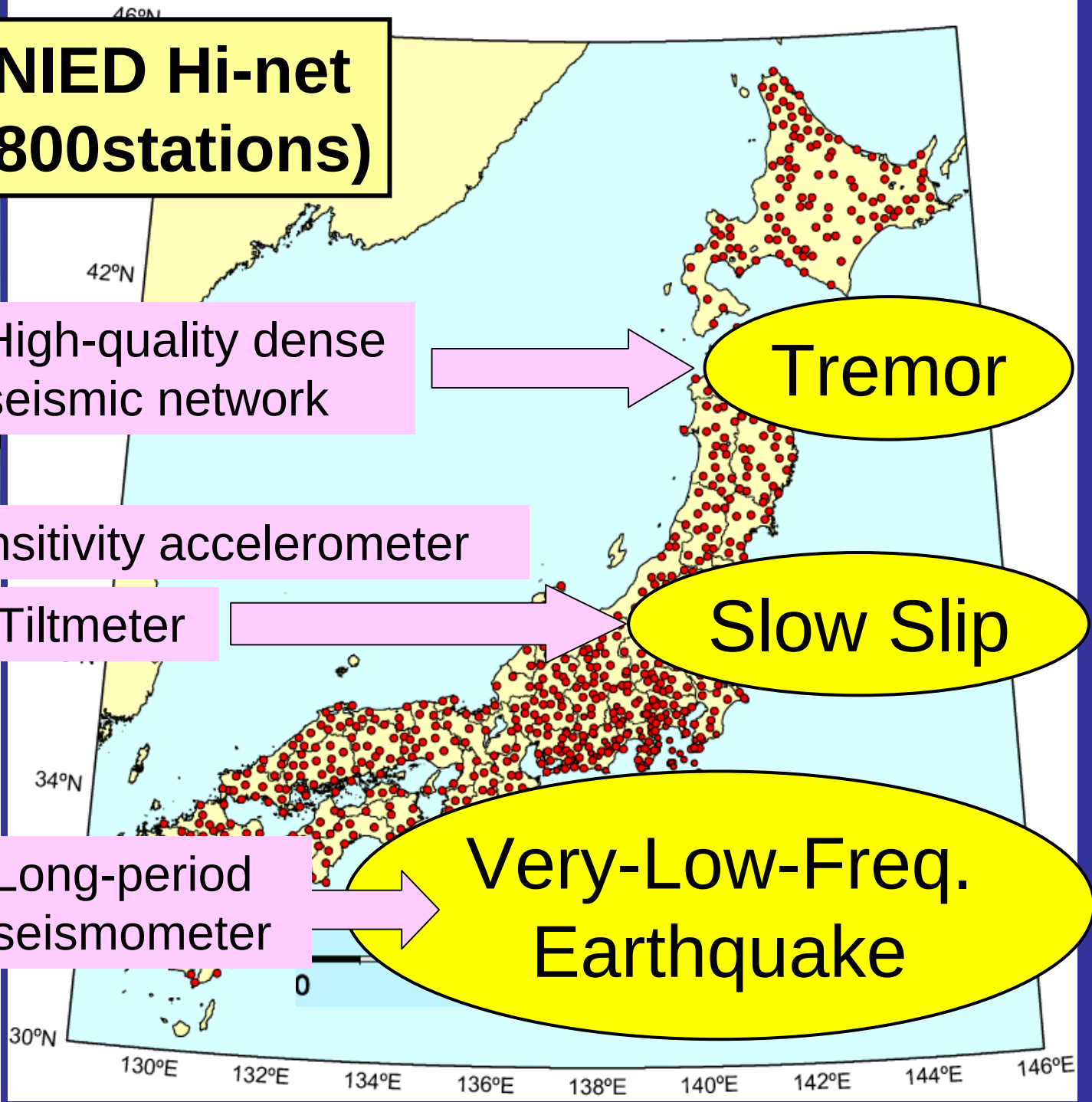




NIED Hi-net (800stations)







High-quality dense seismic network → Tremor

High-sensitivity accelerometer

Tiltmeter → Slow Slip

Long-period seismometer → Very-Low-Freq. Earthquake

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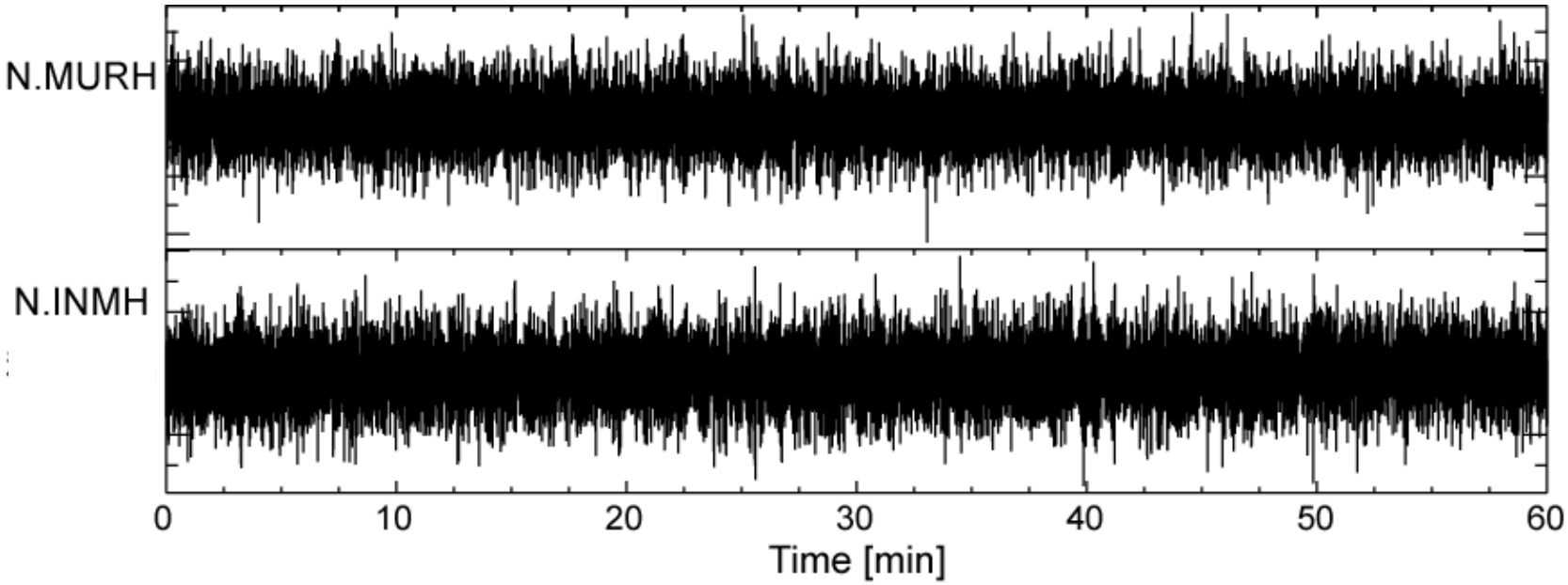
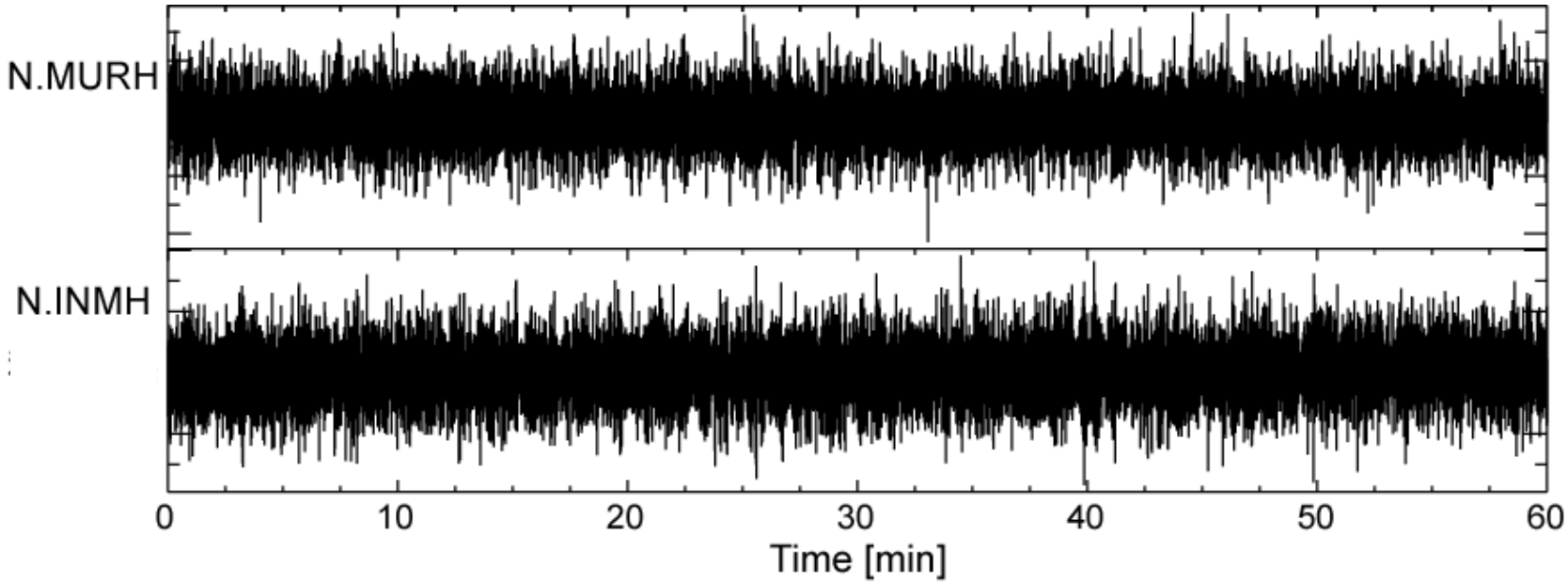
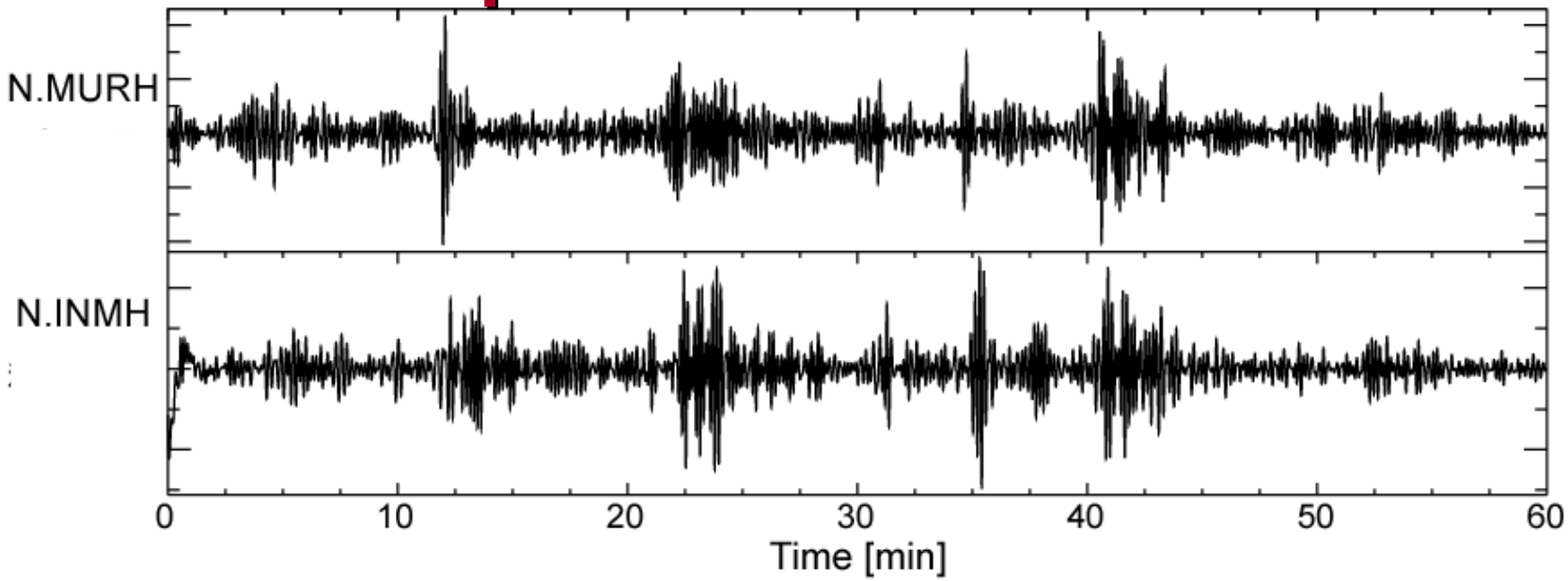
1 hour broadband seismograms (2003/7/6 03h)



