



Kyoto University

Global Center for Education and Research on  
Human Security Engineering for Asian Megacities



## GCOE HSE Overseas Base Bandung Office and Its Associate Researchers



**Prof. Djoko Santoso** : held doctoral degree from ITB in 1990. He is Director General of Higher Education, Indonesia, a Professor of Exploration Geophysics ITB. His main interests are in geology-geophysics, time-lapse microgravity for geohazards engineering, exploration in oil and gas, and geothermal.

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**Dr. rer. nat. Rachmat Sule** : received doctoral degree of science in 2004 from Geophysical Institute, Faculty of Physics, Karlsruhe University, Germany. He is PD researcher of GCOE-HSE Program in period of Feb 2010 – Jan 2011, a lecturer and geophysicist of Research Division of Applied Geophysics, Faculty of Mining and Petroleum Engineering, ITB. His research interests includes the application of near surface imaging technique, microseismic monitoring, and improving imaging techniques by using Common Reflection Stack (CRS) method.

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**Dr. Andri Dian Nugraha** : held doctoral degree from Kyoto University in 2009 and post doctoral of Pioneering Research Unit for Next Generation, Kyoto University, in 2010. He is a lecturer of Global Geophysical Research Group, Faculty of Mining and Petroleum Engineering, ITB. His main interests are in tomography and seismology.

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**Dr. Susanti Alawiyah** : received doctoral degree from ITB in 1999. She is PD researcher of GCOE-HSE Program in period of Jan 2011 – Jan 2012, a lecturer and geophysicist of Research Division of Applied Geophysics, Faculty of Mining and Petroleum Engineering, ITB. Her main interests are in modeling and simulating of fluid movement in the reservoir by using gravity data.

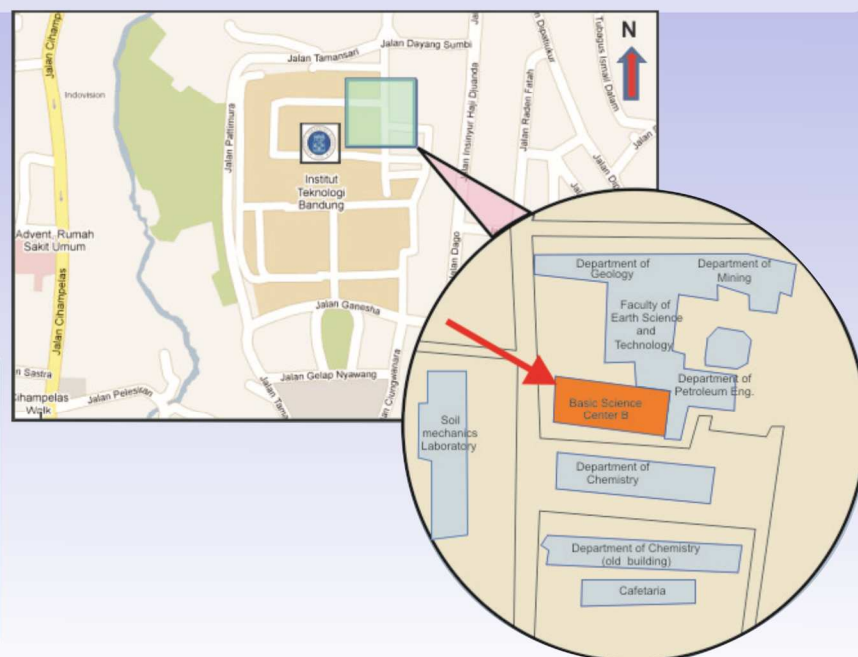
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# Establishing the Discipline of Energy Security Engineering and Disaster Prevention in Indonesia



Institut Teknologi Bandung  
and  
Kyoto University



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## Main Researchers



**Prof. Toshifumi Matsuoka** : overseas base leader, received Ph. D. in 1995 from the University of Tokyo. In 2002 he was promoted to become a Professor of Geological Engineering Lab. Department of Civil and Earth Resources Engineering of Kyoto University. During 1997-1998 he served Vice-President of SEG and President of SEG Japan from 2006 to 2008. email : [matsuoka@earth.kumst.kyoto-u.ac.jp](mailto:matsuoka@earth.kumst.kyoto-u.ac.jp)



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## Research Activities

During the five-year program, the Joint Research Centre of Bandung Base has conducted various research works. The main research works on "Human Security Engineering" to establish the discipline of energy security engineering and disaster prevention in Indonesia, namely:

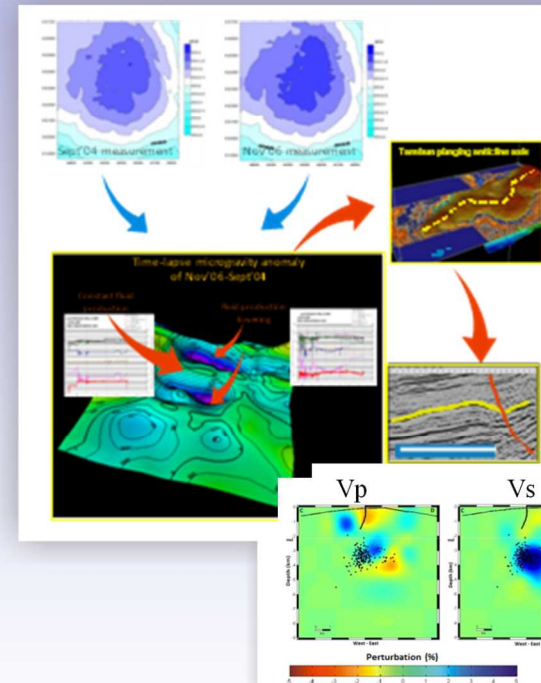
### a) Identification of Land Subsidence, Sea Water Intrusion, and Groundwater Level Lowering in Highly-populated Cities



