IGA NEWS

Newsletter of the International Geothermal Association

Quarterly No. 79

IGA ACTIVITIES

Message from the President

Ladsi Rybach

Dear IGA member

This is the ninth message from your current President.

In my function as IGA President, I was again invited to represent our association and to deliver presentations at various occasions. The following events have taken place since my last message:

- EGEC GeoPower Europe Meeting, Munich/Germany, 3 – 4 December 2009, with "Speeding up geothermal power development";
- European Geothermal PhD Day, Potsdam/Germany, 12 February 2010 with "Research frontiers in geothermal development – a wide open field for PhD students";
- International Geothermal Conference, Budapest/Hungary, 4 March 2010, with "World-wide status and prospects for geothermal energy";
- Geothermal GeoEner 2010 Conference, Madrid/Spain, 10 March 2010, with "Geothermal energy for buildings".

The IPCC Special Report on "Renewable Energy Sources and Climate Change Mitigation" (SRREN) has reached the First Order Draft stage. Various IGA members have been Coordinating, Lead, or Contributing authors of SRREN Chapter 4 "Geothermal Energy". Among others I was appointed by IPCC to act as Expert Reviewer of the entire report.

The preparations for establishing the IGA Secretariat at the Geothermal Center Bochum/Germany after 1 January 2011 (endorsed by EGEC) have started; a Memorandum of Understanding will now be negotiated with the Geothermische Vereinigung e.V.

WGC2010 in Nusa Dua, Bali/Indonesia (April 25-30, 2010) is approaching; the Draft Technical Program has been finalized, providing for 130 Sessions (650 papers scheduled for oral presentation, 260 in reserve) and several Poster Sessions. Besides the conference, the presentations and the exhibition, social events have also been scheduled: Welcome Party, 25 April, 7 pm at The Westin Resort; Indonesian Night, 27 April, 7 pm at Garuda Wisnu Kencana; Closing Ceremony, 30 April, 4.30 pm -5.30 pm at Nusa Indah Hall; Farewell Party, 30 April, 7 pm at the Bali Pecatu. Preparations for an IGA General Assembly to take place on 28 April and the 49th BoD on 1 May are also underway.

Contents

A new contract between the World Bank and IGA Service GmbH for the Bank's African Rift Geothermal Development Program is currently being negotiated. The agreement will cover the following elements: a) Geothermal Project Development; b) Establishment of an East African Branch of IGA and c) Implementation of an Internship Program.

The cooperation between IGA and our partner organizations within the REN Alliance (the International Renewable Energy Alliance) is developing well and activity is increasing. Executive Director Arni Ragnarsson represented IGA at the IRENA (International Renewable Energy Agency) meetings in Abu Dhabi in January 2010, within the framework of the World Future Energy Summit.

As a follow-up from the IGA Board of Directors' decision about closer cooperation between IGA and GRC, a link to key events of the two associations has been established on the respective associations' websites, including the announcement of WGC2010 now being prominently placed on the GRC website.

I look forward to continuing to working with all of you in our joint effort to promote geothermal and thank you for your support.

Update on the WGC 2010 Technical Programme

Roland Horne and Nenny Saptadji, WGC 2010 Technical Program Co-Chairs

The WGC has received 1045 papers from 85 countries. The papers have been reviewed, revised, edited and included in the programme.

The timetable for the technical programme was announced on February 1, and is posted now on the WGC website at www.wgc2010.org (look under the tab "Progamme"). There will be 650 formal oral presentations, and 395 poster presentations. Each session will have five speakers and two reserve speakers (who will also present posters). Reserve speakers will make presentations if a speaker is absent from the session. All 1045 papers will be included on the Proceedings CD, to be provided in the congress registration for all participants.

The programme will also include formal presentations in the opening and closing ceremonies. The President of Indonesia and the President of Iceland have both been invited to attend and speak. There will also be two plenary sessions including panel discussions, one on international cooperation in geothermal energy development, and the other on the development of geothermal energy in Indonesia. A special session on renewable energy will include speakers from the Renewable Energy Alliance.

The technical programme has been organized by an international committee of 140 technical topic experts, under the chairmanship of Prof. Roland Horne of the USA and Prof. Nenny Saptadji of Indonesia. Two collaborating editorial teams, one in the USA and one in Indonesia, have edited, revised and reformatted the papers. The technical sessions themselves will be managed by 260 session chairpersons.

The WGC programme will also include cultural events, field trips and day activities. Total registration is expected to reach 2500 people.

