The Indonesian Association of Geophysicists
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CD PROCEEDING

GEOHAZARDS:
A CHALLENGE
FOR
GEOPHYSICS

HAGI 33rd
ANNUAL CONVENTION & EXHIBITION
Hyatt Regency Bandung
November 3-5, 2008
CONVENTION HIGHLIGHT

Technical Session (Tuesday, November 4, 2008 – Wednesday, November 5, 2008 at Lobby Level and 1st Level): There will be a total of 104 oral papers presented in the technical session on Tuesday afternoon and all day Wednesday. Topics include geohazards, Environmental Geophysics, Exploration & Production, Geodynamics, Volcanology & Geothermal, Marine Geophysics, Oceanography, Meteorology & Climatology, Geophysical Education and General Geophysics. Both oral and poster extended papers are published in one CD ROM (provided free for all registrants). The registration badge is your ticket to attend the technical sessions.

Lunch and Coffee Breaks: Lunches are scheduled for each of the two days of the Convention and served in the Lobby Level and 1st Level. Participants should display their registration badge and lunch coupon for entry to convention lunches, note the lunch is designed for standing. Coffee breaks are scheduled from Tuesday, November 4, 2008 to Wednesday, November 5, 2008 at Function Area and or Exhibition Room surrounding.

Special Topics Session: The Special Session is a session designed for Special Topic which will be delivered by Prof. K. Hattori from Chiba University and Mr. Budi Priasati from WesternGeco - Kuala Lumpur. The Winner of Geophysics Olympiad, I Gede Putu Dharma Yusa (SMAN 4 Denpasar) will be having a presentation of his winning paper. Some oral presenter also will deliver their work on the Ballroom.

HAGI Pleno Meeting: It will be held on Wednesday, November 5, 2008 on 4:00 p.m. at Ballroom. HAGI's member member meeting and HAGI's President succession ceremony will be carry out.

Best Paper Awards: It will conduct on Wednesday, November 5, 2008 on 5:00 p.m. at Ballroom. Prospective winners are encouraged to be present at the closing ceremony on Wednesday to receive their awards.

Closing Ceremony: The Convention and Exhibition will conclude after HAGI's Pleno meeting with remarks by Dr. Djedi S. Widarto, Chairperson Organizing Committee and by Mr. Elan Blantoro, President HAGI 2008-2010 period.
The 33rd HAGI Annual Convention & Exhibition Bandung 2008 performed in the Hyatt Regency Bandung on November 3-5, 2008. The Technical Program covering two effective days becomes the main part of this event with ten topics delivered. The activities taken into account are Courses, Panel Discussion, Oral Presentations, Exhibition, Poster Sessions, Field Trip, and GeoPhoto Contest.

PIT 33 HAGI-2008 Secretariat: The Convention Secretarial is situated in Krakatau Room at Hyatt Regency Bandung.

Medical Room: A medical room staffed by trained medical personnel will be maintained throughout the Convention, located in the Krakatau Room of 2nd level.

Registration Counter: The counter is situated in the Pre-Function Area. Advance Registrants and New Registrants can register and pick-up Convention packages before the Convention at the Hyatt Regency Bandung. The open hour for registration will be opened at 07:00 a.m. - 3:00 p.m. on Monday, November 3, 2008, and during the Convention at 07:00 a.m. - 3:00 p.m. on Tuesday, November 4, 2008 through Wednesday November 5, 2008.

Fieldtrips and Short Courses: The Annual Convention and Exhibition Committee will host Pre and Post Convention Short Courses, and Post-Convention Fieldtrips.

Opening Ceremony: Delegates are asked to be present in the Ballroom Hall at 08.00 a.m. due to the invitation that has been extended for The State Minister for Research and Technology Republic of Indonesia to open the 33rd HAGI Annual Convention & Exhibition Bandung 2008.

Keynote Session: The keynote Session will start soon after the Opening Ceremony. Keynote Address will be given by Dr. Kusmayanto Kadiman.

