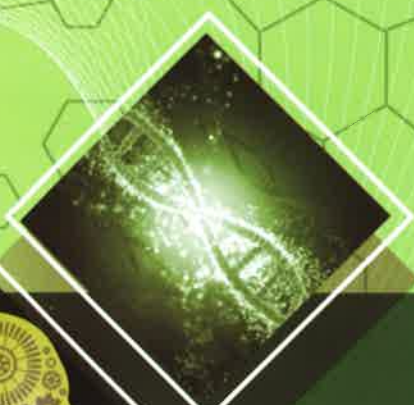


SCA-16

Colombo, Sri Lanka

May 30 - June 1, 2016



**Science for the People:
Mobilizing Modern Technologies for
Sustainable Development in Asia**

**Abstracts
and
Proceedings**



**National Academy of Sciences
of Sri Lanka**



**NATIONAL
SCIENCE
FOUNDATION**



Establishment of Japan Academic Network for Disaster Reduction

Masako Yoneda, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Yasushi Asami and Kimiro Meguro

Steering Committee of Japan Academic Network for Disaster Reduction, Yotsuya 1-chome, Shinjuku-ku, Tokyo, 160-0004, Japan (Member, Science Council of Japan, 7-22-34, Roppongi, Minato-ku, Tokyo 106-8555, Japan)

Academic societies relevant to disaster management gathered and established Japan Academic Network for Disaster Reduction in cooperation with Science Council of Japan (SCJ). When large disasters occur, this network works as an emergency contact network between academies, government and society. The network aims to promote interdisciplinary cooperation for disaster reduction and disaster restoration.

The Great East Japan Earthquake occurred on March 11, 2011. The effect of the earthquake exceeded expectations and current scientific knowledge and technology proved insufficient. After the Earthquake, members of the SCJ became founders and together with 24 academic societies (later 30) relevant to disaster management established the “Academic Society Liaison Association Corresponding to the Great East Japan Earthquake” in May 2011.

As the successor to this association, we established on January 9th, 2016, the “Japan Academic Network for Disaster Reduction” in which 47 academic societies participated. This network targets not only earthquakes but also natural disasters in general. With global climate change, there has been a tendency for disasters to occur more frequently and severely in the world.

For the prevention and mitigation of disasters, many research fields are involved, such as earth observation, meteorology, earthquake, tsunami, oceanography, engineering, history, disaster prevention planning and emergency medical care. In the academic world, specialization has progressed and integration has weakened. For protecting people’s lives and the land from natural disasters, we need a comprehensive platform beyond the boundaries. The network aims to deepen mutual understanding across different expertise.

We present the activities and members of this network and appeal that experience and knowledge learnt from natural disasters should be widely applied to reduce the effects of all disasters worldwide. We emphasize the importance of collaborating across academies and discussing the direction for the future beyond the areas of different expertise.

References:

1. Masako Yoneda, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Yasushi Asami and Kimiro Meguro, Global sharing of the findings from the past great earthquake disasters in Japan, *15th Science Council of Asia Conference and International Symposium*, P23-28, May 15 2015, Siem Reap.
2. Masako Yoneda, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Yasushi Asami and Kimiro Meguro, Joint statement and Cooperation of 30 disaster-related academic societies of Japan, *World Engineering Conference and Convention 2015*, Track 8-3, December 2 2015, Kyoto

Establishment of Japan Academic Network for Disaster Reduction

Masako Yoneda¹, Akira Wada², Teruhiko Yoda³, Kazuo Tamura⁴, Yasushi Asami⁵ and Kimiro Meguro⁵

Directors of Japan Academic Network for Disaster Reduction, Yotsuya 1-chome Shinjuku-ku, Tokyo
Members of Science Council of Japan, 7-22-34, Roppongi, Minato-ku, Tokyo, Japan

¹ Professor, Keio University, ² Professor Emeritus, Tokyo Institute of Technology,
³ Professor, Waseda University, ⁴ Professor, Chiba Institute of Technology, ⁵ Professor, The University of Tokyo

