

Geothermal Resources Council Annual Meeting 2011

(Geothermal 2011)

Geothermal Resources Council Transactions Volume 35

**San Diego, California, USA
23-26 October 2011**

Volume 1 of 2

**ISBN: 978-1-61839-482-8
ISSN: 0193-5933**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2011) by the Geothermal Resources Council
All rights reserved.

Printed by Curran Associates, Inc. (2012)

For permission requests, please contact the Geothermal Resources Council
at the address below.

Geothermal Resources Council
P.O. Box 1350
Davis, California 95617

Phone: (530) 758-2360
Fax: (530) 758-2839

grc@geothermal.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Business Development

Atkin, J. R., A. S. Piccola, and B. D. Dufour.	3
<i>Making Your Construction Documents Financeable</i>	
Elíasson, L. and C. Smith.	7
<i>When Smaller Is Better – Cost/Size/Risk Analysis of Geothermal Projects</i>	
Gowda, V., M. Hogue, and J. Moore	11
<i>Geothermal Economics Calculator (GEC) – A Tool for Estimating Geothermal Economics and Economic Impacts Associated with Geothermal Development</i>	
Hand, D., L. Mink, D. Silveria, and L. Culp.	15
<i>Paisley Oregon Geothermal Project</i>	
Harsoprayitno, S.	19
<i>Geothermal Development in Indonesia – Dream or Reality?</i>	
McIlveen, J.	25
<i>A Geothermal Incentive Design</i>	
McIlveen, J.	29
<i>Valuation of Geothermal Projects</i>	
Mwangi, J. and D. Langat	33
<i>Bridging the Gap Between Project Planning and Execution – A Case of Menengai Geothermal Prospect of Geothermal Development Company in Kenya</i>	
Mwenda, G.	39
<i>Financing of Geothermal Power Projects in Kenya: A Developing Country Model</i>	
Nelson, G.	45
<i>Geothermal Potential Could be Hot in the Western US</i>	
Nelson, G.	49
<i>Utility Geothermal Working Group 2011 Update</i>	
Nordquist, J.	53
<i>Jersey Valley 15 MW Geothermal Project</i>	
Peterson, R.	59
<i>Bonding Requirements for Exploration, Utilization, and Transmission on Public Land</i>	
Piszczałski, M.	63
<i>Geothermal Permitting – The Business Risks, Potential Regulatory Solutions</i>	
Shevenell, L. and R. Zehner	67
<i>Status of Nevada Geothermal Resource Development – Spring 2011</i>	
Turaga, U., V. Shemberkar, A. K. Kacham, L. Vemula, B. Uppala, H. Achanta, and U. Parameswaran	73
<i>Assessing Innovation in Geothermal Energy Technologies: A Review of the Patent Landscape</i>	
Vice, D.	77
<i>The Burlington Northern Mineral Exploration Program</i>	

Welhan, J. A., M. O. McCurry, D. D. Anderson, J. S. Walker, L. H. Beaty, and C. Sato	81
<i>Building Tribal Economic Diversity Through Geothermal R & D</i>	

Case Studies

Bennett, K., K. Li, and R. Horne	85
<i>Power Generation Potential from Coproduced Fluids in the Los Angeles Basin</i>	
Boyd, T. and J. W. Lund.	91
<i>Trials and Tribulation of the Oregon Institute of Technology Small-Scale Power Plant</i>	
Heaps, C.	95
<i>Sage Grouse and Geothermal Development: A Case Study</i>	
McDowell, J. and P. White	99
<i>Updated Resource Assessment and 3D Geological Model of the Mita Geothermal System, Guatemala</i>	

Direct Use

Chuanshan, D., L. Xuezhang, L. Haiyan, and J. Wenjing.	111
<i>Natural Convection Modeling in an Open-Ended Square Cavity Partially Filled with Porous Media</i>	
Dell, R., C. Wei, G. Sidebotham, V. Guido, J. Cataldo, R UnnÞórsson, M. T. Jonasson, T. Þórðarson, K. Smolar, and A. Bronfman.	115
<i>Geothermal Heat in Agriculture: Preliminary Results of an Energy Intensive System in Iceland</i>	
Kiruja, J., and M. Mburu	123
<i>Proposal on the Use of Geothermal Brine for Space Cooling in Kenya</i>	
Mburu, M., and S. Kinyanjui	129
<i>Cascaded Use of Geothermal Energy: Eburru Case Study</i>	
Setiani, P., J. Vilcáez, N. Watanabe, A. Kishita, and N. Tsuchiya	135
<i>Sustainable and Enhanced Hydrogen Production from Biomass through Sulfur Redox Cycle Using Georeactor</i>	
Toth, A. N.	139
<i>Geothermal Potential of an Abandoned Copper Mine</i>	
Tsuchiya, N. and N. Watanabe	143
<i>Advanced Direct Use of Geothermal Energy for Hydrogen Production and Material Conversion</i>	