UPCOMING EVENTS

World Geothermal Congress 2010, Bali, Indonesia, 25-30 April 2010. Website: www.wgc2010.org

International Geothermal Conference 2010, 19-20 May 2010, Freibug, Germany. E-mail: agentur@enerchange.de

The International Conference Cities on Volcanoes, CoV6, 31 May – 4 June, Tenerife, Canary Islands, Spain. Contact: cov6-tenerife2010@citiesonvolcanoes6.com

Renewable Energy World Europe 2010, 8-10 June 2010, Amsterdam, The Netherlands. Website: www.renewableenergyworld-europe.com

Renewable Energy 2010, 27 June-2 July 2010, Yiokohama, Japan. Website: www.re2010.org

2010 IAHR International Groundwater Symposium – Session on Mass Transfer in Geothermal Systems, 22-24 September 2010, Valencia, Spain. Website: http://iahr2010-gw.com

11th World Renewable Energy Congress and Exhibition, 25-30 September 2010, Abu-Dhabi. Website: www.wrenuk.co.uk

34th GRC Annual Meeting, 24-27 October 2010, Sacramento, California, USA. Website:www.geothermal.org

Der Geothermiekongress 2010, 16-18 November 2010, Karlsruhe, Germany. Website: www.geothermie.de

Exploring and Harnessing the Renewable and Promising Geothermal Energy, Djibouti, 22-25 November 2010. Contact: argeo-c3-djibouti@intnet.dj

Late February snapshot of the WGC 2010

Suryadarma, Indonesian Geothermal Association (INAGA)

As of late February, the Organizing Committee (OC) of the World Geothermal Congress 2010, the IGA Steering Committee and the Co-Convener Indonesian Geothermal Association (INAGA) reported the following status of Congress preparations.

Up to 19 February 2010, the number of registered participants was 744, from 75 countries. Of these, 646 are technical participants and 98 are accompanying persons

World Geothermal Congress 2010
25-30 April, 2010 – Bali, Indonesia

(*Editors note: As of 8 April, the number of registered participants had risen to 1343*). The number of contracted booths for the Exhibition was 74 out of 83 reserved. The number of fellowships granted was 104 from IGA and 84 from the United Nations University (UNU).

The status of registration for the WGC 2010 Short Courses by 22 February 2010 was: 26 persons for SC1 (Drilling, completion and testing of geothermal wells); 12 persons for SC2 (Design, construction and operation of geothermal plants); 3 persons for SC3 (Geothermal heat pumps); 6 persons for SC4 (Financing geothermal projects); and 5 persons for SC5 (Introduction to geothermal energy). At that time there were sufficient inscriptions to run Short Courses 1 and 2. It is expected that more people will register for Short Courses.

A number of technical and social events have been arranged:

- Welcome Reception at the Westin Hotel, Poolside and Garden, at 7 pm, 25 April 2010. Includes welcoming remarks by organizers, Golf Tournament trophy awards ceremony, cocktails, buffet, Indonesian music and dancing.
- Opening Ceremony, Westin Hotel, Nusantara Indah Hall, starting 7 am, 26 April 2010. Includes registration; welcoming dance (Balanganjur dance); report from the OC; welcome remarks from INAGA; opening remarks from the President of IGA; Indonesian children´s choir; opening speech by the President of the Republic of Indonesia, Dr. Susilo Bambang Yudhoyono; signing of Geothermal Project World Wide (TBA); opening keynote remarks by the President of Iceland Mr. Olafur Ragnar Grimsson; exhibition visit; and coffee break.
- Other technical events are: Keynote Speaker Session I featuring talks by high officials from the governments of Indonesia, USA and India and from geothermal companies and institutions (Pertamina, Chevron International and WGC 2010 Technical Programme Committee). Keynote Speaker Session II with presentations on world geothermal development, direct utilization, power generation and sustainable development. Panel discussion on global geothermal development. Panel discussion and REN Alliance Partners side events.

A snapshot on the Technical Programme is presented in an accompanying article.

The Social Programme includes the Indonesian Night (Tuesday 27 April, 7 pm), the Closing Ceremony (Friday 30 April, 4.30 pm) and the Farewell Party (Friday 30 April, 7 pm). The status of field trips registration was 19 persons for FT1, 1 person for FT2, 16 persons for FT3 and 1 person for FT4.

Europe

EGEC´s position paper on carbon capture and storage

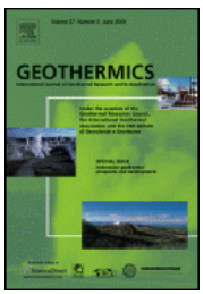
Editorial note: This article reproduces an EGEC paper and it does not necessarily represents IGA´s views.

Before the EU Member States implement the directive on the geological storage of carbon dioxide (CCS) and the directive on the promotion of the use of energy from renewable Sources, EGEC, representing the geothermal industry, and relying on its members' expertise in geology and hydrogeology, belonging to organisations involved in geothermal but also CCS technologies, presents here its position addressing the synergies and conflicting issues in both technologies.