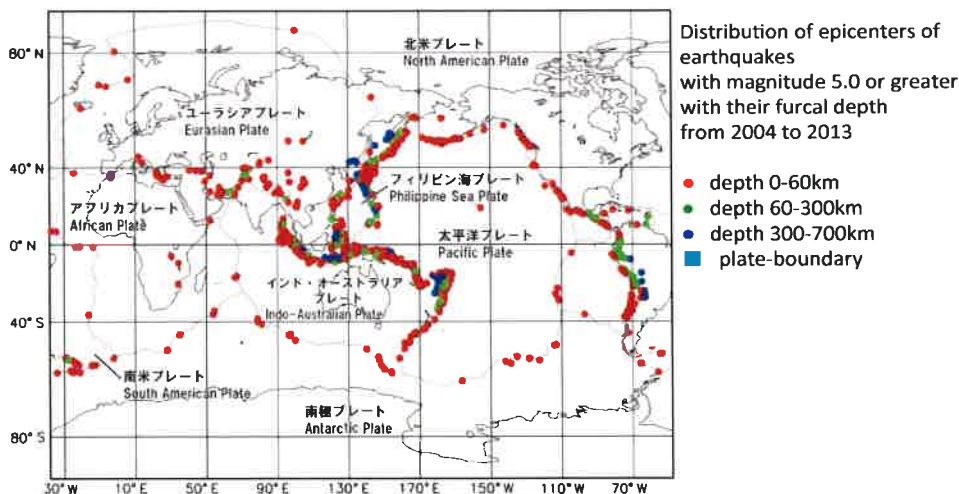
Abstract

Disaster external forces, such as earthquakes, volcanoes, heavy rains and typhoons, are increasing in Japan. Forty seven academic societies relevant to disaster management gathered and established Japan Academic Network for Disaster Reduction (JANET-DR) in cooperation with Science Council of Japan (SCJ). When large disaster occurs, JANET-DR works as emergency contact network among academies, government and society. JANET-DR aims for promotion of interdisciplinary cooperation for disaster reduction and disaster restoration in Japan and around the world by sharing the lessons learnt from the past disasters.

Keywords: academic network, disaster reduction, interdisciplinary cooperation

1. Disaster-Activated Japan

Japan is located in the Circum-Pacific Mobile Belt where seismic and volcanic activities are very high. Although Japan covers only 0.25% of the land area on the planet, it has 18.5% of the total number of earthquakes with magnitude 6.0 or greater (2004-2013), and 7% of the total number of active volcanoes in the world³⁾. Japan is located in the intersection of four plates of Pacific Ocean, Philippine Sea, North American and Eurasian Plates. Pacific Ocean Plate contains lots of water and it is heavier than North American Plate. Therefore, Pacific Ocean Plate has been subducting under the North American Plate. The Great East Japan Earthquake occurred on March 11, 2011. The Pacific Ocean Plate and the North American Plate moved large in opposite directions. The maximum slip was about 30m and the length of the main fault was about 450 km, and the width was about 150 km⁴⁾. The duration of rupture of the fault was about 170 seconds⁴⁾. This is the largest movement of the plate since the establishment of Japanese modern seismology, so called “once in a thousand years”.

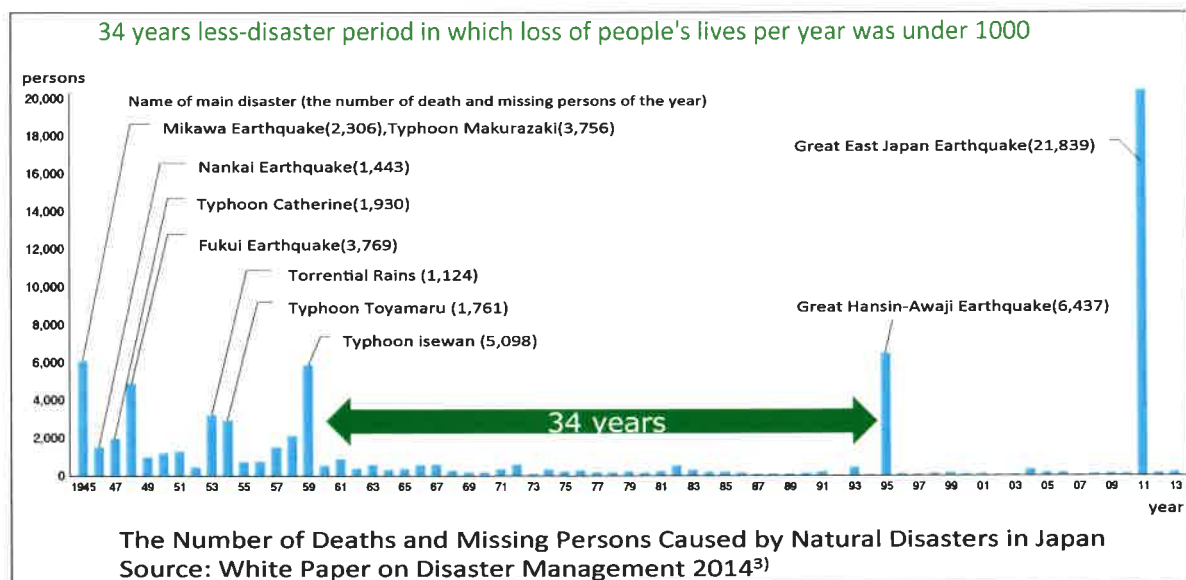


World Geographical Distribution of Hypocenters and Plates
Source: White Paper on Disaster Management 2014³⁾