Panel Discussion: Discussion among attendees will be focused on discussion among panelists; Prof. M.T Zen, Dr. Ir. Hery Harjono, Dr. Ir. Sri Woro B. Harjono, MSc and Mrs. Karen Agustiawan.

Poster Session (Tuesday, November 4, 2008 - Wednesday, 5 November 2008 at Function Area Lobby Level): A total of 19 posters (professional and student) representing a wide range of topics will be displayed in the Function Area Lobby Level for viewing and discussion with the authors.

Exhibition (Tuesday, November 4, 2008 - Wednesday, 5 November 2008 at Function Area Lobby Level): The exhibition will consist of more than 10 exhibitors highlighting major industry projects and the latest research as well technology and service available to the petroleum, mining industry and gas experienced.
Dear All HAGI Members,
Assalamualaikum ww and Salam Sejahtera,
It is really a pleasure to present in this event and meet all of you, many thanks to PIT HAGI-33 Committee that arranged and plan this event very well. Also I would like to thank you to Board of HAGI Advisor, HAGI Executive Committee, Speaker and Presenter, Exhibitor and Sponsor for fully support to this event. We are proud to say that this moment become an important thing especially on geohazard issues related to science and technology geophysics development of Indonesia in the future.
Let me introduce you pertaining to HAGI, The Indonesian Association of Geophysicists - HAGI (Himpunan Ahli Geofisika Indonesia) is a non-profit organization that encourages and develops science and technology of geophysics in Indonesia since in 1976, not only for exploration and development of natural resources industry and activities but also for earthquake seismology and geodynamic, oceanography and meteorology sciences and application, included geohazard mitigation and its related.
Every year HAGI held Annual Scientific Meeting or Special Topics Meeting in different places of Indonesia (Jakarta, Bandung, Yogyakarta, Surabaya, Malang, Semarang, and Lampung, Bali) as an independent or joint with others association. Geographically, Indonesia is one of the country having the most geohazard active (earthquake, flooding, volcano, climate change, etc) in the world. The Cooperation between geosciences or professional association that is important thing to encourage the research that give contribution and solution to natural disaster prevention. We do hope technical discussions that will be performed on this event will give highly significant value and positive impact for geophysical science and technology in the future, especially to natural disaster and geohazard mitigation in Indonesia.
Finally, representing all of the executive committees and our member, we would like to say thank you for getting involved and support in this event. Welcome to Bandung City, enjoyed and good luck with Pertemuan Imiah Tahunan Himpunan Ahli Geofisika Indonesia (PIT HAGI-33).
Thank you.

Warm Regards,
Ahmad Mulchen Masnier
President of HAGI
Dear Participants,

On behalf of the organizing committee, I am as Chairman of Local Organizing Committee of the 33rd HAGI's Annual Convention and Exhibition (PIT-33 HAGI) 2008 would like to express my gratitude and it's our great honor to welcome you all to this annual convention and exhibition in Bandung. It is our pleasure that we have an opportunity to organize this convention which is a part of our annual HAGI's Committee Programs for 2006 – 2008. In this year, the theme for the convention is 'Geohazards: A Challenge for Geophysics'. This theme is put as based on the fact that in the last decade, Indonesia suffered from many Earth disasters, for which geophysicists gave their important contribution within the framework of geo-science and technology application.

The aim of this convention is to have a forum to highlight the use of geophysical sciences and technology emphasizing on geodynamics and geo-hazards in particular, as well as their application to the upstream processes of Earth energy exploration and production. The convention will evaluate and discuss the state of the art and the recent progress in research and development in geophysical sciences and technology by issuing several topics, i.e. geodynamics, geo-hazards, environmental geophysics, exploration and production, marine geophysics, meteorology and climatology, oceanography, and geophysical education.

I would like to report you, on the scientific/technical papers presented for this convention. We have a total of 105 papers, of which 31 will be presented as oral session and 24 will be as poster session. Amongst the presenters, there are at least 15 undergraduate and graduate students who will contribute to present their research results.