Drilling

Asmundsson, R., R. A. Normann, H. Lubotzki, and E. Schill	149
<i>High Temperature Downhole Tools for Enhanced and Supercritical Geothermal Systems</i>	
Dick, A., C. Freyer, J. Macpherson, J. Oppelt, and D. Patterson	151
<i>Governments and Private Companies in the United States and Germany Partner to Drive Development of Innovative Geothermal Drilling, Evaluation and Completion Technologies</i>	

Diek, A., L. White, J. Roegiers, and D. Blankenship	159
<i>A Fully Coupled Thermoporoelastic Model for Drilling in Geological Formations</i>	
Gollmyer, E., S. Mitchell, A. Bailey, B. Rickard, and S. Pye	165
<i>Casing Protection for Geothermal Wells</i>	
Ito, S., K. Hayashi, and K. Nagano	169
<i>Characterization of a Hydraulic Fracture in the Higashi-Hachimantai Geothermal Model Field, Japan, Based on Fluid Dynamics</i>	
Kaya, T., F. Ulgun, H. Bitlis, C. Daskin, U. Kormaz, A. Ersoy, M. Hosbas, C. Satkan, I. Oglu, and F. Simsek	173
<i>Experiences in Geothermal Deep Well Drilling of TPIC in Turkey</i>	
Listi, R., J. Tuttle, and N. Peterson	181
<i>Protecting Your Payzone</i>	
Lyon, R., J. Montegu, R. De Angelis, J. Stefanic, and M. Cruz	185
<i>Diamond Drilling — A Proven Geothermal Exploration Technology for Latin America</i>	
Mansure, A. J. and D. A. Blankenship	189
<i>Geothermal Well Cost Update 2011</i>	
Meade, D., M. Lazaro, S. Bjornstad, S. Alm, A. Tiedeman, A. Sabin, and C. Page	193
<i>Results of the US Navy Geothermal Program Office 2010 Drilling Project at Hawthorne Army Depot, Nevada</i>	
Mibei, G.	197
<i>Bentonite Deposits in Kenya as Drilling Mud</i>	
Mijarez, R., A. Aragón, and S. Santoyo-Gutiérrez	203
<i>Analysis of Thermal Behavior of Materials to be used as Insulators in Logging Tools for Oil Wells</i>	
Miyora, T.	207
<i>Controlled Directional Drilling in Kenya and Iceland (Time Analysis)</i>	
Orazzini, S., R. Kasirin, G. Ferrari, A. Bertini, I. Bizzocchi, R. Ford, Q. Li, and M. Zhang	215
<i>New Roller Cone Bit Technology for Geothermal Application Significantly Increases On-Bottom Drilling Hours</i>	
Rickard, B., A. S. Samuel, B. Alarcon, A. Bailey, and W. Howard,	225
<i>Reverse Circulation Cementing of Geothermal Wells: A Comparison of Methods</i>	
Rickard, B., A. Samuel, C. Lee, P. Spielman, I. Cuadros, J. Long, and E. Robert	229
<i>KS 14 Puna Geothermal Venture: Flawless Execution of Aerated Mud Drilling with Mud Motor in Hostile Environment</i>	
Sanyal, S. K. and J. W. Morrow	233
<i>An Investigation of Drilling Success in Geothermal Exploration, Development and Operation</i>	
Stacey, R., S. Sanyal, J. Potter, and T. Wideman	239
<i>Effectiveness of Selective Borehole Enlargement to Improve Flow Performance of Geothermal Wells</i>	

Sugama, T., T. Butcher, L. Brothers, and D. Bour	247
<i>Temporary Cementitious Sealing Materials</i>	
Sumotarto, U., E. Supriyanto, M. Affif, and S. D. Nugroho	255
<i>Deep Top Cementing Job – A Lesson Learnt from a Geothermal Well Drilling in Indonesia</i>	
Suryanarayana, P. V., P. Sachdeva, I. Ceyhan, and G. Ring.	263
<i>System Design Alternatives and their Influence on Geothermal Heat Recovery from Co-Produced Oil & Gas Wells</i>	
Voronov, O. A. and B. H. Kear	273
<i>Enhancement of Geothermal Well Drilling and Brine Pumping Efficiency using TIC/TI Composites</i>	
Walsh, S. D. C., I. Lomov, and J. Roberts.	277
<i>Geomechanical Modeling for Thermal Spallation Drilling</i>	
Wideman, T. W., N. J. Sazdanoff, J. G. Unzelman-Langsdorf, and J. M. Potter	283
<i>Hydrothermal Spallation for the Treatment of Hydrothermal and EGS Wells: A Cost-Effective Method for Substantially Increasing Reservoir Production Flow Rates</i>	