- Having regard to the RES Directive, defining geothermal energy as a renewable *"energy stored in the form of heat beneath the surface of solid earth"*
- Having regard to the CCS directive (recital 19 and article 4), *"Member States should retain the right to determine the areas within their territory from which storage sites may be selected. This includes the right of Member States not to allow any storage in parts or on the whole of their territory, or to give priority to any other use of the underground, such as exploration, production and storage of hydrocarbons or geothermal use of aquifers. In this context, Member States should in particular give due consideration to other energy-related options for the use of a potential storage site, including options which are strategic for the security of the Member State's energy supply or for the development of renewable sources of energy".*

EGEC considers:

- CCS is a solution to mitigate climate change at short and medium term, towards a carbon free European energy
- It could be applied in particular if no alternatives exist, like for energy-intensive industry (steel, cement, glass…),



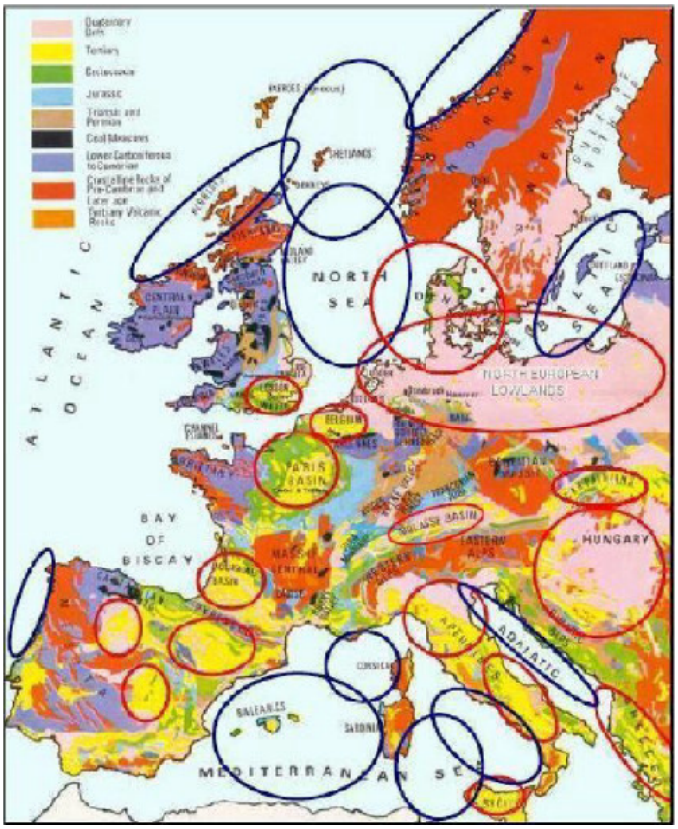


Fig 1 shows major on – and offshore sedimentary basins in Europe which are possible storage sites. Cost analysis must be performed to identify the most cost-effective (modified after Kirkaldy, 1967)

- CCS should use privilege off-shore storage sites wherever feasible,
- CO_2, like natural gas, is a sensitive fluid which needs to be stored in safe conditions with an impermeable cap to avoid migration.

A research collaboration should start immediately between both the Geothermal and CCS communities[1] on common areas of interest in order to decrease the costs and resolve environmental issues:

- drilling stimulation and reservoir assessment, 3D & 4D modelling, deep geological mapping (1-5 km),
- Creation of a Fund for covering the drilling risk,
- monitoring of micro-seismicity
- a research program should be launched on permanent fixation of CO_2 in the form of calcite in basaltic rocks
- a research program should be initiated on the safe use of CO_2 as a heat carrier fluid in geothermal systems such as EGS

Therefore EGEC suggests:

- the CCS projects financed by the European Economy Recovery Plan (ca. €1.050 billion) and the NER300 must share with the public their results on exploration and storage
- the CCS exploration licence must be granted for a defined area and for a specified period of time. The area and the duration of the licence should be appropriate for the size and type of the project as done in the oil and gas industry
- the potential of deep geothermal in Europe must be evaluated (with a special emphasis on Enhanced Geothermal Systems (EGS))

EGEC urges public authorities to produce an underground regional planning in order to optimise resource allocation between geothermal energy, carbon storage and possible other underground usages, and therefore maximize the benefits for society.

There is obviously conflicting potential as a result of the competition between CO_2 disposal and geothermal energy projects because they may target the same deep aquifers, or the same areas within sedimentary basins. Geothermal energy may also be produced from rocks below the depth range for potential CO_2 disposal sites, and investigations are needed to determine if geothermal exploitation beneath CO_2 deposits might be feasible at all.

Carbon capture and storage is essentially a bridging technology whereas geothermal energy is a sustainable energy resource.

This map shows geological basins in Europe which are possible for cost-effective geothermal electricity projects ; future developments might allow other regions to be used too. There is also current potential in Romania, Bulgaria and Greece, which are not covered on the map (base map Kirkaldy, 1967).

[1]plus oil & gas sector on some topics

Zones of dual use capability should be clearly identified and priority should be given to their use for geothermal energy over their use as a carbon storage site.

EGEC foresees an important development of geothermal energy in the future and especially after 2030 when Enhanced Geothermal Systems will be a widely-used technology.

