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frequency information from accelerometers and low-frequency information from collocated GNSS instruments. These combined broadband observations retain the permanent (static) displacement, are immune to clipping and magnitude saturation for large earthquakes experienced by traditional seismic data, while being sensitive enough to resolve deep earth deformation too weak to detect with GNSS instruments. Rapid seismo-geodetic analysis techniques utilizing scaling relationships can provide accurate and effective tsunami warnings to the near field communities.

The panel will explore the scientific, technical, infrastructural, and programmatic opportunities and challenges to creating integrated seismic and geodetic observational networks for earthquake and tsunami early warning that properly utilize the useful information available from seismo-geodetic real time data.

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## **J05 Crustal dynamics: Multidisciplinary approach to seismogenesis**

**Convener:** Takeshi Sagiya

**Co-convener:** Hiroyuki Noda, Kuo-Fong Ma

### **Description**

Recent deployment of dense seismic and geodetic observation networks has revealed detailed pattern of crustal stress and strain rate in tectonically active regions all over the world. Furthermore, the Mw 9.0 2011 Tohoku-oki earthquake in northeast Japan provided a unique opportunity to investigate how the Japanese Islands' crust responds to instantaneous as well as transient stress changes due to the giant fault motion. So now is a time to proceed toward integrated understanding of dynamic processes in the Earth's crust, such as great earthquakes and following relaxation. In those approaches, mechanical properties of the crustal and mantle rocks, and frictional properties of intra-plate as well as plate boundary faults, are important key factors. This session aims to bring various research results together to promote multidisciplinary investigation in the above-mentioned direction for better understanding of crustal dynamic processes. We welcome presentations regarding seismic, geodetic, and other geophysical observations and data analysis, laboratory experiments, geological field works, numerical simulations, and integrated modeling of seismogenic as well as other geodynamic processes.

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## **J06 The spectrum of fault-zone deformation processes (from slow slip to earthquake)**

**Convener:** Hitoshi Hirose

**Co-convener:** Yoshihiro Ito, Chris Marone

### **Description**

The aim of this session is to bring together the latest, cutting-edge work on the spectrum of fault-zone deformation processes and slip behaviors. We welcome contributions on slow deformation and fast fault slip that will improve our understanding of fault creep, slow slip events, tectonic tremor, episodic tremor and slip, very low-frequency earthquakes, and ordinary earthquakes. The session will highlight linkages between slow and fast fault slip (earthquakes) and explore scaling relationships for the observed spectrum of fault slip behaviors. Contributions from all areas are welcome, including geophysical and geodetic observations, studies of fault zone structure, laboratory experiments, geological surveys, theoretical works, and numerical studies.

# J05. Crustal dynamics: Multidisciplinary approach to seismogenesis

Session: **J05-1**  
 Session title: Crustal dynamics: Multidisciplinary approach to seismogenesis I  
 Type: Oral  
 Date: Tuesday, August 1, 2017  
 Time: 13:30 - 15:00  
 Room: Room 501  
 Chairs: Takeshi Sagiya (Nagoya University)  
 Kuo-Fong Ma (National Central University)

Time	Title	Program No.
13:30	<b>Southern Costa Rica and the Next Decade: A Spatial and Temporal Opportunity for an International Subduction Zone Observatory</b> <u>Marino Protti</u> , Cyril Muller	J05-1-01
13:45	<b>Spatio-temporal variation of the postseismic deformation of the 2011 off the Pacific coast of Tohoku Earthquake (M9.0) detected by means of terrestrial and seafloor observations</b> <u>Takeshi Iinuma</u> , Yusaku Ohta, Satoshi Miura, Jun Muto, Fumiaki Tomita, Motoyuki Kido, Ryota Hino	J05-1-02
14:00	<b>Stress field around fault zones of the 2016 Kumamoto earthquake sequence (Mj7.3) inferred from moment tensor data from 1996 to 2016</b> <u>Satoshi Matsumoto</u> , Yusuke Yamashita, Manami Nakamoto, Masahiro Miyazaki, Shin-ichi Sakai, Yoshihisa Iio, Kazuhiko Goto, Tomomi Okada, Mako Ohzono, Toshiko Terakawa, Masahiro Kosuga, Masayuki Yoshimi, Youichi Asano	J05-1-03
14:15	<b>Effects of Postseismic Stress Redistribution of the 2011 Tohoku Earthquake on Fault Activities</b> <u>Yan Hu</u> , Roland Burgmann, Naoki Uchida, Brent Delbridge, Kelin Wang	J05-1-04
14:30	<b>Modeling deformation processes of the island arc crust and mantle during the postseismic period of the Tohoku-oki earthquake</b> <u>Bunichiro Shibazaki</u> , Satoshi Miura, Akemi Noda, Takeshi Iinuma, Takumi Matsumoto	J05-1-05
14:45	<b>Frictional strength of plate interfaces inferred from numerical simulations of stress fields for oceanic plates: Application to the North American-Pacific plate interface off northeast Japan</b> <u>Akemi Noda</u> , Mitsuhiro Matsu'ura	J05-1-06