Looking back to the Japanese history, before the end of 1950s, large-scale typhoons and earthquakes caused extensive damage and thousands of fatalities. Thereafter, disaster damage level showed declining tendency due to development of disaster management systems, strengthening of houses and infrastructures and promotion of home land conservation, thanks to the progress in science and technology. For thirty four years from 1960 to 1994, the country experienced less disaster in which loss of people's lives due to natural disasters per year was under 1,000. This period coincided with the growth period of the Japanese economy. Some people thought that Japan's technological capabilities suppressed the natural disaster. But this thought was not correct. This period of thirty four years, fortunately, was the time of small crustal movement.

In 1995, more than 6,400 people were killed by the Kobe (Hyogo-ken Nanbu) Earthquake. Also, in 2011, more than 18,000 people were killed or still missing due to the Great East-Japan Earthquake. After the large plate-movement, Japan's crust became unstable. Seismic activity of the Japanese archipelago is more activated. Nankai Trough and Tokyo Metropolitan Inland Earthquakes are feared. Volcanic activity in Japan also became more active. In 2013, "Nishinoshima" island was expanded by the eruption of the submarine volcano in the Pacific Ocean in the south of Japan. In 2014, 58 people were killed and five people are still missing by the eruption of Mt. "Ontakesan".

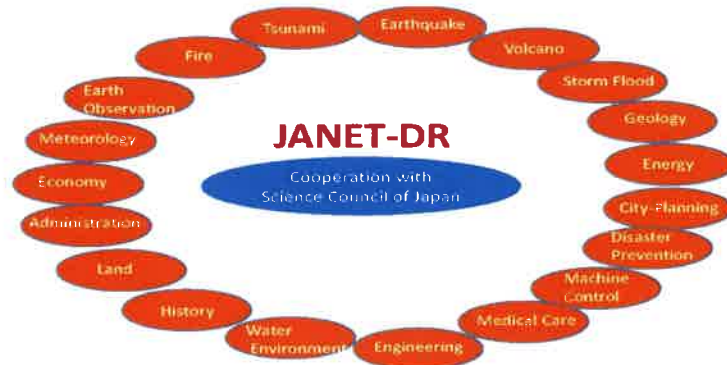
In global climate change, there is a tendency that scale of hazards becomes larger and their frequency increases in the world. In Japan, the number of typhoons and torrential rain increased resulting in the frequent occurrence of floods and landslides. Nowadays, Japan is in the time of disaster-activated.



2. Japan Academic Network for Disaster Reduction

Disaster external forces, such as earthquakes, volcanoes, heavy rains and typhoons, are increasing. Now, we must prepare for next catastrophe. We should reinforce the society's capabilities to manage disasters and mitigate vulnerabilities to disasters. For prevention and mitigation of disasters, many research fields are involved, such as earth observation,

meteorology, earthquake, tsunami, oceanography, engineering, history, disaster management, planning and emergency medical care, etc. In academic world, specialization has evolved while integration has been weakened. For protecting people's lives and the land from natural disasters, we need a comprehensive platform which can embrace all the specialized fields.



Forty seven academic societies relevant to disaster management gathered and established Japan Academic Network for Disaster Reduction (JANET-DR) in cooperation with Science Council of Japan (SCJ) from which 20 voluntary members listed below have joined. This network aims to deepen mutual understanding across different expertise.

[Member: 47 academic societies (later 50) & 20 members of SCJ]