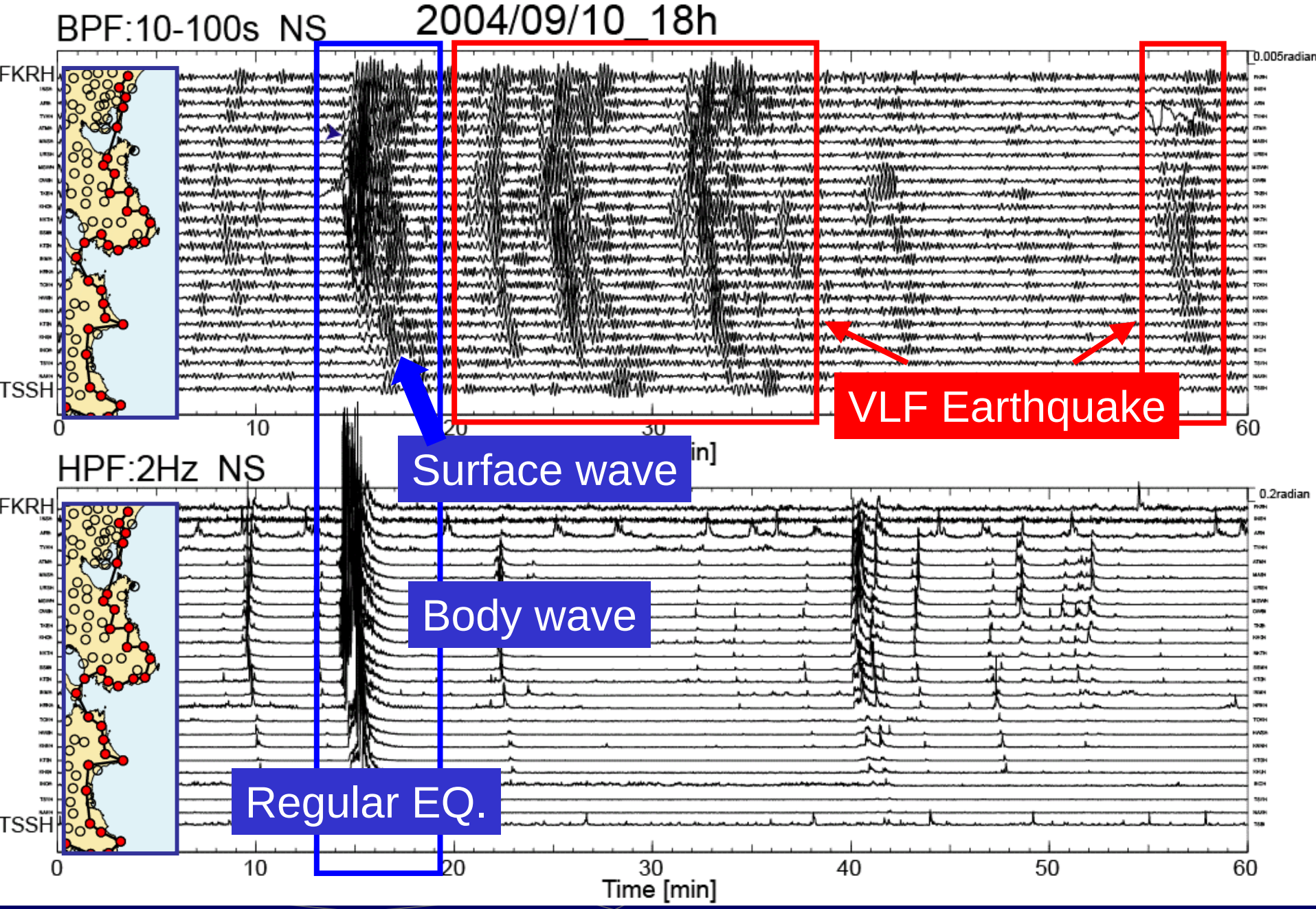
1 hour broadband seismograms (2003/7/6 03h)