Session: **J05-2**  
 Session title: Crustal dynamics: Multidisciplinary approach to seismogenesis II  
 Type: Oral  
 Date: Tuesday, August 1, 2017  
 Time: 16:30 - 18:00  
 Room: Room 501  
 Chairs: Hiroyuki Noda (Kyoto University)  
 Takeshi Sagiya (Nagoya University)

Time	Title	Program No.
16:30	<b>A unified representation of Earth's quasi-dynamic deformation processes</b> <u>Sylvain Barbot</u>	J05-2-01 invited
17:00	<b>Rheological Structure Beneath Java Island after the 2006 Java Tsunami Earthquake Based on GPS Data</b> <u>Endra Gunawan</u> , Irwan Meilano, Hasanuddin Z. Abidin, N. Rahma Hanifa, Rio Raharja, Susilo Susilo, Joni Efendi	J05-2-02
17:15	<b>Afterslip and Viscoelastic Relaxation Model Following The 2010 Mentawai Earthquake Deduced from Postseismic Surface Deformation</b> <u>Mohammad Yuzariyadi</u> , Irwan Meilano, Endra Gunawan, Kosuke Heki	J05-2-03
17:30	<b>Reciprocal relationship between seismically estimated slip rates and geodetically estimated slip-deficit rates at plate interfaces: Physical interpretation and logical consequence</b> <u>Mitsuhiro Matsu'ura</u> , Shunichi Nomura, Yoshihiko Ogata, Naoki Uchida	J05-2-04
17:45	<b>Characteristics of spatiotemporal variation of hypocenters and the diversity of waveforms of deep low-frequency earthquakes in northeastern Japan</b> <u>Masahiro Kosuga</u>	J05-2-05

Session: **J05-3**  
 Session title: Crustal dynamics: Multidisciplinary approach to seismogenesis III  
 Type: Oral  
 Date: Wednesday, August 2, 2017  
 Time: 08:30 - 10:00  
 Room: Room 501  
 Chairs: Kuo-Fong Ma (National Central University)  
 Takeshi Sagiya (Nagoya University)

Time	Title	Program No.
08:30	<b>Spatial heterogeneity of crustal stress</b> <u>Yoshihisa Iio</u>	J05-3-01 invited
09:00	<b>Fault rocks and paleostress fields in the San-in shear zone, western Japan</b> <u>Hideto Uchida</u> , Hideki Mukoyoshi	J05-3-02

09:15	<b>Three-dimensional seismic velocity structure beneath the northern South Island, New Zealand from dense seismic observation</b> <u>Tomomi Okada</u> , Yoshihisa Iio, Satoshi Matsumoto, Stephen Bannister, Shiro Ohmi, Masumi Yamada, Shintaro Horiuchi, Tsutomu Miura, Tadashi Sato, Jarg Pettinga, Francesca Ghisetti, Richard Sibson	J05-3-03
09:30	<b>3d distribution of fluids and their origins in a seismogenic zone, Northern Miyagi, NE Japan</b> Zenshiro Saito, <u>Yasuo Ogawa</u> , Masahiro Ichiki, Hideyuki Satoh	J05-3-04
09:45	<b>A new temperature proxy on faults during earthquake by using maturity of carbonaceous materials: Kinetic effect on the maturation</b> <u>Shunya Kaneki</u> , Tetsuro Hirono	J05-3-05

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Session: **J05-4**  
 Session title: Crustal dynamics: Multidisciplinary approach to seismogenesis IV  
 Type: Oral  
 Date: Wednesday, August 2, 2017  
 Time: 10:30 - 12:00  
 Room: Room 501  
 Chairs: Takeshi Sagiya (Nagoya University)  
 Kuo-Fong Ma (National Central University)