The increase of a renewable energy source, a long term solution, must not be hampered by a technology, CCS, that has the potential only to serve as a temporary, interim GHG mitigation measure.

European Geothermal Energy Council - EGEC
Renewable Energy House
63-67 rue d'Arlon - B - 1040 Brussels
T : +322 400 10 24 & F : +322 400 10 39
E : com@egec.org & W : www.egec.org

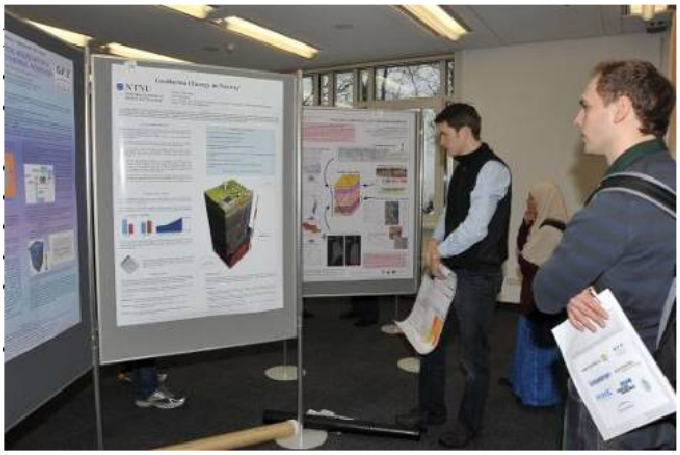
First European Geothermal PhD-Day – EGPD201

Henning Francke[1], Thomas Reinsch[1], Ansgar Schepers[1], Matthis Thorade1

[1]Helmholtz Centre Potsdam GFZ - German Research Centre for Geosciences

The first European Geothermal PhD-day (EGPD2010) was held at the Helmholtz Centre Potsdam GFZ - German Research Centre for Geosciences - on February 12th, 2010, as a result of an initiative of the European Energy Research Alliance (EERA) joint program in geothermal energy. The goal of the PhD-day was to bring together young scientists working in various fields of geothermal energy research and offer them the opportunity to share ideas and build up a network between them, which leads to synergies and collaborations.

During the last year, addresses of more than 180 PhD students working in geothermal energy research have been collected from 20 European countries. About half of them participated in the EGDP2010. In total, participants from 16 countries and various scientific disciplines attended the PhD-day, showing that there is a broad interest in geothermal energy research throughout Europe. The presented topics ranged from socio-economic observations over engineering aspects to geoscientific studies.



Some students during poster presentation

The PhD-day started with the keynote lecture "Research frontiers in geothermal development – a wide open field for PhD students" given by Ladislaus Rybach/Switzerland. Afterwards, the participants each gave a short presentation to introduce their topics of research, which were discussed in detail in the subsequent poster session. This was followed by a concluding presentation by Fausto Batini/Italy about the EERA joint program in geothermal energy. The collection of abstracts can be found on the website www.gfz-potsdam.de/egpd2010.

The scientific quality of the presentations was evaluated and a poster prize was awarded by the scientific committee, which consisted of Eva Schill/Switzerland, Jan-Diederick van Wees/Netherlands, Ernst Huenges/Germany, Fausto Batini/Italy, Martyn Unsworth/Canada, Ólafur Flovenz/Iceland and Thomas Kohl/Switzerland. Financial support for the organization

Key note lecture

Some participants during Potsdam sightseeing tour

of the event was generously given by Vattenfall Europe Technology Research GmbH, Schlumberger GmbH, Gasag - Berliner Gaswerke AG, RWE Innogy GmbH, Baker Hughes INTEQ GmbH, Ferrostaal AG, and GPC Instrumentation Process (GPC IP).

The general consensus was that the EGPD2010 was a successful event and yielded interesting contacts and fruitful discussions among the PhD students. Thus, and in order to strengthen the newly developed network among the European geothermal PhD students, annual meetings are planned to be held in different European countries. The next meeting, EGPD2011, is scheduled for next year and will take place in Reykjavik, Iceland.

Germany

The seismic risk in geothermal projects can be managed!

Editorial note: This article reproduces a press release from GtV-Bv

The seismic risk of geothermal projects can be managed – this is the key message of the recently published seismological expertise on the Basel project.

In the course of a geothermal project, ground movements did occur in Basel, Switzerland. The magnitude according to the Richter scale reached a maximum of 3.4. The project had been suspended immediately, as a risk was seen that a major earthquake might be triggered. Basel is located in a seismically active area, and had been badly damaged by a quake in mediaeval times.

The moratorium provided the time for a seismic investigation and expertise.

The expertise now finalised has been released in a summary version, the final publication of the full tet might take a few months more. Hence it is hard to evaluate currently the conclusions drawn.