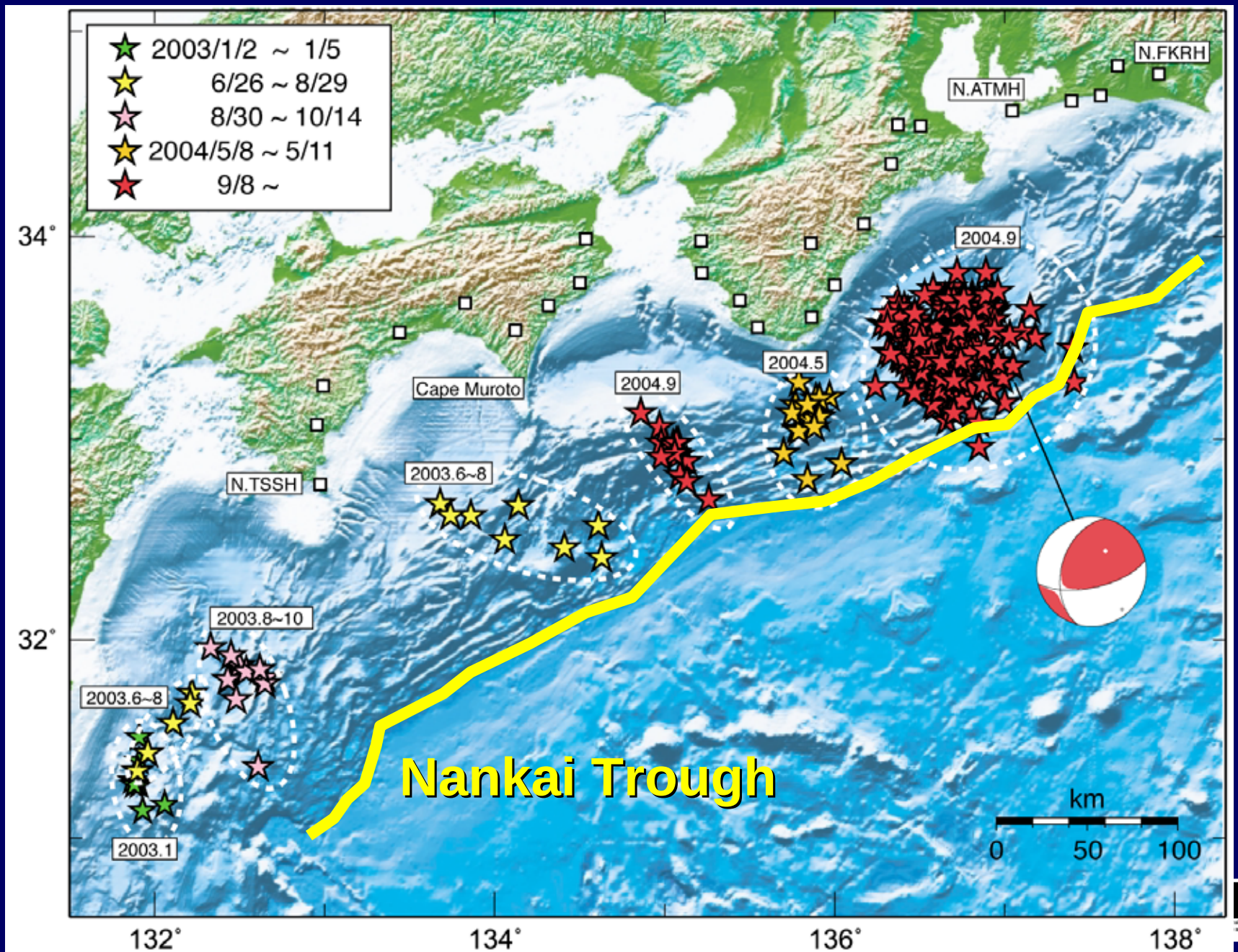
10-100s Band-pass filtered traces



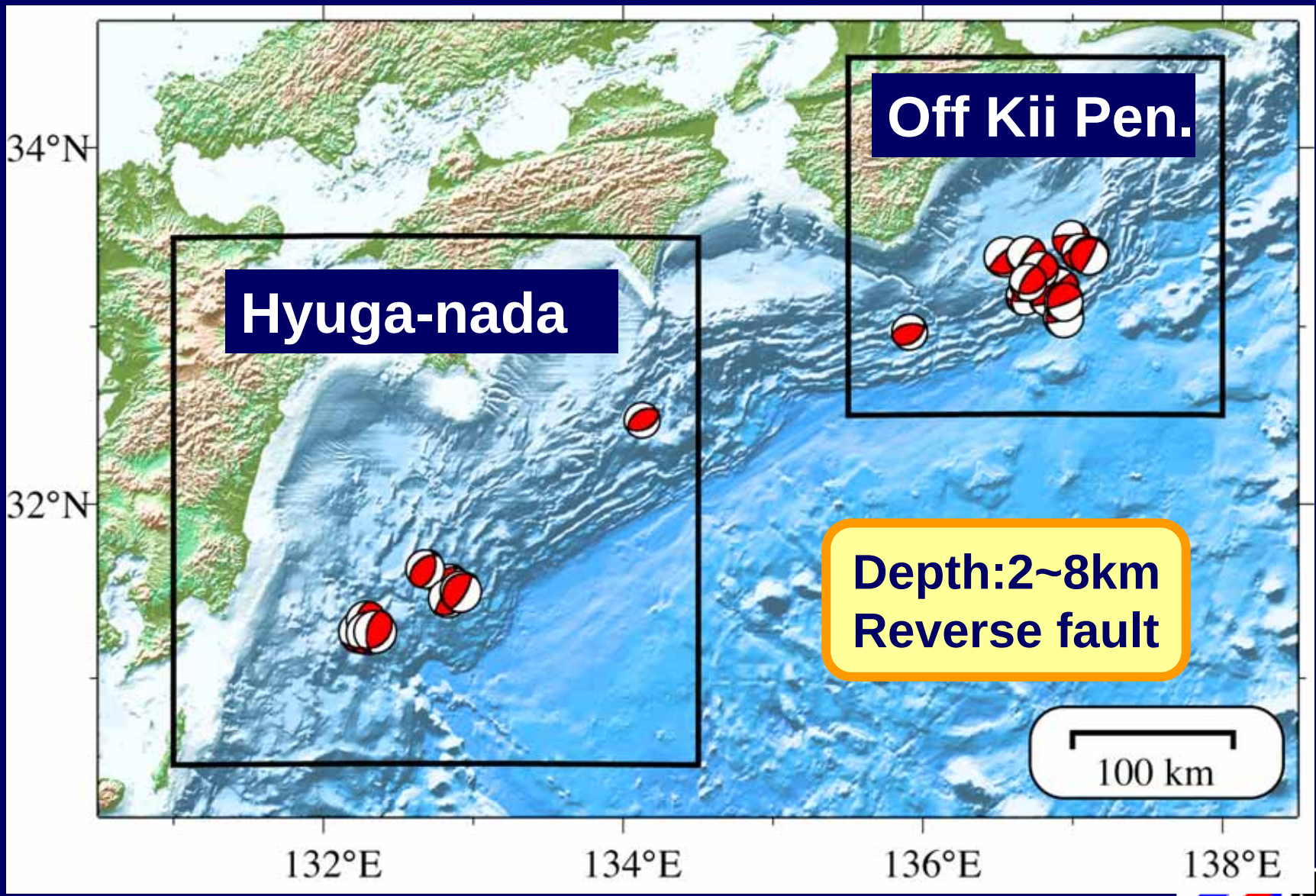
VLF and regular earthquake after the M7 major event



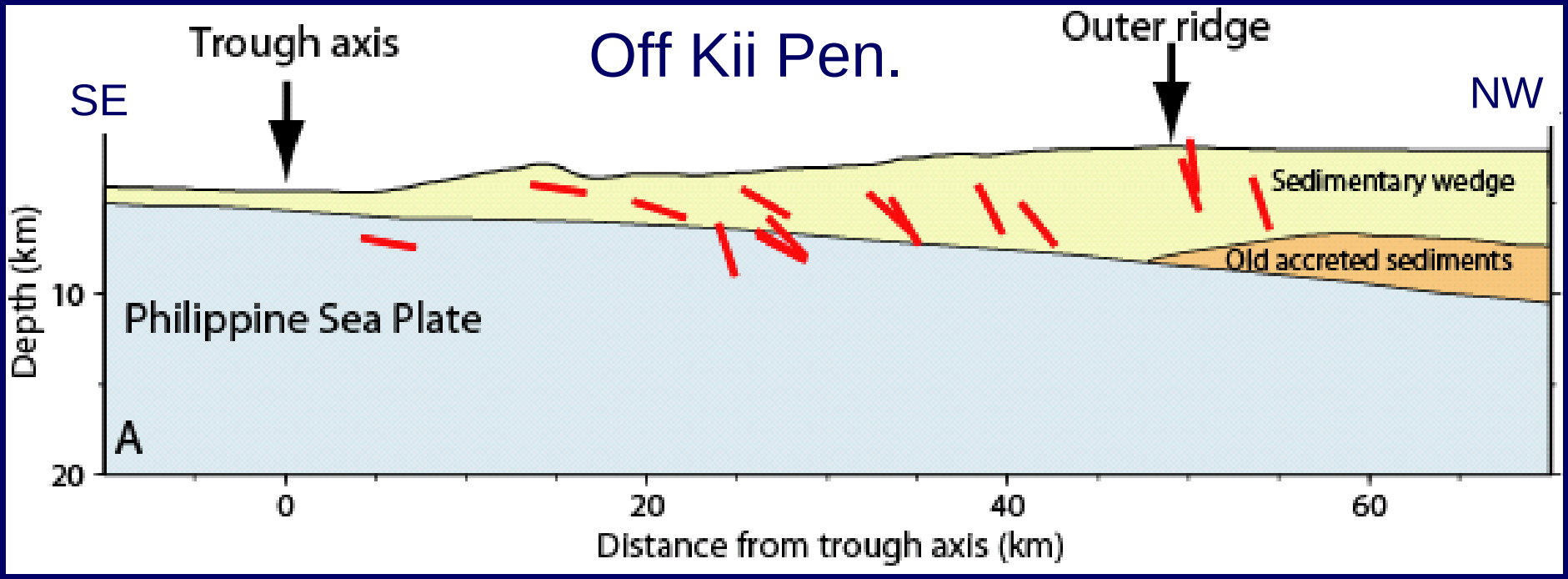
Epicentral distribution of VLF (2003-2004)