Time	Title	Program No.
10:30	<b>GPS VELOCITY FIELD IN THE NORTHWESTERN CORNER OF SOUTH AMERICA</b> <u>Hector Mora-Paez</u> , James Kellogg, Jeff Freymueller, Dave Mencin, Rui Fernandes da Silva, Leonardo Cardona-Piedrahita, Sindy Lizarazo, Leidy Giraldo, Fredy Diaz-Mila	J05-4-01 invited
11:00	<b>Taiwan vertical velocity field from precise leveling observations, 2000-2015</b> <u>Kwo-Hwa Chen</u> , Kuo-En Ching	J05-4-02
11:15	<b>Observation of aseismic crustal deformation in Taiwan by analysis of InSAR and GPS data</b> <u>Kotaro Tsukahara</u> , Youichiro Takada	J05-4-03
11:30	<b>Rapid crustal deformation in SW Taiwan caused by the interaction between active faults and reactivated mud diapirs</b> <u>Kuo-En Ching</u> , Yuan-Hsi Lee, Ruey-Juin Rau, Ming Yang, Yi-Jhen Hung, Song-Chuen Chen, Lingho Chung, Jei-Ching Hung, Chien-Liang Chen	J05-4-04
11:45	<b>Performance of VADASE single-frequency GPS solutions in the 2016 M 6.5 Meinong, Taiwan, earthquake</b> <u>Ruey-Juin Rau</u> , Choon-Muar Ker, Giorgio Savastano, Mattia Crespi	J05-4-05

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Session: **J05-5**  
 Session title: Crustal dynamics: Multidisciplinary approach to seismogenesis V  
 Type: Oral  
 Date: Wednesday, August 2, 2017  
 Time: 13:30 - 15:00  
 Room: Room 501  
 Chairs: Hiroyuki Noda (Kyoto University)  
 Kuo-Fong Ma (National Central University)

Time	Title	Program No.
13:30	<b>Early recurrence of an M6 intraplate earthquake (5.8 years) observed in northern Kanto region, Japan, after the 2011 Tohoku-oki earthquake</b> <u>Yo Fukushima</u> , Shinji Toda, Satoshi Miura	J05-5-01
13:45	<b>Crustal deformation process in Mid-Niigata as observed by dense GPS network before and after the 2011 Tohoku-oki earthquake</b> <u>Angela Meneses-Gutierrez</u> , Takeshi Sagiya, Shutaro Sekine	J05-5-02
14:00	<b>Crustal deformation in and around the Atotsugawa fault before and after the Tohoku-Oki earthquake</b> <u>Tomomi Inamatsu</u> , Youichiro Takada, Takeshi Sagiya, Takuya Nishimura	J05-5-03
14:15	<b>The role of the lower crust in crustal deformation of the Japan island arc</b> <u>Takeshi Sagiya</u> , Angela Meneses-Gutierrez, Xuelei Zhang, Yumi Shimoyama, Kouki Kumagai	J05-5-04
14:30	<b>Importance of fault rheology around brittle-plastic transition in long-term slip rate of major faults</b> <u>Hiroyuki Noda</u>	J05-5-05
14:45	<b>Seismicity and Geothermal activities in the Upemba Rift Basin (SE of the DR Congo)</b> <u>Kadima Kabongo</u> , Kipata Mwabanua	J05-5-06

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Session: **J05-P**  
 Type: Poster  
 Date: Tuesday, August 1/ Wednesday, August 2, 2017  
 Time: 15:30 - 16:30  
 Room: Shinsho Hall

Title	Program No.
<b>Investigation of remote earthquake triggering after the 2011 M9.0 Tohoku-oki earthquake</b> <u>Anca Opris</u> , Bogdan Enescu, Yuji Yagi	J05-P-01
<b>Simulation of postseismic deformation caused by the 2011 Tohoku-Oki earthquake</b> <u>Hisashi Suito</u>	J05-P-02
<b>Spatiotemporal distribution of locking and aseismic slips prior to the 2011 Tohoku-oki earthquake</b> <u>Momo Tanaka</u> , Shoichi Yoshioka, Yukiko Nishino	J05-P-03
<b>Source processes of the M6-class repeating earthquakes which occurred in northern Ibaraki Prefecture, Japan, on 2011 and 2016</b> <u>Kazuhito Hikima</u>	J05-P-04

