Johnson, J. B., R. C. Aster, and P. R. Kyle (2004), Volcanic eruptions observed with infrasound, *Geophys. Res. Lett.*, 31, L14604, doi:10.1029/2004GL020020.

Kind, R., X. Yuan, J. Saul, D. Nelson, S. Sobolev, J. Mechie, W. Zhao, G. Kosarev, J. Ni, U. Achauer, and M. Jiang (2002), Seismic images of crust and upper mantle beneath Tibet: Evidence for Eurasian plate subduction, *Science, 298,* 1219–1221.

Li, Y.-G., J. E. Vidale, and E. S. Cochran (2004), Low-velocity damaged structure of the San Andreas Fault at Parkfield from fault zone trapped waves, *Geophys. Res. Lett., 31,* L12S06, doi:10.1029/2003GL019044.

Lutter, W., et al. (2004), Upper crustal structure from the Santa Monica Mountains to the Sierra Nevada, Southern California: Tomographic results from the Los Angeles Regional Seismic Experiment, phase II (LARSE II), *Bull. Seismol. Soc. Am., 94,* 619–632.

MacAyeal, D., et al. (2004), SOUTHBERG: An in situ investigation of the seismic symphony of Iceberg C16, Ross Sea, Antarctica, *Eos Trans. AGU, 85*(47), Fall Meet. Suppl., Abstract C33D-08.

Wilson, D., R. Aster, M. West, J. Ni, S. Grand, W. Gao, W. S. Baldridge, S. Semken, and P. Patel (2005), Lithospheric structure of the Rio Grande rift, *Nature, 433,* 851–855.

Wolfe, C. J., P. G. Okubo, and P. M. Shearer (2003), Mantle fault zone beneath Kilauea volcano, Hawaii, *Science, 300,* 478–480.

Zandt, G., H. Gilbert, T. Owens, M. Ducea, J. Saleeby, and C. Jones (2004), Active foundering of a continental arc root beneath the southern Sierra Nevada in California, *Nature, 431,* 41–46.

Author Information

R. Aster, New Mexico Institute of Mining and Technology, Socorro, New Mex.; B. Beaudoin, IRIS PASSCAL Instrument Center, New Mexico Institute of Mining and Technology, Socorro; J. Hole, Virginia Polytechnic Institute and State University, Blacksburg; M. Fouch, Arizona State University, Tempe; J. Fowler, IRIS Consortium, Washington D.C.; and D. James, Department of Terrestrial Magnetism, Carnegie Institution of Washington, D.C.

For additional information, contact R. Aster; E-mail: aster@nmt.edu.

NEWS

Earthquake Off Japan Could Generate Strong Tsunami

PAGES 169–170

The 26 December 2004 earthquake off Sumatra induced a disastrous tsunami that struck in South Asian countries. In a similar context, a potential great earthquake off Japan might occur and generate a strong tsunami in East Asia.

The 2004 Sumatra earthquake is the second biggest earthquake ($M_w = 9.3$) recorded during the last century. It occurred at a depth of 20–30 km, close to an indentation of the Indonesian forearc (Figure 1). The rupture propagated about 1200 km northward and terminated north of Andaman Islands.

The India (IN) plate motion with respect to Eurasia (EU) is highly oblique to the margin (6 cm/yr at N015°). With the curvature of the subduction zone, the right-lateral shear motion occurring along the Sumatra fault evolves northward into the rift system of the Andaman Sea. The Burma plate is thus delineated in the east by the Sumatra fault, which follows the line of arc volcanoes, the rift segments of the Andaman Sea, and the right-lateral Sagaing shear fault; it is delineated in the west by the Andaman-Nicobar Trench. The seismicity shows that the Andaman-Nicobar subducting slab continues northward and abuts against Tibet. Consequently, the Burma plate ends against the location of the continental collision between India and Eurasia, forming the Himalayan mountain belt.

The Japan-Taiwan geodynamic system is very similar to the Indonesian-Tibet one (Figure 1). The motion of the Philippine (PH) Sea plate with respect to EU is approximately perpendicular to the trends of the Nankai Trough and Ryukyu Trench. The Median Tectonic Line (MTL) is a right-lateral shear fault, which follows the line of onland arc volcanoes and is prolonged southwestward by the rift axis of the Okinawa Trough backarc basin. The Okinawa Trough terminates in the Ilan Plain (northern Taiwan), right above the southwestward termination of the Ryukyu subducting slab. The Okinawa-Japan (OJ) plate, bounded to the south by the Nankai Trough and Ryukyu Trench, abuts southwestward against the Taiwan mountain belt, which is considered to be the result of the collision of the intra-oceanic Luzon Arc against the EU continental margin.