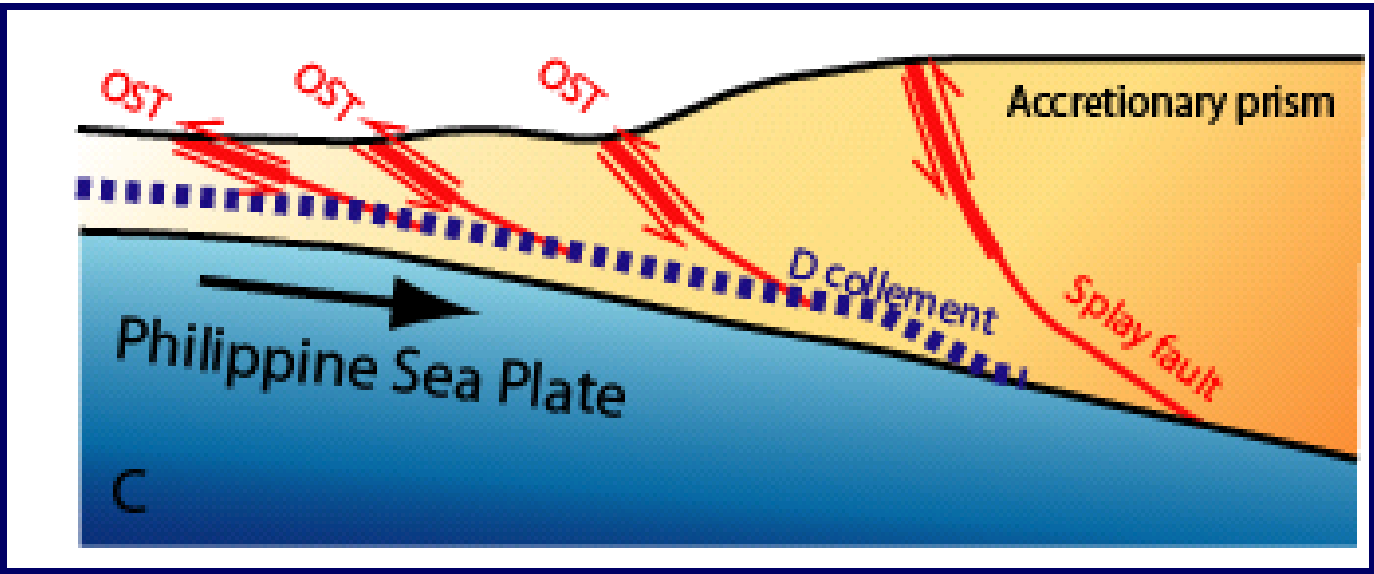


CMT solution of VLF earthquakes



Cross section of fault plane of VLF earthquake





NIED

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1-1. Impact of KOBE Earthquake (Jan. 17, 1995)

1-2. Earthquake research plan by Japanese government

1-3. K-NET: Strong motion observation network

1-4. Hi-net (KiK-net): High sensitivity seismograph network with two sets of strong motion seismometer

1-5. F-net: Broadband seismograph network

2. Recent significant result : Slow earthquakes

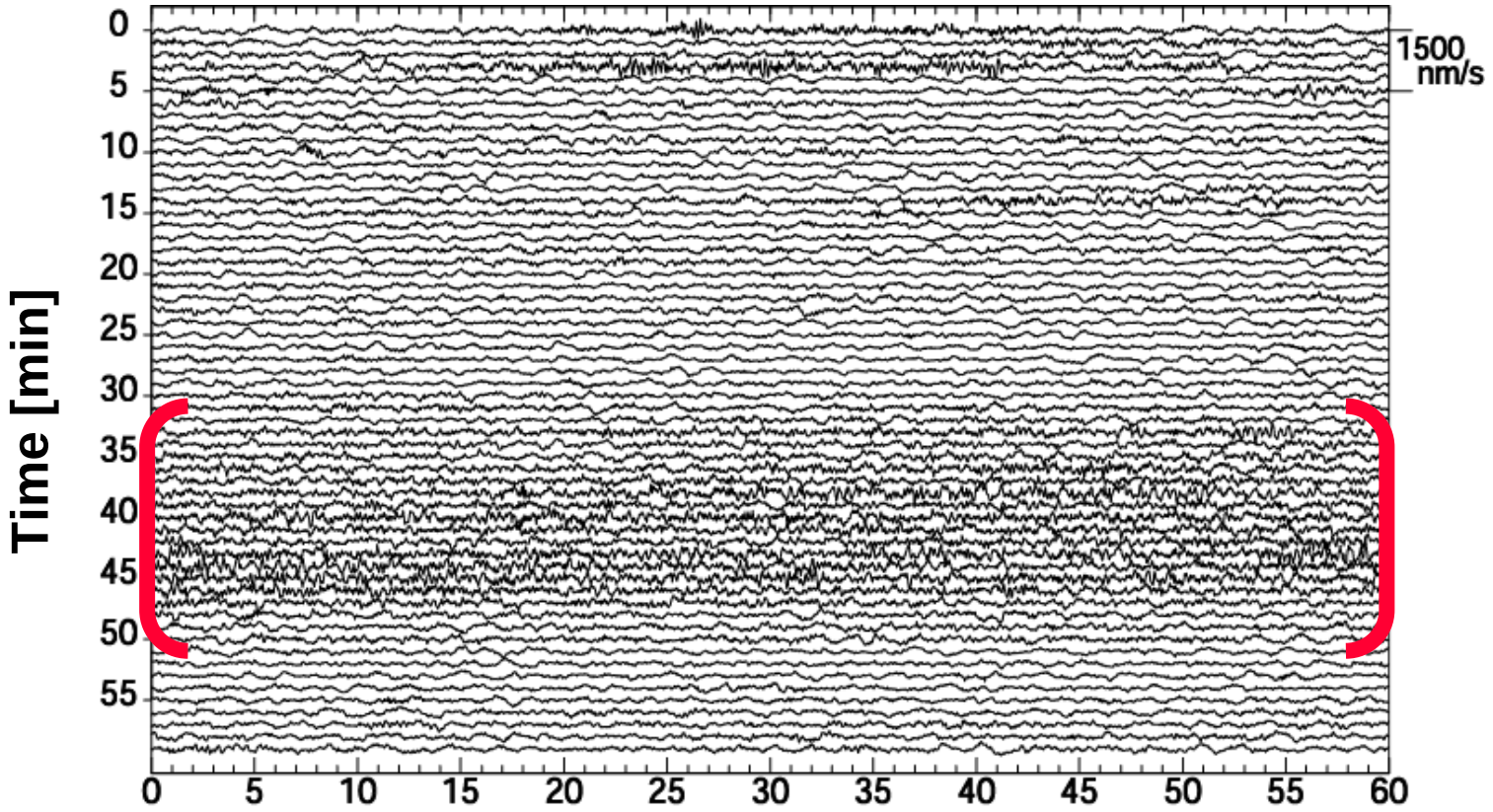
2-1. Shallow very low frequency earthquake