The expertise concludes, based upon comprehensive calculations, that there is no risk of geothermal energy triggering a major, natural earthquake. The impact on existing geological faults is much too small for that. Furthermore, the considerations made are rather specific for the Basel area, i.e. for a region with high risk of earthquakes. They cannot be transferred to other sites. Basel is a unique, singular case in many respects.

Also the incidents caused (induced) by the project directly can be calculated and are controllable. In addition to the usual methods for risk analysis, the authors of the expertise suggest a relation to the size of the reservoir used in the underground. This relation could be found in reviewing numerous cases where fluids have been injected into the underground. As the size of the reservoir can be planned and controlled by the plant operator, the seismic risk is controllable and geothermal plants are possible also in future. In the stimulation process in Basel, water of high pressure (300 bar at the borehole head) has been injected into the underground, in order to create an artificial heat exchanger. This situation cannot be compared with the operational phase of a geothermal plant, when much lower pressures are used, not the least due to economic reasons. It is also a fact that a geothermal plant is operational in Riehen near Basel since many years, without seismic events.

The fact that the expertise very likely means the final stop for the geothermal project in Basel does not diminish its basic message. In Basel, not only the subsurface heat exchanger was in an unfavourable situation, but also the "vulnerability" of the immediate surroundings was unusually high, sporting urban buildings and industry. Hence the authors of the expertise calculated substantial, and surely untypical, maximum damage cost.

Press contact:

Dr. Horst Kreuter, 0049 (0) 721 570 44 6 88, horst.kreuter@geothermie.de

Prof. Dr. Horst Rüter, 0049 (0) 231 44 57 66, horst.rueter@geothermie.de

Switzerland

Seismic risk assessment in Basel

In the aftermath of the Basel EGS project, the Kanton Basel-Stadt commissioned Q-con GmbH to undertake a seismic risk analysis for the Basel region. The reference for the full study is as follows:

Deep Heat Mining Basel - Seismic Risk Analysis

Stefan Baisch, David Carbon, Uwe Dannwolf, Bastien Delacou, Mylène Devaux, François Dunand, Reinhard Jung, Martin Koller, Christophe Martin, Mario Sartori, Ramon Secanell, Robert Vörös.

SERIANEX study prepared for the "Departement für Wirtschaft, Soziales und Umwelt des Kantons Basel-Stadt, Amt für Umwelt und Energie", http://www.wsu.bs.ch/geothermie, 553 pages.

The summary from this report is reproduced below by permission of Q-con and Kanton Basel-Stadt.

From the Secreteriat

IGA General meeting 28 April 2010

IGA will held a General Meeting on 28 April, 2010 in Nusa Dua, Bali, Indonesia, during the WGC2010. The meeting will start at 6 p.m. in the Nusa Indah Hall at the Westin Hotel, BICC. All IGA members are welcome to the meeting where information about the main IGA activities in the past as well as the plans for the future will be given.

SUMMARY

In the course of the development of an enhanced geothermal reservoir at a depth of about 5 km underneath the city of Basel, a felt earthquake of magnitude ML = 3.4 was triggered on December 8th, 2006. The operator's insurance paid out property damages of about 7 million CHF, which were attributed to the earthquake. The geothermal project has been suspended since. In the current study, commissioned by the Kanton Basel-Stadt and supported by the Swiss federal government, we assess the seismic risk resulting from continued development and subsequent operation of the geothermal system.

Besides seismicity triggered directly by the geothermal project, the study also considers the impact of the geothermal reservoir on natural seismic activity in the Basel region. The principal issue is to what extent the geothermal project may affect the occurrence of a large earthquake. Such an earthquake caused large damage to the city of Basel in the year 1356.

To analyse the issue, we developed a 3-dimensional geologic model of the subsurface of the Basel region. In the wider vicinity of the geothermal reservoir, eight relevant, natural fault zones were identified, each of them large enough to produce large earthquakes. We estimated the seismic activity of these faults, i.e. the time intervals when large earthquakes could be expected to occur on these faults. We found that the geothermal reservoir can have an impact on the recurrence time of these natural earthquakes by modifying subsurface stresses. But, numerical simulations demonstrate that these variations are very small and represent a negligible risk.

In addition, the development and operation of the project is expected to result in seismic activity in the immediate vicinity of the geothermal reservoir. We developed a numerical model to capture these processes, ran computational simulations and used empirical relations to investigate how future seismic activity might evolve. Given the local conditions, there is a high probability that earthquakes exceeding the strength of previous activity will occur during continued development and operation of the geothermal facility. We expect the biggest event magnitude in the order of ML=4.5. Further, we anticipate up to 30 felt earthquakes in the development phase, 9 of which might reach or exceed the intensity of the earthquake of December 8th, 2006. Within the operational period of 30 years, we expect 14 to 170 felt earthquakes.