- Architectural Institute of Japan, Association for Children's Environment, Atomic Energy Society of Japan, Geographic Information Systems Association of Japan, Geological Society of Japan, Institute of Social Safety Science, Japan Association for Earthquake Engineering, Japan Association for Fire Science and Engineering, Japan Association for Planning and Public Management, Japan Association for Quaternary Research, Japan Association for Wind Engineering, Japan Cartographers Association, Japan Concrete Institute, Japan Emergency Management Association, Japan Geoscience Union, Japan Society for Disaster Information Studies, Japan Society for Disaster Recovery and Revitalization, Japan Society for Natural Disaster Science, Japan Society for Safety Engineering, Japan Society of Civil Engineers, Japan Society of Disaster Nursing, Japan Society of Engineering Geology, Japan Society of Erosion Control Engineering, Japan Society of Material Cycles and Waste Management, Japan Society on Water Environment, Japanese Association for Acute Medicine, Japanese Association for Disaster Medicine, Japanese Institute of Landscape Architecture, Palaeontological Society of Japan, The Association of Japanese Geographers, The City Planning Institute of Japan, The Japan Association for Regional Economic Studies, The Japan Landslide Society, The Japan Society of Mechanical Engineers, The Japanese Forest Society, The Japanese Geotechnical Society, The Japanese Society for Active Fault Studies, The Japanese Society of Irrigation, Drainage and Rural Engineering, The Meteorological Society of Japan, The Oceanographic Society of Japan, The Robotics Society of Japan, The Seismological Society of Japan, The Society of Environmental Instrumentation Control and Automation, The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, The Society of Instrument and Control Engineers, The Volcanological Society of Japan, Transdisciplinary Federation of Science and Technology
- <20 voluntary members of Science Council of Japan>
 Takashi Onishi, Keisuke Hanaki, Hiroshi Yoshino, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Masako Yoneda, Yasushi Asami, Kimiro Meguro, Masahiko Isobe, Toshimitsu Komatsu, Hisao Komatsu, Shunsuke Ikeda, Masashi Kamon, Toshio Koike, Mitsuru Senda, Kaoru Takara, Haruo Hayashi, Yuko Minami, Ikuo Tohata

[Organization]

The Steering Committee has 116 members, including two members from each academic society, two members from the secretariat, and 20 members from SCJ. Board of directors consists of 18 members who are selected from the Steering Committee members. Secretariat changes every two years and the current secretariat is the Japan Society of Civil Engineers. The next secretariat will be the Architectural Institute of Japan. There is another secretariat support team managed by SCJ members.

[History of establishment, the relationship with SCJ]

The Great East-Japan Earthquake occurred on March 11, 2011. Its effect exceeded people's expectations and proved that current scientific knowledge and technology are insufficient. After the Earthquake, voluntary members of the SCJ, who are the authors of this paper, became founders and together with 24 academic societies (later 30) relevant to disaster management established the "Academic Society Liaison Association Corresponding to the Great East-Japan Earthquake (ASLA-CGEJE)" in May 2011.

As the successor of this association, on January 9 2016, 47 academic societies established JANET-DR in cooperation with SCJ. This network targets not only earthquakes but also other natural disasters in general. On the other hand, SCJ established a new committee for promoting interdisciplinary cooperation of disaster reduction and disaster restoration in July 2015. JANET-DR and this new committee of SCJ work together to promote multidisciplinary research for disaster reduction in the world.



Representatives of 47 Academic Societies and SCJ voluntary members, January 9, 2016

[Activity: Symposium and workshop]

JANET-DR and SCJ have annual symposium with all academic societies of this network and hold occasional workshops focused on particular theme.

As a predecessor organization of this network, ASLA-CGEJE held eleven serial symposiums of 'How to protect people's lives and national land from huge disasters' from November 2011 to January 2016. Based on these activities, ASLA-CGEJE presented Joint Statement of 30 Academic Societies "Proposal for Revision of Japanese Disaster Prevention and

Reduction Policies” on May 10, 2012. ASLA-CGEJE also published a special feature in "Trends in the Sciences" March 2013. In the 10th symposium, it declared “Joint Statement of 30 Disaster-Related Academic Societies of Japan, Global sharing of the findings from the Past Great Earthquake Disasters in Japan”, and published the booklet of 30 academic societies’ international activities and initiatives against the great earthquakes.



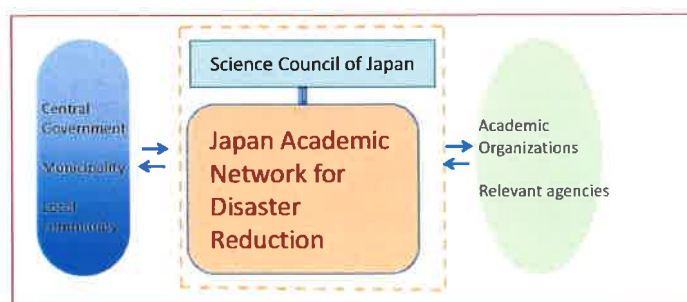
The forum of ‘Establishment of JANET-DR’ on January 9, 2016
This forum was also the last (11th) of ASLA-CGEJE serial symposiums.