The increasing population and industry in highly-populated cities have greatly impacted the excessive extracting of groundwater. This matter causes natural disasters, such as subsidence, groundwater level lowering and sea water intrusion. This makes environmental impacts and affects to human activities as well. The impact needs to

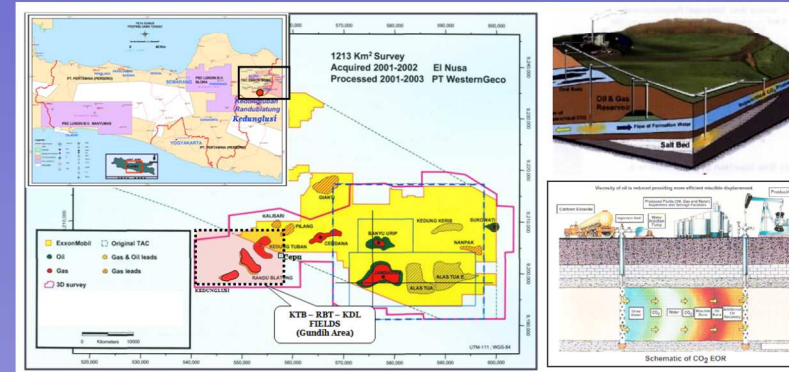
be addressed at the early stage so that other environmental hazards can be avoided or reduced. In this research, we have applied and developed the 4D geophysical method to identify and deepen the understanding of the subsidence and groundwater level lowering areas, especially in densely-populated residential areas.

### b) Development of Geophysical Monitoring Techniques and Its Application in Geothermal and Hydrocarbon Reservoirs



Several efforts to overcome the problems of increasing energy demand and declining oil production in Indonesia can be achieved by increasing the use of renewable/geothermal energy sources in Indonesia and maintaining/improving the Indonesian oil production at mature/old oil fields. In this research, the development of microseismic and microgravity monitoring techniques have been conducted and applied in geothermal prospect area and further aspects related to reservoir characterizations have been investigated. In addition, a new technologies must be developed and current existing technology must be improved in order to support the sustainability of total oil production in Indonesia. Seismic modeling combined with 4D microgravity and microseismic methods is a prospective new technology to improve better understanding on reservoir model. Vertical resolution of surface microgravity observation has been enhanced by using borehole microgravity measurement.

## c) Pilot Study for Carbon Sequestration in Indonesia



The collaborative research on Carbon Capture and Storage (CCS) among ITB, Kyoto University, Pertamina UTC, and PT Pertamina has been intended to make a significant contribution to energy systems for low carbon society. The planned pilot project of CCS will be implemented in Gundi Area, Central Java Province, Indonesia. Gundi area is now operated by Pertamina EP. This area is chosen after several intensive meeting and discussions that had been held in 2009 and 2010 and were attended by many geoscientists and petroleum engineers from Indonesia and Japan, i.e. ITB, Pertamina UTC, Pertamina EP, Kyoto University,

Japex, RITE and Fukuda Geological Institute. The project will be started with G & G study to determine the best aquifer for storing CO<sub>2</sub> and will be ended by injected CO<sub>2</sub> into aquifer in subsurface, including geophysical monitoring which are very useful to make sure that the CO<sub>2</sub> is stored in a correct place. Several unconventional and advanced geophysical monitoring will be implemented with a hope that many new aspects and achievements in the geophysical exploration and monitoring techniques could be obtained. Besides that, this research project will involve many scientists from many universities, research centers and companies from Japan and Indonesia and therefore strengthened the international cooperation.

## General Information and History of Institut Teknologi Bandung



Institut Teknologi Bandung (ITB) was founded on March 2, 1959 by the Indonesian government as an institution of higher learning of science, technology, and visual arts, with a mission of education, research, and service to the community. ITB was named as Technische Hoogeschool te Bandung after its establishment on 1920 during Dutch Government Era.

ITB is located in Bandung city, with a population of approximately two and a half million, lying in the mountainous area of West Java, at an altitude of 770 meters. ITB main campus, to the north of the town centre, covers a total area of 770,000 square meters.



## Symposium and Educational Activities



During this project period, the Joint Research Centre of Bandung Base also has produced one book entitled "The Contribution of Geosciences to Human Security", 30 peer-reviewed papers, and 18 international conference presentations. In addition, ITB in cooperation with Kyoto University and Kyoto University Global COE Program "Global Center for Education and Research on Human Security Engineering for Asian Megacities" have conducted 11 international workshops/symposiums and 2 special/guest lectures activities.