<p><b>Numerical Simulation of Plate Deformation and Stress in the Andaman Subduction Zone</b> R. Yadav, <a href="#">VM Tiwari</a></p>	J05-P-05	<p><b>The gravity anomalies analysis over the active reverse fault zones in Japan</b> <a href="#">Nayuta Matsumoto</a>, Yoshihiro Hiramatsu, Akihiro Sawada, Shinsuke Okada, Ryo Honda, Toshiyuki Tanaka</p>	J05-P-15
<p><b>The 2016 M6.5 Pidie Jaya Earthquake, Aceh Province, Indonesia; Which Fault?</b> <a href="#">N. Rahma Hanifa</a>, Irwan Meilano, Masyhur Irsyam, Agustan Agustan, Daryono Daryono, Danny H. Natawidjaja, Wahyu Triyoso, Sri Widiyantoro, Sri Hidayati, Mohamad Ridwan, Susilo Susilo, Endra Gunawan, Amir H. Isa, Supartoyo Supartoyo, Andri C. Utomo, Gayatri I. Marliyani, Bagoes D. Ramdhani, Refi R. Ramadian, Suchi Rahmadani, Alwidya A. Safitri</p>	J05-P-06	<p><b>Influence of water on rheological properties of feldspar aggregates under the lower crustal temperature and pressure</b> <a href="#">Masanori Kido</a>, Jun Muto, Sanae Koizumi, Hiroyuki Nagahama</p>	J05-P-16
<p><b>Regional stress field inferred from focal mechanisms obtained by dense seismic observation in the northern South Island, New Zealand</b> <a href="#">Tadashi Sato</a>, Tomomi Okada, Yoshihisa Iio, Satoshi Matsumoto, Stephen Bannister, Shiro Ohmi, Masumi Yamada, Tsutomu Miura, Jarg Pettinga, Francesca Ghisetti, Richard Sibson</p>	J05-P-07	<h2 style="margin: 0;">J06.</h2> <h1 style="margin: 0;">The spectrum of fault-zone deformation processes (from slow slip to earthquake)</h1>	
<p><b>Crustal stress and strain inversion of the Taiwan orogen using a mixed linear-nonlinear Bayesian approach</b> <a href="#">Ray Y. Chuang</a></p>	J05-P-08	<p>Session: <b>J06-1</b>            Session title: The spectrum of fault-zone deformation processes (from slow slip to earthquake) I            Type: Oral            Date: Monday, July 31, 2017            Time: 08:30 - 10:00            Room: Intl Conf Room (301)            Chairs: Tadafumi Ochi (AIST)                      Hitoshi Hirose (Kobe University)</p>	
<p><b>Afterslip and viscoelastic components observed in surface gravity change after the 2011 Great Tohoku earthquake</b> <a href="#">Shuheji Okubo</a>, Xinlin Zhang, Yoshiyuki Tanaka, Yuichi Imanishi, Satoshi Miura, Sadato Ueki, Hiromitsu Oshima, Tokumitsu Maekawa, Kazumi Okada, Miwako Ando</p>	J05-P-09	<p><b>The spatial distribution of the stress ratio in the aftershock area of the 2000 Western Tottori Earthquake</b> <a href="#">Takaki Iwata</a></p>	J05-P-10
<p><b>Seismic velocity structure in the lower crust beneath the seismic belt in the San-in district, Japan</b> <a href="#">Hiroo Tsuda</a>, Yoshihisa Iio, Takuo Shibutani</p>	J05-P-11	<p><b>Long-term slow slip events in the Tokai region, central Japan, before 2000</b> <a href="#">Tadafumi Ochi</a></p>	J06-1-02
<p><b>Depth dependence of stress field investigated from microseismicity in northwestern Kii Peninsula, southwestern Japan</b> <a href="#">Sumire Maeda</a>, Toru Matsuzawa, Keisuke Yoshida, Shinji Toda, Hiroshi Katao</p>	J05-P-12	<p><b>Correlation between Coulomb Stress Rate Change Imparted by Two Slow Slip Events and Seismic Rate Change in Lower Cook Inlet of the Alaska-Aleutian Subduction Zone</b> Shanshan Li, <a href="#">Jeffrey Freymueller</a>, Jianjun Wang, Natalia Ruppert</p>	J06-1-03
<p><b>Tectonic Loading of the Atera Fault inferred from Dense GNSS Observation</b> <a href="#">Koki Kumagai</a>, Takeshi Sagiya, Nobuhisa Matta</p>	J05-P-13	<p><b>Insights into the Causal Relationship between Slow Slip Events and Tectonic Tremors in Guerrero, Mexico</b> <a href="#">Carlos Villafuerte</a>, Victor Cruz-Atienza</p>	J06-1-04
<p><b>Spatio-temporal variation in Coda Q in the northeastern part of Niigata-Kobe Tectonic Zone in 2009-2014</b> <a href="#">Masanobu Dojo</a>, Yoshihiro Hiramatsu</p>	J05-P-14		