The themes of serial symposiums entitled ‘How to protect people’s lives and national land from huge disasters’

- 1 : Prediction of earthquake and tsunami hazards for disaster reduction, December 2011
- 2 : For the next national land policy on the premise of great disasters, January 2012
- 3 : How to realize a disaster mitigation society, February 2012
- 4 : Preparedness for the next mega-quake, May 2012
- 5 : Direction of regional and urban planning after the big earthquake, June 2012
- 6 : How to re-create the energy policy from the accident of the nuclear power station, July 2012
- 7 : A new approach for making a resilient homeland after the Great East-Japan earthquake, August 2012
- 8 : All-inclusive forum and prospective society collaboration, November 2012
- 9 : How should academic societies face the Nankai Trough earthquake?, December 2013
- 10: Global sharing of the findings from the past great earthquake disasters in Japan, November 2014
- 11: Establishment of Japan Academic Network for Disaster Reduction, January 2016

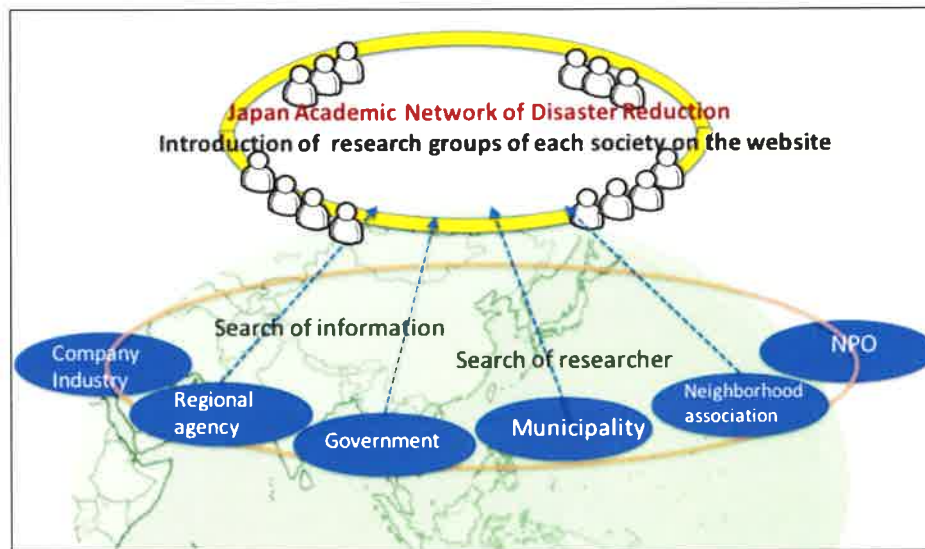
[Activity: network between academies, government and society]

When large disaster occurs, JANET-DR works as emergency contact network among academies, government and society in cooperation with SCJ. In normal time, this network works for communication and mutual understanding among academies, government and society.



[Activity: Introduction of academic society on the website]

JANET-DR set up the website <http://janet-dr.com/>, aiming to be the Japan's academic comprehensive website of disaster reduction providing news, reports and event calendar including 47 academies' ones. The database of research groups from 47 academic societies relevant to disaster reduction and disaster restoration are being constructed and it is scheduled to be on the website for the reference in July 2016.



3. Conclusions

For many years, Japanese scientists and engineers have tried to establish scientific knowledge and develop technologies for disaster reduction. However, they were fragmented due to specialization that has caused significant knowledge gaps and communication difficulties among specialties.

JANET-DR aims to collaborate across academies to promote multidisciplinary research for disaster reduction and sustainable development. The researchers in both natural and social science fields, such as physical science, engineering, medicine, sociology, and economics, etc. will work together to create practical measures that have been examined from various perspectives. The aim is to integrate different specialties and establish comprehensive and effective risk reduction countermeasures for local communities around the world as well as in Japan, considering each local environment and condition.

4. References

1. Masako Yoneda, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Yasushi Asami and Kimiro Meguro, Global sharing of the findings from the past great earthquake disasters in Japan, *15th Science Council of Asia Conference and International Symposium*, P23-28, May 15 2015, Siem Reap.
2. Masako Yoneda, Akira Wada, Teruhiko Yoda, Kazuo Tamura, Yasushi Asami and Kimiro Meguro. Joint statement and Cooperation of 30 disaster-related academic societies of Japan, *World Engineering Conference and Convention 2015*, Track 8-3, December 2 2015, Kyoto
3. White paper on disaster management 2014, Cabinet Office, Japan
4. Monthly Report on Earthquakes and Volcanoes in Japan March 2011, Japan Meteorological Agency