The two geodynamic contexts are very similar: The Burma and OJ plates are similar in shape and dimension and their boundaries are of similar types. Both plates abut against compressive orogenic systems, though they correspond to the collision of two continental plates and the collision of an intra-oceanic arc with a continental plate, respectively. In both cases, the undergoing plate involved in the collisional system is delaminated: The lower part of the India plate subducts beneath EU, and the EU plate subducts beneath the Philippine Sea plate [*Sibuet et al.,* 2004].

Compared to the 2004 Sumatra earthquake, the expected-to-come Tokai great earthquake [*Le Pichon et al.,* 1996] is located in a specific geodynamic

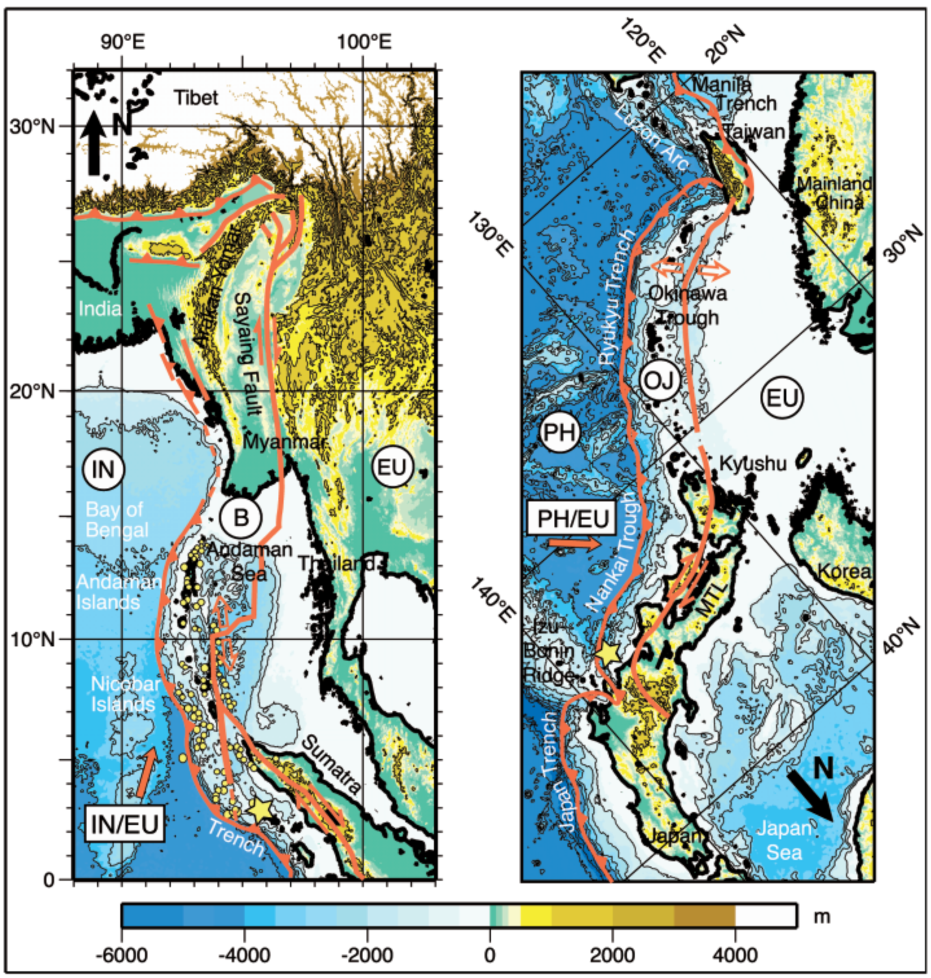

Fig. 1. Geodynamic context of the 2004 Sumatra great earthquake and similar geodynamic context between Japan and Taiwan. Yellow stars indicate the 2004 Sumatra earthquake and the expected-to-come Tokai earthquake [Le Pichon et al., *1996*]. *Yellow circles indicate the 2004 Sumatra aftershocks; the data are from the U.S. Geological Survey. Indonesian geodynamic context is from Institut de Physique du Globe de Paris (IPGP) and Ecole Normale Supérieure (ENS) de Paris. IN, India; B, Burma; EU, Eurasia; PH, Philippine; OJ, Okinawa-Japan; MTL, Median Tectonic Line.*

environment (Figure 1). The intra-oceanic shortening occurring south of the eastern Nankai Trough has generated the present-day Zenisu Ridge as well as a previous paleo-Zenisu Ridge, which is now buried beneath the continental margin. The subduction of the paleo-ridge has induced a tilting of the backstop. However, part of the backstop and possibly of the wedge are extruded in response to the collision of the Izu-Bonin Ridge with Japan. This might explain the apparent longer recurrence time of great earthquakes in the Tokai area.

Nevertheless, the shortening rate along the Zenisu thrust might indicate a high seismic potential there. Such a potential great earthquake, located southwest of the Izu-Bonin Ridge, might rupture along the Nankai subducting slab, in a geodynamic environment similar to the 2004 Sumatra earthquake.