2-2. Nonvolcanic deep low-frequency tremor

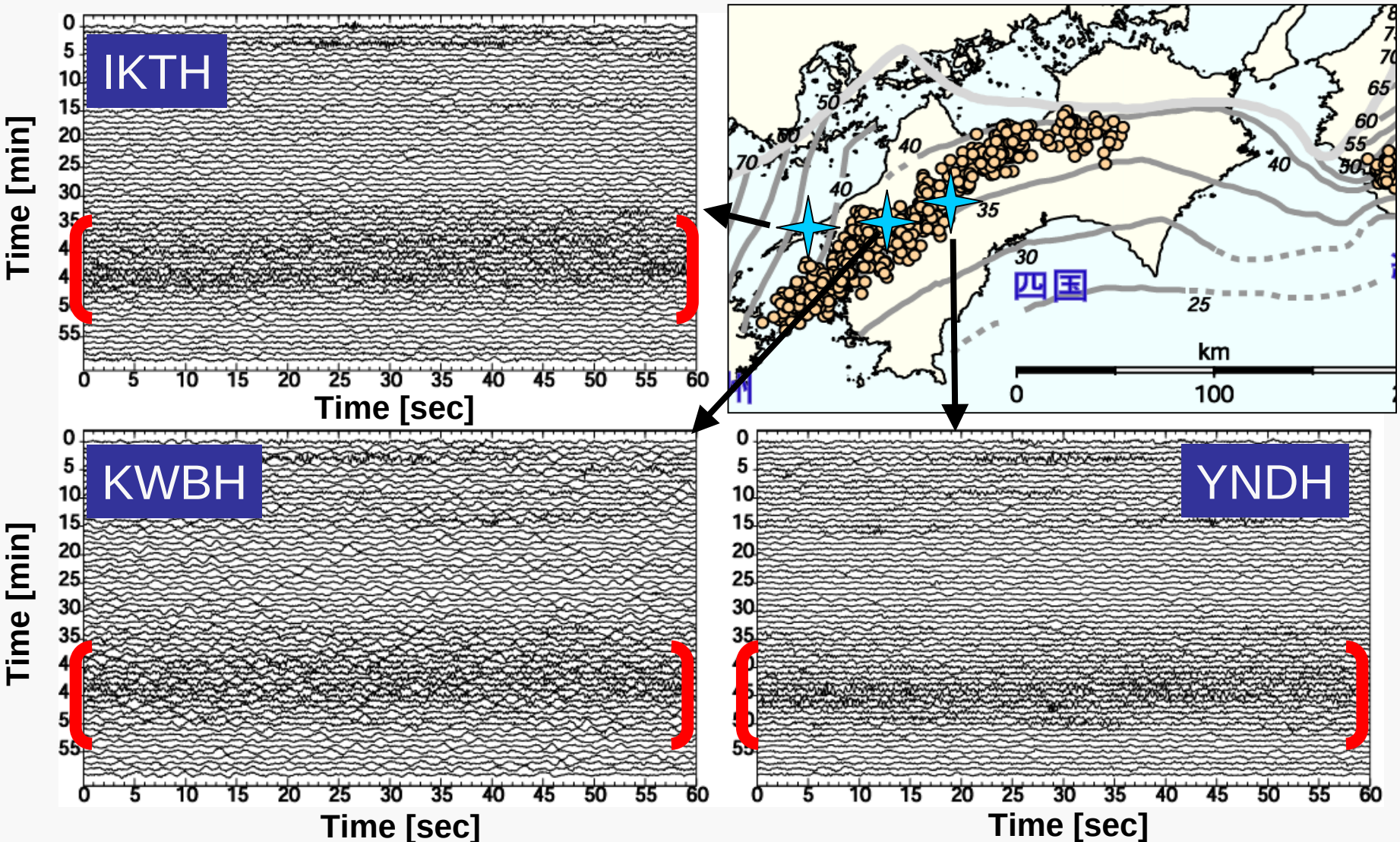
2-3. Short-term slow slip event

NIED
National Research Institute for Earth Science and Disaster Prevention

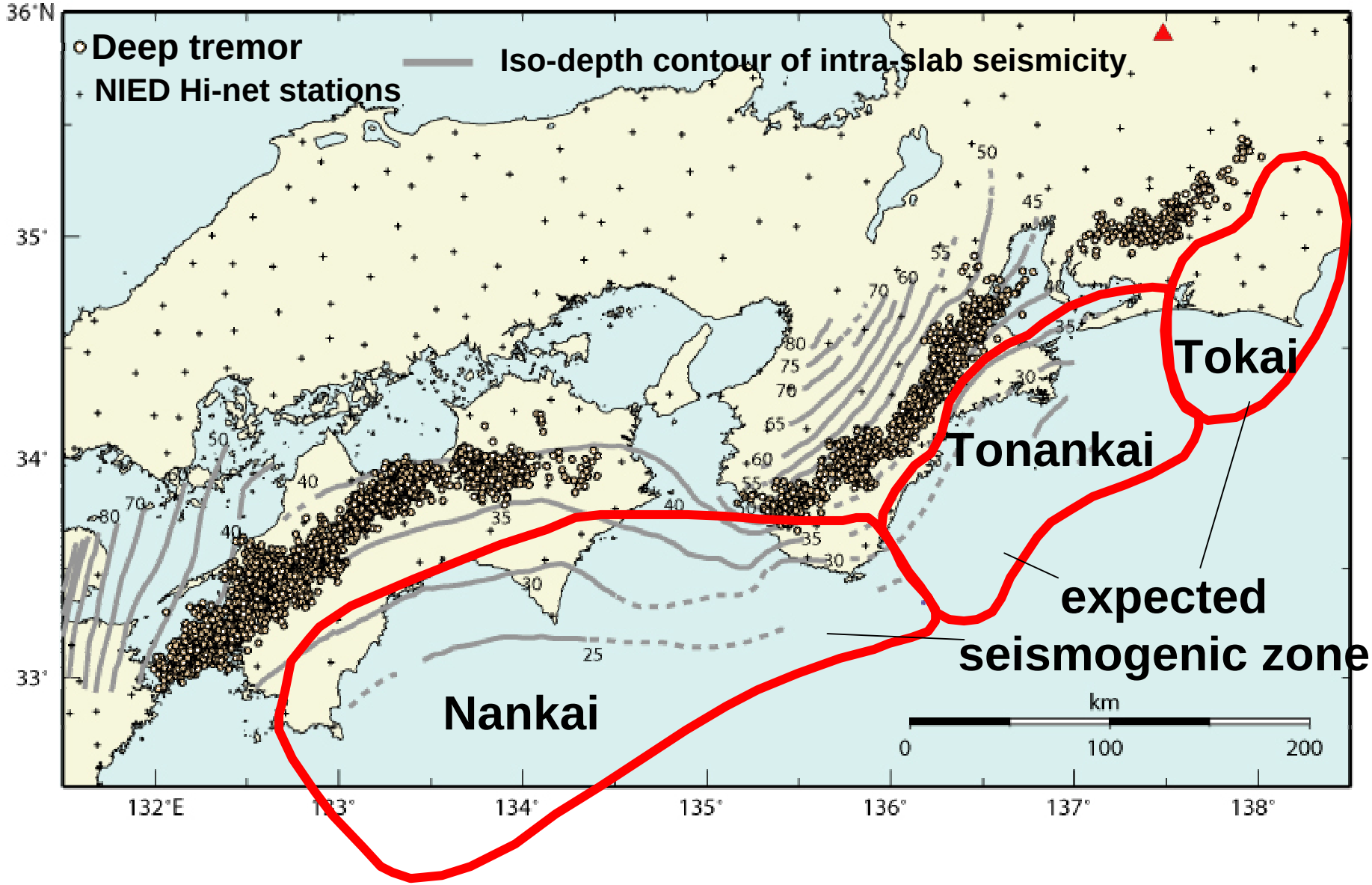
1 hour continuous seismograms observed at station IKTH in the western part of Shikoku (4 am, 17 August 2001)



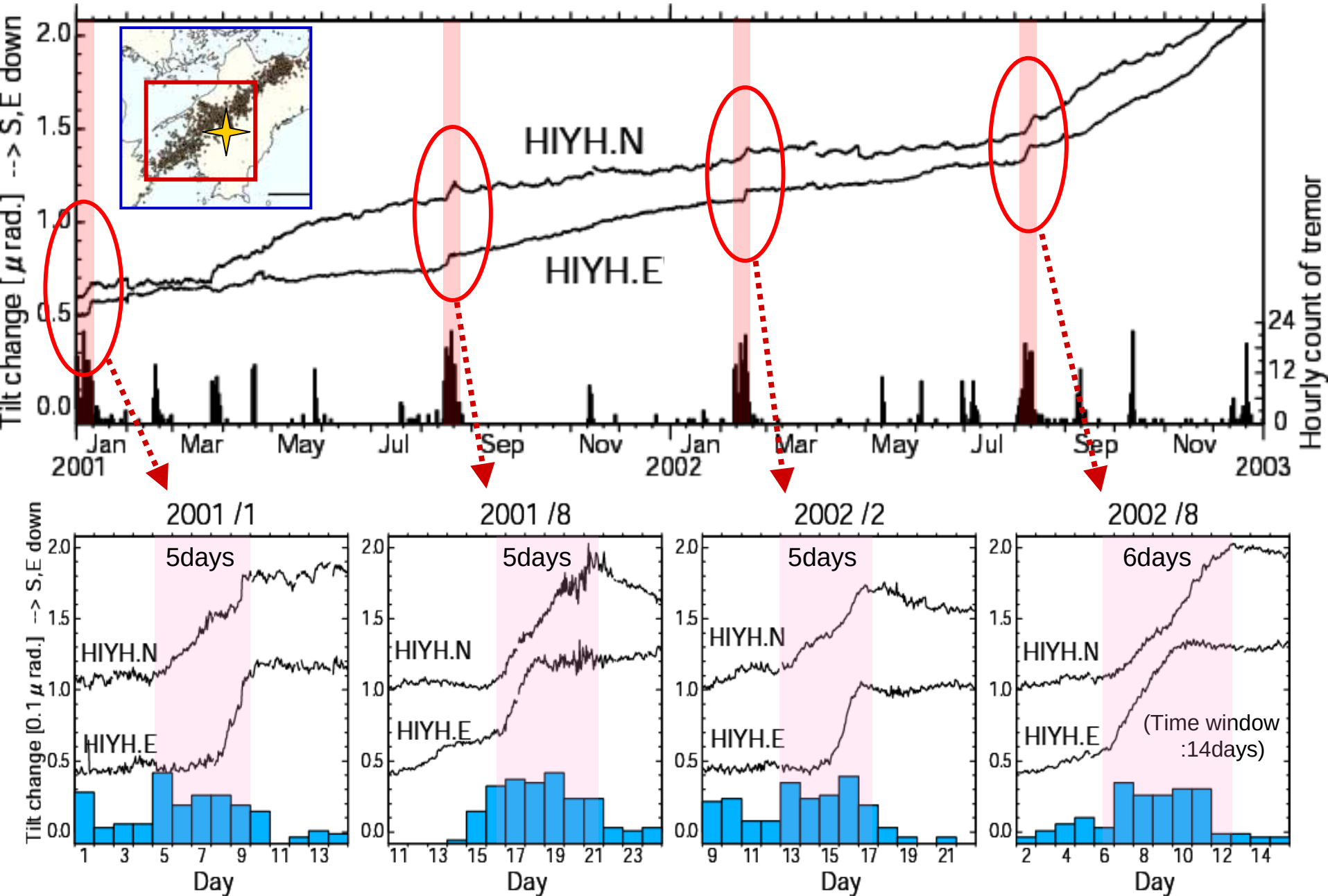
1 hour continuous seismograms observed at 3 stations in the western part of Shikoku (4 am, 17 August 2001)