Enhanced Geothermal Systems (EGS)

Andrews, J. R., J. M. Reyes-Montes, and R. P. Young	289
<i>Continuous Microseismic Record Analysis for Reservoir Hydrofracture Treatments</i>	
Asanuma, H., K. Tamakwa, H. Niitsuma, R. Baria, and M. Häring.	295
<i>Reflection Imaging of EGS Reservoirs at Soultz and Basel Using Microseismic Multiplets as a Source</i>	
Ayling, B., P. Rose, and S. Petty	301
<i>Using QEMSCAN to Characterize Fracture Mineralization at the Newberry Volcano EGS Project, Oregon: A Pilot Study</i>	
Chandra, D., C. Conrad, D. Hall, N. Montebello, E. Phelan, A. Weiner, A. Narasimharaju, V. Rajput, S. Pisupati, U. Turaga, G. Izadi, and D. Elsworth	307
<i>Combined scCO₂-EGS IGCC to Reduce Carbon Emissions from Power Generation in the Desert Southwestern United States (New Mexico)</i>	
Cladouhos, T. T., M. Clyne, M. Nichols, S. Petty, W. L. Osborn, and L. Nofziger	317
<i>Newberry Volcano EGS Demonstration Stimulation Modeling</i>	
Davatzes, N. and S. Hickman	323
<i>Preliminary Analysis Stress in the Newberry EGS Well 55-29</i>	
Fakcharoenphol, P. and Y. Wu	333
<i>A Fully-Coupled Flow-Geomechanics Model for Fluid and Heat Flow in Geothermal Reservoirs</i>	
Fetterman, J. D., and N. Davatzes	339
<i>Evolution of Porosity in Fractures in the Newberry Volcano Geothermal System, Oregon, USA: Feedback between Deformation and Alteration</i>	
Friðleifsson, G. Ó., A. Albertsson, W. Elders, Ó. Sigurdsson, R. Karlsdóttir, and B. Pálsson	347
<i>The Iceland Deep Drilling Project (IDDP): Planning for the Second Deep Well at Reykjanes</i>	

Fu, P., S. M. Johnson, and C. R. Carrigan.	355
<i>Investigation of Stimulation-Response Relationships for Complex Fracture Systems in Enhanced Geothermal Reservoirs</i>	
Gentier, S., X. Rachez, M. Peter-Borie, A. Blaisonneau, and B. Sanjuan.	363
<i>Transport and Flow Modelling of the Deep Geothermal Exchanger Between Wells at Soultz-sous-Forêts (France)</i>	
Gritto, R., S. Jarpe, K. Boyle, and L. Hutchings	371
<i>Investigations of Temporal Seismic Velocity Variations at The Geysers Geothermal Field</i>	
Henfling, J., F. Maldonado, S. Lindblom, J. Greving, D. Chavira, M. Vaughn, and J. Uhl	375
<i>Dewarless High Temperature Seismic Tool for EGS</i>	
Huang, H., P. Meakin, R. Podgorney, S. Deng, and C. Lu	383
<i>Physics-based Modeling of Fracturing and Permeability Evolution in Engineered Geothermal Reservoirs</i>	
Iovenitti, J., D. Blackwell, J. Sainsbury, I. Tibuleac, A. Waibel, T. Cladouhos, R. Karlin, B. M. Kennedy, E. Issaks, P. Wannamaker, M. Clynes, and O. Callahan	389
<i>EGS Exploration Methodology Development using the Dixie Valley Geothermal District as a Calibration Site: A Progress Report</i>	
Izadi, G., B. Zheng, J. Taron, and D. Elsworth,	397
<i>Evolution of Permeability and Triggered Seismicity: Fluid Pressure, Thermal and Chemical Effects in Enhanced Geothermal Systems</i>	
Kalinina, E., T. Hadgu, S. McKenna, and T. Lowry	407
<i>Bridging the Gap between Complex Numerical Modeling and Rapid Scenario Assessment: A Dimensionless Parameter Approach for Enhanced Geothermal Systems</i>	
Kelkar, S., G. Zyvoloski, S. Rapaka, and K. Lewis	413
<i>Modeling Shear Failure and Permeability Enhancement Due to Coupled Thermal- Hydrological-Mechanical Processes in Enhanced Geothermal Reservoirs</i>	
Klapperer, S., I. Moeck, and B. Norden	419
<i>Regional 3D Geological Modeling and Stress Field Analysis at the CO₂ Storage Site of Ketzin, Germany</i>	
Klenner, R., W. Gosnold, J. Heine, M. Severson, and S. Hauck	425
<i>An Assessment of Heat Flow and Enhanced Geothermal System Resources in Minnesota</i>	
Koh, J., A. R. Shaik, and S. S. Rahman.	431
<i>An Innovative 3D Thermo-Poroelastic Model for Studying the Long Term Behavior of Geothermal Systems</i>	
Kumar, D. and M. Gutierrez	439
<i>Development of Two-Dimensional Hydro-Thermal Fracture Model for Enhanced Geothermal Systems</i>	
Leary, P., and P. Malin.	445
<i>Is This Flow Modelling Sufficient for EGS/HSA Geothermal Energy Production?</i>	
Leidig, M., D. Reiter, A. Ferris, and W. Rodi	451
<i>Induced Seismicity Monitoring Tools for the Geothermal Environment</i>	