Like Indonesia, Japan might be severely affected by the tsunami associated with such a large subduction earthquake. However, depending on the extent of the seafloor rupture southwest of Kyushu or not, countries such as Korea and Mainland China might or might not be affected by the tsunami. Like Myanmar during the 2004 Sumatra tsunami, Taiwan would be less affected by such a tsunami. The presence of a tsunami warning center in Japan as well as the use of security procedures by populations may significantly mitigate the potential number of deaths and casualties.

Acknowledgments

We acknowledge the National Science Council of Taiwan and the French Institute in Taipei for their encouragement and financial support.

References

Le Pichon, X., S. Lallemant, H. Tokuyama, F. Thoué, P. Huchon, and P. Henry (1996), Structure and evolution of the backstop in the eastern Nankai Trough area (Japan): Implications for the soon-to-come Tokai earthquake, *Island Arc*, *5*, 440–454.

Sibuet, J.-C., S.-K. Hsu, and E. Debayle (2004), Geodynamic context of the Taiwan orogen, in *Continent-Ocean Interactions Within East Asian Marginal Seas, Geophys. Monogr. Ser.,* vol. 149, edited by P. Clift et al., pp. 127–158, AGU, Washington, D. C.

—SHU-KUN HSU, Institute of Geophysics, National Central University, Chung-Li, Taiwan; and JEAN-CLAUDE SIBUET, Ifremer Centre de Brest, Plouzané, France

SECTION NEWS

GEOMAGNETISM & PALEOMAGNETISM

Editor: *John W. Geissman, University of New Mexico, Albuquerque, NM 87131 USA; Tel: +1-505-277-3433; Fax: +1-505-277-8843*
Section President, *Christopher G. A. Harrison;* **Section Secretary**, *Catherine L. Johnson*

New Edition of the Global Paleomagnetic Database

PAGE 170

A new version of the Global Paleomagnetic Database—GPMDB V 4.6—is available now at the Tectonics Special Research Centre of the University of Western Australia Web site (http://www.tsrc.uwa.edu.au/). This version contains 9259 paleomagnetic poles from 7513 rock units published in 3673 articles up to December 2004 inclusive.

This version has also been completely updated using the latest International Stratigraphic Chart published by the International Commission on Stratigraphy (ICS) on its Web site (www.stratigraphy.org). This new timescale is significantly different from the timescale which has been used in the database for the past decade. All entries in the database based on biostratigraphic ages have had their absolute minimum and maximum age limits revised according to this new scale. Therefore, users of the database who have compiled their own files based on the old database should be aware that the assigned absolute ages have now changed.

Sometimes these changes are significant, especially for the Permian and Devonian. The following list highlights some of the major changes from the previous timescale.

1. The Quaternary no longer exists! Instead the epochs from Miocene to the present are referred to as Neogene 1–4 (N1, Miocene; N2, Pliocene; N3, Pleistocene; N4, Holocene).
2. The Paleogene is now labeled as E1, Paleocene; E2, Eocene; and E3, Oligocene.
3. The symbols for the System Periods follow that used by the ICS. For example, the Triassic is labelled T1 (245–251 Ma), T2 (228–245 Ma), and T3 (200–228 Ma).
4. The Permian is now divided into three epochs: P1, Cisuralian (271–299 Ma); P2, Guadalupian (260–271 Ma); and P3, Lopingian (251–260 Ma).
5. The Devonian has significant changes to the limits of the epochs: D1 (398–416 Ma), D2 (385–398 Ma), and D3 (359–385 Ma), making the lengths of the Frasnian and Famennian stages much longer.
6. The base of the Cambrian is now 542 Ma.
7. The Vendian has been eliminated and is now part of the Neoproterozoic, which is divided into three epochs: NP1, Tonian (850–1000 Ma); NP2, Cryogenian (600–850 Ma); and NP3, Ediacaran (542–600 Ma).

Many new geochronological data have been published in recent years. Many of these come from rocks subjected previously to paleomagnetic studies and represented in the Global Paleomagnetic Database. The ages of these paleomagnetic poles have been updated accordingly; users, especially those interested in Precambrian data, should be aware of this.

There are also several improvements in the location coordinates for some previously published paleomagnetic data.

The GIS-based Visual Paleomagnetic Database announced in *Eos* (*84(*20), 192, 2003) is also updated accordingly. New ArcView shape files can be downloaded from http://www.tsrc.uwa.edu.au/.

ArcView (3.x) users who are interested in obtaining the Visual Paleomagnetic Database are welcome to contact the author at spisarevsky@tsrc.uwa.edu.au. All data are free. All instructions and a short manual are available in *Eos*, *84*(20), 192, 2003, and on the *Eos* Electronic Supplement.

Send requests, questions, and comments to the author at the e-mail address above.

—SERGEI PISAREVSKY, Tectonics Special Research Centre, School of Earth and Geographical Sciences, University of Western Australia, Crawley