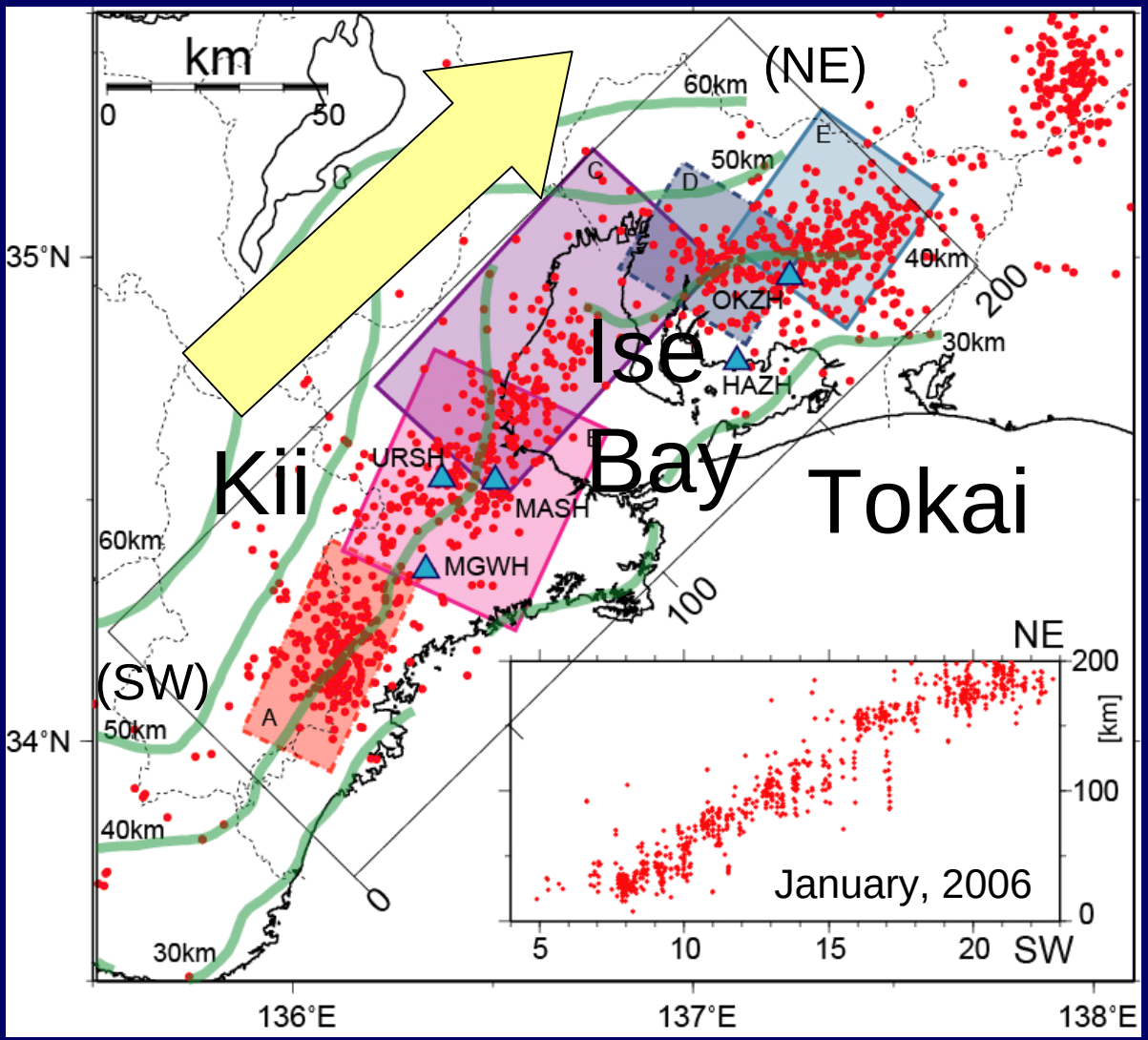
Epicentral distribution of tremor

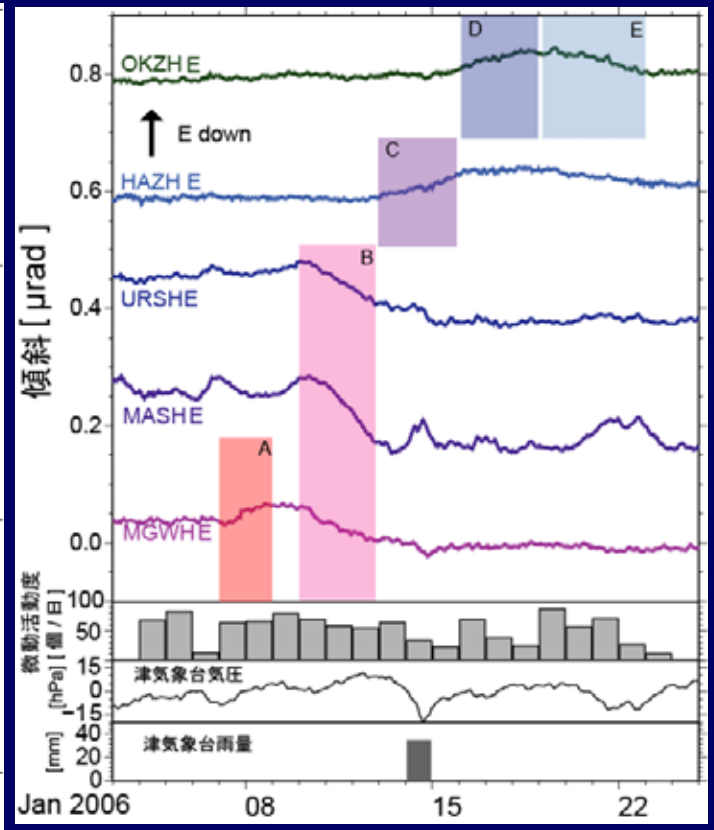


Tremor and Tilt change in the western part of Shikoku



Migrating tremor and slow-slip event in Tokai and Kii area, January 2006

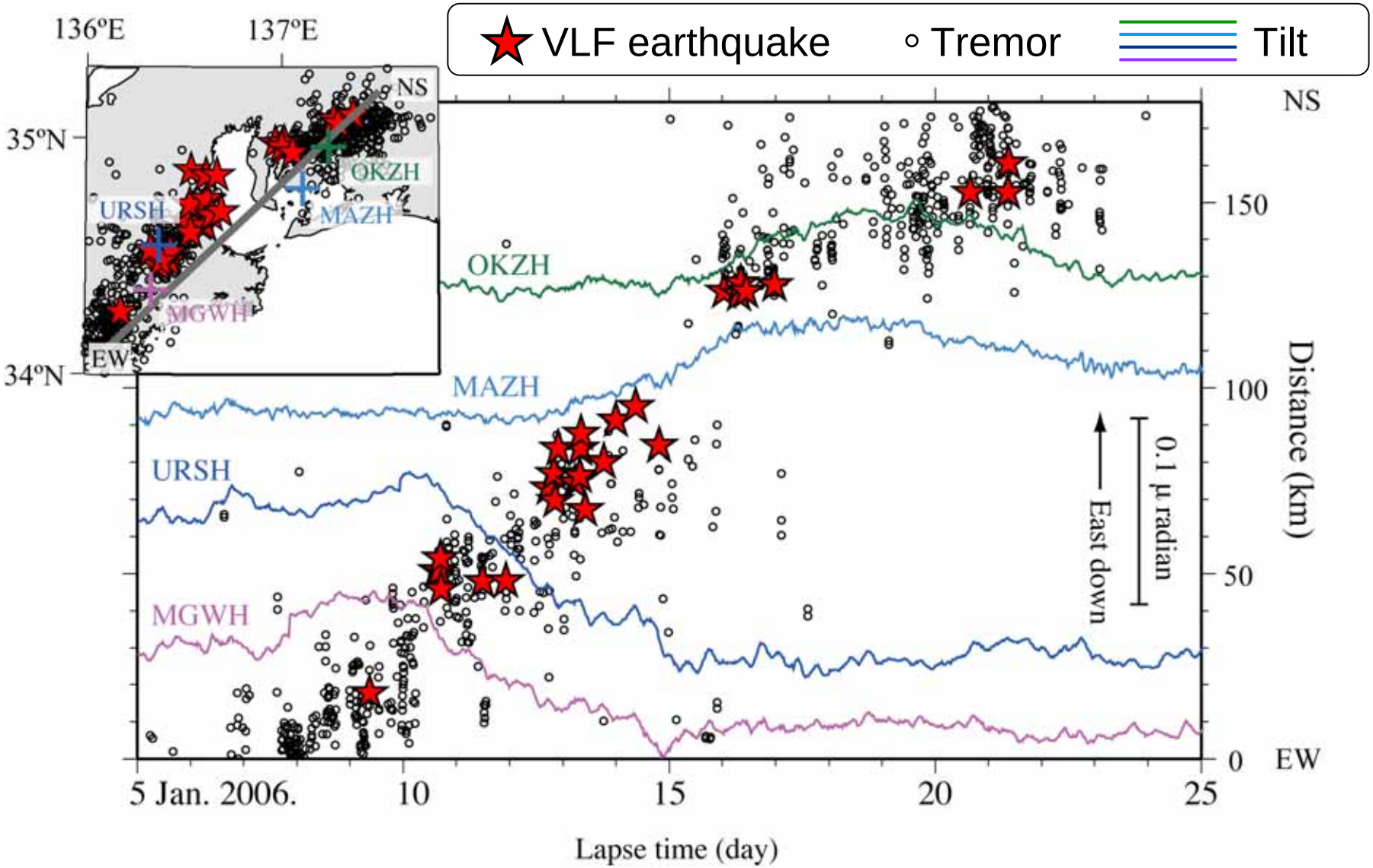




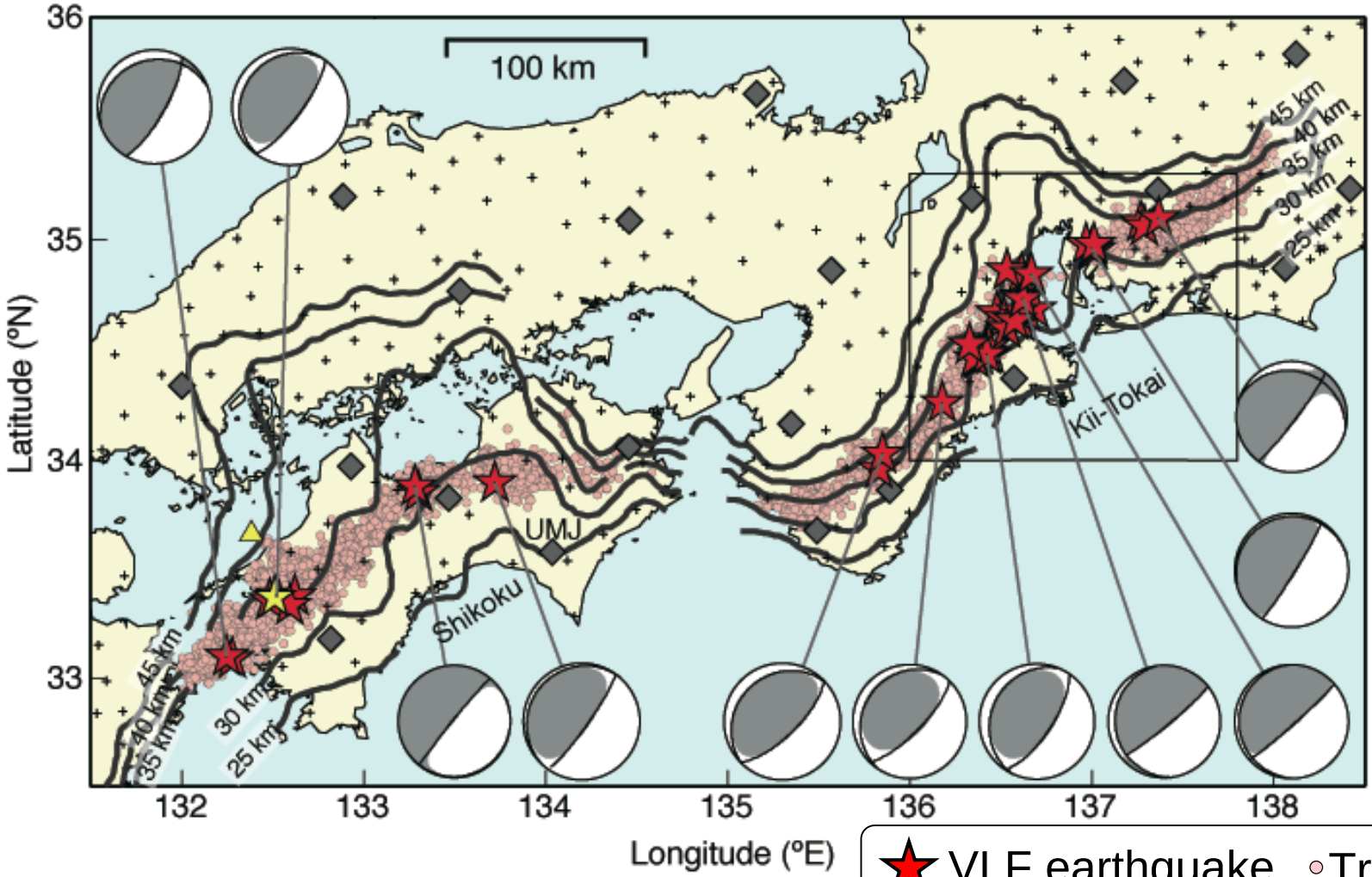
Vel.=10km/day

Total M**w** ~ 6.2

Deep VLF earthquakes with tremor and slip of episode 2006 in Tokai and Kii area