To estimate the associated property damage, we recorded the building stock within a radius of 12 km around the facility. Using probabilistic modelling of the seismic risk we classified buildings according to their vulnerability. Based on expert judgement, we expect no relevant property damages to infrastructural facilities resulting from the induced earthquakes. However, in all likelihood property damage of 40 million CHF is to be expected in case of continued development of the geothermal reservoir. This comprises minor structural

From the Secreteriat

IGA Board election 2010

The election for the 2010–2013 term of the IGA Board of Directors will be held in the period May-July 2010. The nomination process is already finished. This time the election material will be distributed to IGA members electronically only. Thus, ballots and other election material will not be sent in paper form to members as at earlier BoD elections. However, those members who are not able to receive the material electronically can request the Secretariat to send it to them in paper form. To facilitate the election process it is important that IGA members are registered with their e-mail addresses. The voting itself will be through the IGA website where all necessary information will also be available when the election starts.

damages, which we expect to occur in large numbers due to the high population density. There is a 15% probability, that damages will even exceed 600 million CHF in an extreme case. During the projected facility's operational period of 30 years, the most probable property damage is set at 6 million CHF per year.

While the risk of the geothermal project to cause bodily harm is low, the property damage may be deemed as unacceptable according to risk criteria of the Swiss ordinance on major accidents. We reach the same conclusion also by comparing other technical risks in Switzerland, where in some cases potential cumulative damages are less.

In light of the considerable property damage risk in Basel, we evaluated alternative concepts for developing the geothermal reservoir at its current location. We conclude that none of the concepts considered will completely rule out the occurrence of earthquakes. Therefore, alternative utilization concepts at this location will require a separate risk assessment.

From a seismic risk perspective, the location of Basel is unfavourable for the exploitation of a deep geothermal reservoir in the crystalline basement. Other locations in Switzerland may offer a significantly lower seismic risk. A thorough evaluation of site-specific seismic risk should be required for future geothermal project developments in Switzerland. The findings of this Basel study constitute an important data point for future risk assessments. After analyses of the data acquired from the suspended project and after comparison with experiences made in other geothermal projects, we consider the Basel earthquakes caused by the geothermal project to have been exceptionally strong.

Americas

Canada

The Canadian geothermal energy association (CANGEA) announces the release of the Canadian geothermal code for public reporting

CALGARY, ALBERTA—(Jan. 18, 2010) – The Canadian Geothermal Energy Association (CanGEA) announces the release of the Canadian Geothermal Code for Public Reporting. The Canadian Geothermal Code for Public Reporting provides a minimum set of requirements for the public reporting of Exploration Results, Geothermal Resources and Geothermal Reserves. The Code will provide a basis for transparency, consistency and confidence in the public reporting of geothermal information.

The Canadian Geothermal Code for Public Reporting was prepared by the Canadian Geothermal Code Committee (CGCC), established in December 2008. The primary objectives determined by the Committee were to provide a reporting basis that would be satisfactory to investors, stakeholders and capital markets such as the Canadian Securities Exchanges, and to develop a Code that would be applicable to geothermal plays in both Canada and internationally. The Code, a first in Canada, will serve to increase investor confidence and interest in the geothermal energy sector through the standardization of geothermal reporting.

Lee Deibert, CanGEA Director and CGCC Chairman had this to say about the Code, "This key initiative has been completed for the benefit of our members and the industry overall. With the increasing level of activity in Canadian geothermal public and private financings, mergers & acquisitions, and the development of geothermal opportunities in Canada, the Code represents a key part of any investment and development strategy".

It is anticipated that public reporting using the Code will be undertaken by all CanGEA members involved in exploration and/or operation of geothermal properties. The use of the Code will be on a voluntary compliance basis (industry self-regulation) until 2011 when Code compliance will be a mandatory requirement for CanGEA membership. CanGEA members involved in the financial community, including geothermal investors, financial advisors and financial institutions will also benefit from standardized and transparent reporting of geothermal assets. CanGEA will be holding Code training seminars throughout the upcoming months.

Alison Thompson, CanGEA Founder and Chair commented, "The Canadian Geothermal Code for Public Reporting establishes the industry standard and we are pleased that CanGEA has strengthened our leading role in

the international geothermal community. The Canadian Securities Exchanges are already host to many of the premier players in the geothermal world and this Code is expected to further facilitate the industry's growth."

CanGEA collaborated with the Australian Geothermal Energy Association (AGEA) in the development of the Code.

About CanGEA

CanGEA is a national, not-for-profit association that works on behalf of our members to facilitate and promote the responsible and sustainable growth of high temperature geothermal energy in Canada, which, we believe, can provide competitive, emissions free, renewable, base-load energy to Canadians and export markets. 5,000 MW by 2015!