Finally, I congratulate you to have a nice stay during the convention in Bandung, and please do accept our sincere apology if there is any lack of services and organization. Let me conclude by wishing this convention all the best success.

Thank you.

LOG 33rd HAGI Annual Convention and Exhibition

Dedi S. Widarto
Chairman

CHAIRMAN OF PIT HAGI 33
FOREWORD

The Indonesian Association of Geophysicists
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Monitoring Mikroseismik untuk Deteksi Langsung Keberadaan Hidrokarbon
(Microseismic for Hydrocarbon Detection and Identification – MHDI-Tech)

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Abstrak

Sebuah teknik baru di dalam eksplorasi minyak dan gas bumi menggunakan gelombang seismik alam (passive seismic monitoring) mulai banyak digunakan sebagai alternatif metode seismik konvensional (active seismic exploration) yang sudah menjadi standard di dunia eksplorasi. Metode monitoring seismik dengan sumber dari alam ini (microseismic or ambient noise) sebenarnya telah lama digunakan, diantaranya untuk monitoring aktivitas gunungapi, geothermal system, active fluid monitoring, near-surface study, dsb. namun penggunaan dalam eksplorasi hidrokarbon di Indonesia belum pernah dilakukan.

Berbeda dengan metode seismik aktif pada umumnya, yang produk akhirnya bersa dengan struktur geologi, maka metode seismik pasif ini dapat mendeteksi keberadaan hidrokarbon secara langsung, tanpa memperhatikan struktur geologi. Metode ini merekam secara kontinu sinyal atau background noise di atas permukaan bumi, yang biasanya bersumber dari aktivitas baik di atas permukaan bumi seperti gelombang laut (0,1 - 0,2 Hz), aktivitas manusia (lalu-lintas, mesin-mesin industri), angin, dsb, maupun berasal dari aktivitas di bawah permukaan bumi seperti background noise dari aktivitas geodinamik.

Fenomena muncul terjadi ketika pengukuran dilakukan di atas sebuah reservoir hidrokarbon (minyak atau gas), yaitu dengan munculnya frekuensi anomali antara 2 – 4 Hz, yang tidak teramati jika pengukuran dilakukan di luar reservoir yang mengandung hidrokarbon. Dengan demikian, metode ini dapat dijadikan indikator keberadaan hidrokarbon secara langsung. Beberapa teori muncul berkaitan dengan sumber penyebab adanya frekuensi anomali tersebut, diantaranya adalah interaksi gelombang mikro laut dengan hidrokarbon di dalam pori-pori reservoir yang menghasilkan sinyal baru dengan kandungan frekuensi antara 2 – 4 Hz.

Studi kasus telah banyak dilakukan diantaranya di beberapa lapangan hidrokarbon di Timur Tengah, Eropa dan Amerika Selatan. Beberapa hasil pengukuran dengan sampel data-data yang diukur di sekitar Jawa Tengah (Lasem, Rembang, dan Cepu) yang mengandung hidrokarbon, termasuk sebuah hasil pengukuran yang dilakukan di atas lapangan hidrokarbon Sidoarjo (di dekat Lumpur Sidoarjo) akan ditampilkan, dan dibandingkan dengan daerah-daerah lain yang tidak mengandung hidrokarbon.

Metode ini sangat bermanfaat untuk diaplikasikan pada pengembangan lapangan baru (sebelum dilakukan eksplorasi seismik 2D/3D), sebagai pendukung dalam eksplorasi seismik 2D/3D, mengidentifikasi daerah prospek dan menentukan posisi titik pengeboran, menghindari risiko pengeboran dry-hole, dapat mengidentifikasi ketebalan lapisan hidrokarbon pada reservoir sehingga dapat digunakan untuk mengestimasi sumberdaya hidrokarbon, serta dapat digunakan untuk memonitor lapangan-lapangan yang sudah lama berproduksi (EOR).

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