CMT solution of VLF earthquakes in 2006

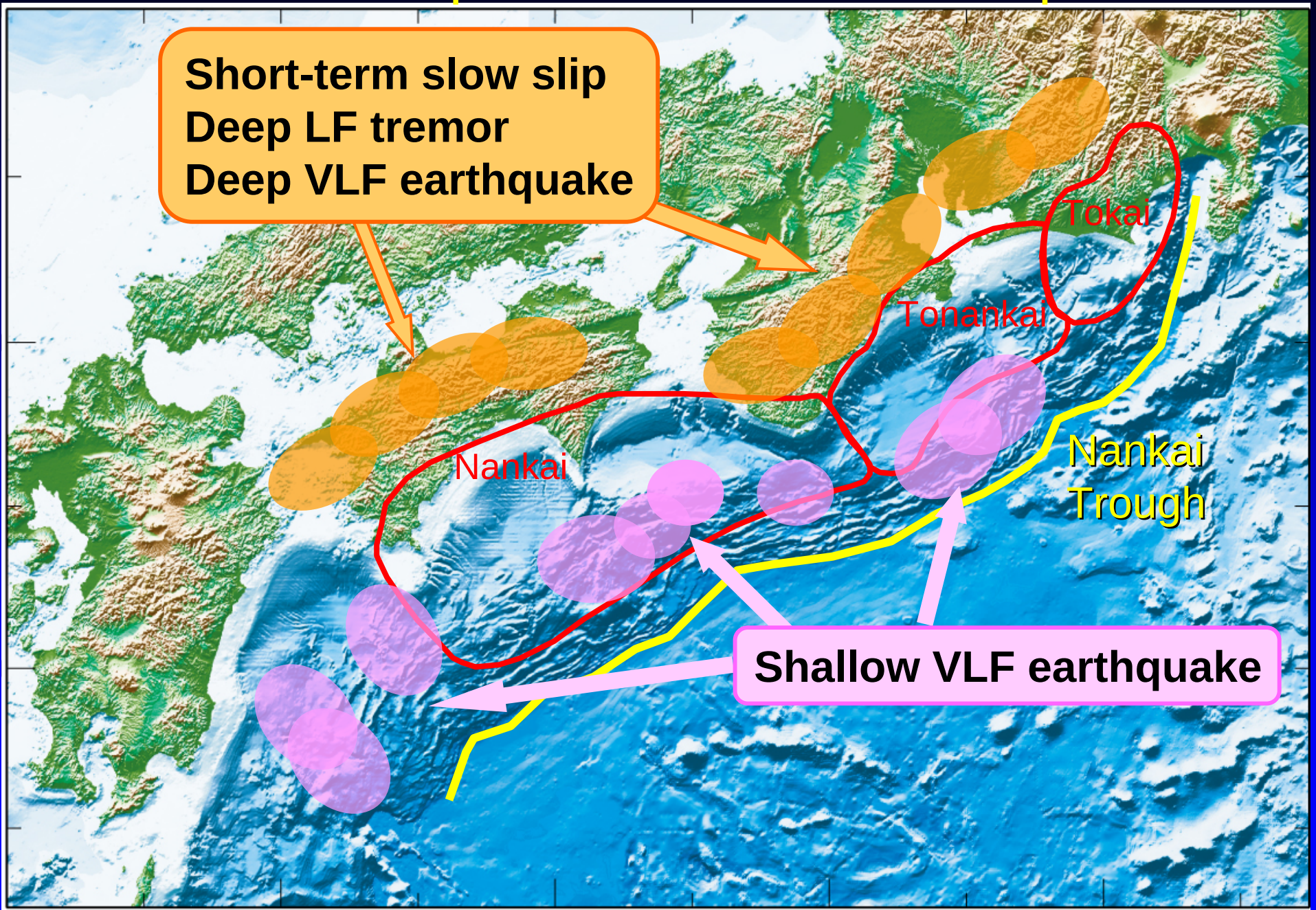


Focal mechanism = Thrust type

Focal depth = 30~40km

Slab surface

Slow earthquakes in southwest Japan



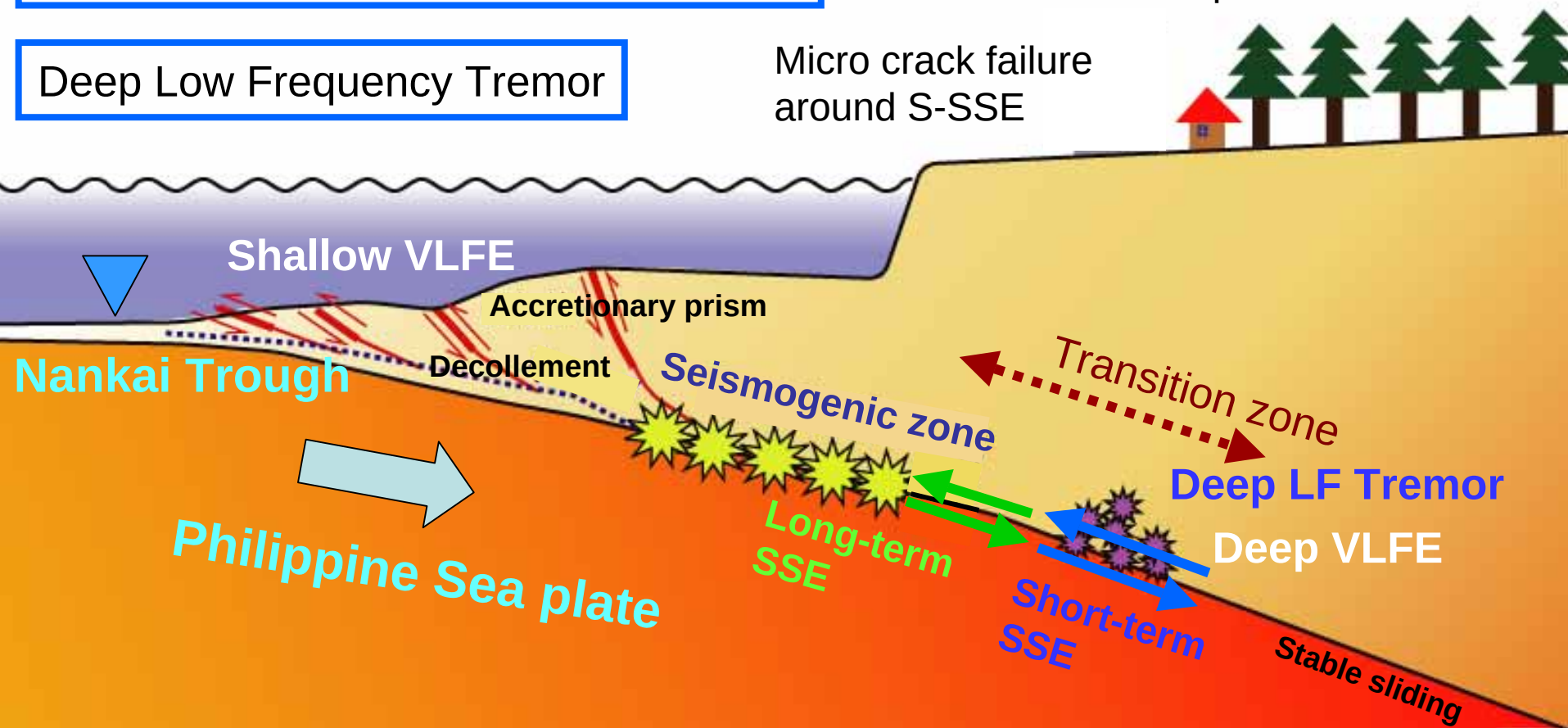
Slow Earthquake Families in Nankai Zone

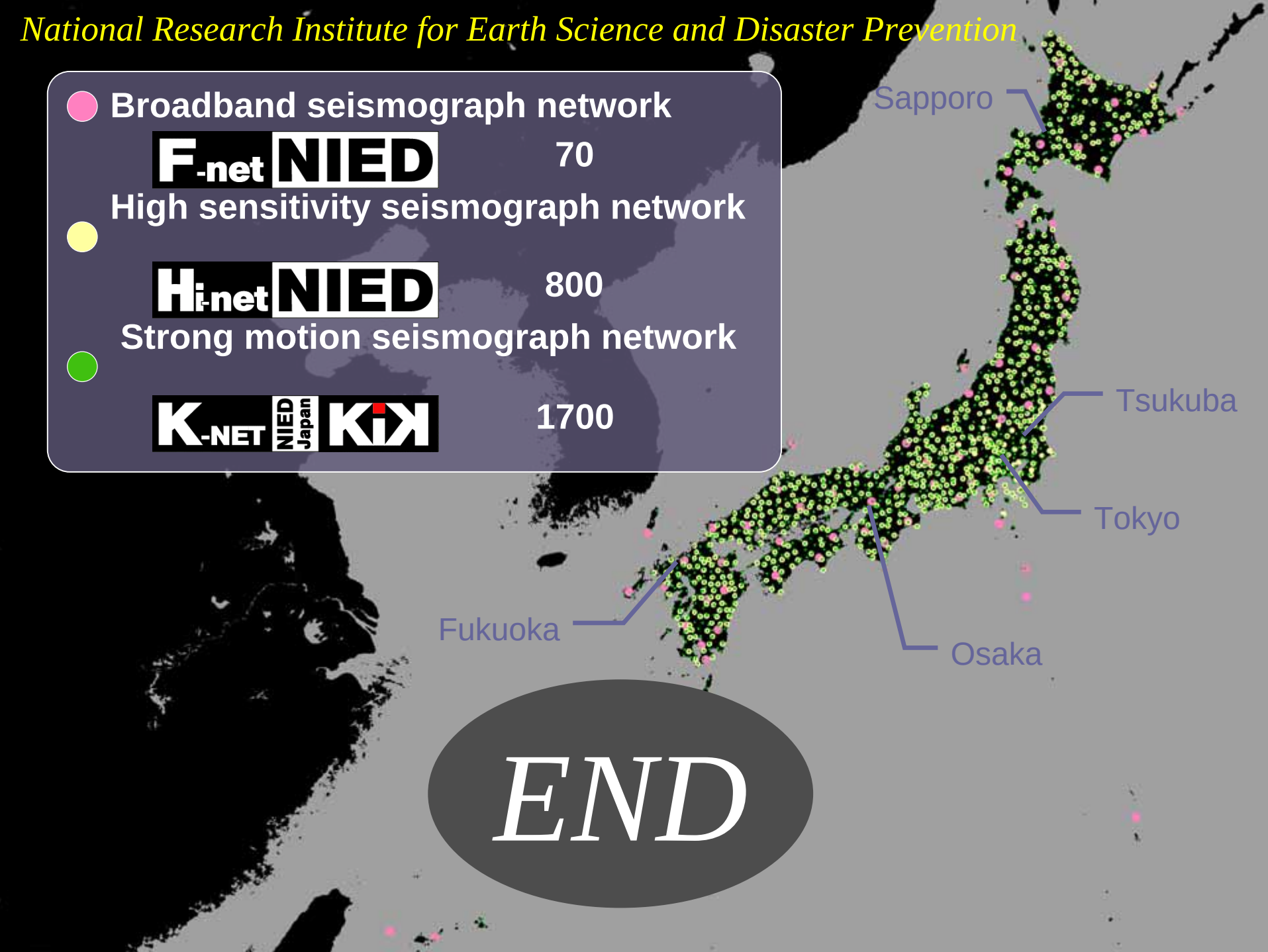
Shallow Very Low Frequency Earthquake — Seismic slip in accretionary prism

Short-term Slow Slip Event — Aseismic stick-slip on the plate boundary

Deep Very Low Frequency Earthquake — Seismic slip of small patch on S-SSE fault plane

Deep Low Frequency Tremor — Micro crack failure around S-SSE

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Broadband seismograph network
F-net NIED
70
High sensitivity seismograph network
Hi-net NIED
800
Strong motion seismograph network
K-NET NIED Japan KiK
1700
Sapporo
Tsukuba
Tokyo
Fukuoka
Osaka
END