For more information please contact:
The Canadian Geothermal Energy Association (CanGEA)
Brian Toohey, B.Eng
Reservoir Engineer
Canadian Geothermal Code Committee Member & Business Development Coordinator
brian@cangea.ca
www.cangea.ca

El Salvador

Promising results of the first exploratory wells in the Chinameca Geothermal Field, El Salvador

Carlos Pullinger and Francisco Montalvo, LaGeo

The Chinameca geothermal field (Fig. 1), located approximately 130 km east of the capital city San Salvador, is the fourth geothermal field where LaGeo S.A. de C.V. (LaGeo) has undertaken drilling in recent years. The field is located on the northern flanks of El Limbo and Pacayal volcanoes of Holocene age. Previous studies and drilling of two deep wells in the 1970s by the Comisión Ejecutiva Hidroeléctrica del Rio Lempa (CEL) identified a moderate size resource with temperatures in the 200°C range. However, recent surface exploration studies carried out by LaGeo in 2004-2006 identified an area of interest to the south of the previous wells that included a deep resistive magnetotellurics (MT) anomaly, several geochemical anomalies and appropriate geologic structures.

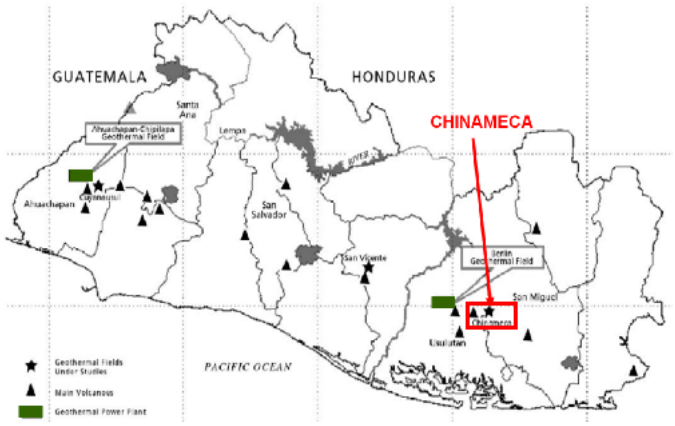


Fig. 1 Chinameca geothermal field location

Fig. 2 Drilling platform for the well CHI-3

The first well, CHI-3, drilled by LaGeo from February to April 2009 (Fig. 2), was sited with the objective of intercepting the transition zone between the shallow conductive and deep resistive MT anomalies at a site with geochemical and geological evidences for fractured rocks. Well CHI-3 was drilled to a depth of 1869 m in a period of 70 days and intercepted the geothermal reservoir at 1400 m depth (zone of total loss of circulation) with a temperature greater than 240 °C (Fig. 3). Initial simulations indicate a potential of 3-5 MWe.

Three additional wells are planned to be drilled in 2009-2010 to further confirm the extent of the geothermal resource. If these wells indicate a strong potential for installing a commercial power plant, plans call for additional drilling and installation of the necessary infrastructure in order to develop the field and initiate production in 2014.

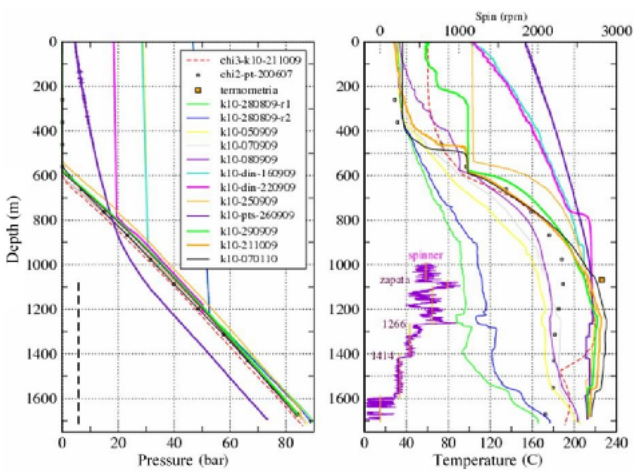


Fig. 3 Thermal recovery for the well CHI-3 until 24/04/09

Mexico

XVII Congress and Assembly of the Mexican Geothermal Association (AGM)

Luis C.A. Gutiérrez-Negrín

The XVII Annual Congress of the Mexican Geothermal Association (AGM: Asociación Geotérmica Mexicana) was held on November 13, 2009, together with the XVII Ordinary General Assembly. Both meetings were carried out at the facilities of the geothermal division (Gerencia de Proyectos Geotermoeléctricos) of the Comisión Federal de Electricidad (CFE, Federal Commission for Electricity) in its headquarters located in Morelia City, State of Michoacán, west-central Mexico.

There were 36 participants, from the CFE's geothermal division, the Mexican electric research institute (IIE, Instituto de Investigaciones Eléctricas), the engineering institute of the national university (Instituto de Ingeniería, UNAM), the university of Michoacán (Universidad Michoacana de San Nicolás de Hidalgo, UMSNH) and two private companies related to geothermics (Smith International and Geocónsul). The attendees were welcomed by the current AGM's President and Vice-President, Raúl Maya González and Magaly Flores Armenta, respectively.

The following ten technical papers were presented and discussed during the congress:

- Presence of cross-flow at the Cerro Prieto, BC, geothermal field, by Marco H. Rodríguez (CFE).
- Geochemical changes in fluids from the Las Tres Vírgenes, BCS, geothermal field during 1997-2007: Identification of reservoir processes, presented by Eduardo Iglesias (IIE).

Photo 1. Bernardo Domínguez (right) delivers the 2009 Pathé Award to Alfredo Mañón.

- Relationships between the local seismic activity, injection wells and active faults at the geothermal fields in Mexico, by Edgar Urban (II, UNAM).
- Evolution of the geothermal system in Acoculco, Pue., Mexico: Study based on petrography of well EAC-2 and other subjects, by Julio C. Viggiano (CFE).
- Study with steam- and liquid-tracers in the Tejamaniles zone, Los Azufres geothermal field, by Eduardo Iglesias (IIE).
- Economic, environmental and social impacts of geothermal development and saving and efficient use of electricity in Baja California, Mexico, presented by Luis C.A. Gutiérrez (AGM).
- Experiences on acid stimulation activities in the Mexican geothermal fields, by Magaly Flores (CFE).
- Scaling inhibition on heat exchangers at the Cerro Prieto geothermal field, by Ismael Canchola (CFE).
- Thermo-poroelasticity in geothermics, formulated in four dimensions, by Mario C. Suárez (UMSNH).
- Composed focal mechanisms: the case of the Los Azufres geothermal field, by Jorge Soto (CFE).

Photo 2. Some participants at the XVII Annual Congress of the AGM.

From the Secreteriat

IGA Membership Dues

IGA Membership dues for individual and corporate members for the year 2010 were due 31 March. In order to keep the membership status, we advise those of you who have not paid to do that as soon as possible. See the application form on the back cover of this issue for renewal details.

The transactions of the congress were distributed to the participants on a compact disc. As usual, most of the papers are going to be published in the Mexican magazine Geotermia (which can be read at the websites of the AGM (http://www.geotermia.org.mx), and of the Geothermal Resources Council (GRC) (http://geothermal.org).

The XVII General Assembly was conducted by the AGM Vice-President. After the reports of the Board of Directors and the Treasurer, the 2009 Pathé Award was delivered to Alfredo Mañón-Mercado by Bernardo Domínguez-Aguirre - the recipient of the 2008 award. This is a special award instituted by the AGM in 2005 to recognize the career and achievements of relevant Mexicans involved in geothermics, and it is delivered every year. Alfredo Mañón-Mercado, 68, is a chemical engineer who worked for the former Geothermal Energy Commission, based in the Cerro Prieto geothermal field, in 1966-1968. In 1971 he joined the CFE with responsibility for the chemical laboratory in the same field, and then was appointed as responsible for the studies area (1977-1981) and for the entire geothermal field (Coordinador Ejecutivo) between 1982 and 1989. From 1989 through 1993 he was in charge of the Geochemical Office and from 1993 through 1999 of the Environmental Protection Department of the CFE's geothermal division, based in the Morelia headquarters. He retired from CFE in 1996, and since then has been a private consultant and a director of the private company Geocónsul.

The AGM finished its meetings with the traditional photo inside the offices of the CFE's geothermal division.

IGA News

IGA News is published quarterly by the International Geothermal Association. The function of IGA News is to disseminate timely information about geothermal activities throughout the world. To this end, a group of correspondents has agreed to supply news for each issue. The core of this group consists of the IGA Information Committee:
Benedict Steingrímsson, Iceland (Chairman)
Graeme Beardsmore, Australia
Werner Bussmann, Germany
Philippe Dumas, France
John Garnish, United Kingdom
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Gestur Gíslason, Iceland
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Zbigniew Malolepszy, Poland
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Martin N. Mwangi, Kenya
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Sylvia Ramos, Philippines
Colin Randall, Australia
Yoonho Song, South Korea
Joaquin Torres-Rodriguez, Mexico
Toshihiro Uchida, Japan
François-David Vuataz, Switzerland
Kasumi Yasukawa, Japan

The members of this group submit geothermal news from their parts of the world, or relevant to their areas of specialization. If you have some news, a report, or an article for IGA News, you can send it to any of the above individuals, or directly to the IGA Secretariat, whatever is most convenient. Please help us to become essential reading for anyone seeking the latest information on geothermal worldwide.

While the editorial team make every effort to ensure accuracy, the opinions expressed in contributed articles remain those of the authors and are not necessarily those of the IGA.

Send IGA News contributions to:
IGA Secretariat, c/o Samorka
Sudurlandsbraut 48, 108 Reykjavík, Iceland
fax: +354-588-4431
e-mail: iga@samorka.is

This issue of IGA News was edited by Eduardo Iglesias. John Garnish proofread the articles. Produced by Gestur Gíslason for the IGA Secretariat. Design layout by François Vuataz.

Application for membership

Please complete the following form and return it with payment to:

International Geothermal Association Secretariat
c/o Samorka
Sudurlandsbraut 48, 108 Reykjavik, Iceland
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