Liu, H., S. Mukhopadhyay, N. Spycher, and B. M. Kennedy.	457
<i>Analytical Solutions of Tracer Transport in Fractured Rock Associated with Precipitation-Dissolution Reactions</i>	
Lowry, T., E. Kalinina, T. Hadgu, and S. A. McKenna	465
<i>Modeling the Risk of Geothermal Energy Production Using GT-Mod</i>	
Lutz, S. J., A. Zutshi, A. Robertson-Tait, P. Drakos, and E. Zemach	469
<i>Lithologies, Hydrothermal Alteration, and Rock Mechanical Properties in Wells 15-12 and BCH-3, Bradys Hot Springs, Nevada</i>	
Morgan, P., and B. Scott	477
<i>Bottom-Hole Temperature Data from the Piceance Basin, Colorado: Indications for Prospective Sedimentary Basin EGS Resources</i>	
Mukuhira, Y., H. Asanuma, H. Niitsuma, and M. Häring.	487
<i>Identification of Fracture Orientation for Large Induced Seismicity Recorded at Basel, Switzerland in 2006</i>	
Ohren, M., D. Benoit, M. Kumataka, and M. Morrison	493
<i>Permeability Recovery and Enhancements in the Soda Lake Geothermal Field, Fallon, Nevada</i>	
Osborn, W. L., S. Petty, T. T. Cladouhos, J. Iovenitti, L. Nofziger, O. Callahan, D. Perry, and P. L. Stern.	499
<i>Newberry Volcano EGS Demonstration — Phase I Results</i>	
Peter-Borie, M., and S. Gentier	507
<i>From the Tectonic and Structural Analysis towards a Fault Network Model for Hydraulically Modeling the Soultz EGS (France)</i>	
Petty, S., D. Bour, Y. Nordin, and L. Nofziger.	515
<i>Temporary Diverters for EGS Reservoir Optimization — Field Applications</i>	
Randolph, J. B., and M. O. Saar	521
<i>Impact of Reservoir Permeability on the Choice of Subsurface Geothermal Heat Exchange Fluid: CO₂ versus Water and Native Brine</i>	
Shembekar, V., and U. Turaga	527
<i>Towards Affordable Geothermal Power: Economic Impacts of Innovation and New Technology</i>	
Smith, M. M., T. J. Wolery, and S. A. Carroll.	533
<i>Chlorite Kinetics and Impact on EGS-CO₂</i>	
Sugama, T. , S. Gill, L. Ecker, T. Butcher, and D. Bour	539
<i>Susceptibility of Granite Rock to scCO₂/Water at 200°C and 250°C</i>	
Tafti, T. A., and F. Aminzadeh	547
<i>Fracture Characterization at The Geysers Geothermal Field using Time Lapse Velocity Modeling, Fractal Analysis, and Microseismic Monitoring</i>	
Thoram, S., and C. Ehlig-Economides	553
<i>Extending Shale Gas Well Life with Low Grade Geothermal Power — Haynesville Case</i>	
Turaga, U., V. Shembekar, A. Mohan, S. Pisupati, and D. Elsworth.	561
<i>Pairing of an Integrated Gasification Combined Cycle Power Plant (IGCC) with CO₂-EGS as a Strategy for Deployment in Arid Regions</i>	

Wamalwa, H.	567
<i>Enhanced Geothermal Systems Towards Environmental Management in Kenya: Case Study at Olkaria Geothermal Project</i>	
Zhao, X., J. M. Reyes-Montes, J. R. Andrews, and R. P. Young	573
<i>Optimized EGS Reservoir Stimulation using Microseismic and Numerical Methods</i>	

Environmental

Batts, D., and A. Gentile	583
<i>Tools to Facilitate Lease Nominations and Permitting for Geothermal Development on Federal Lands</i>	
Benn, B., K. E. McIntush, C. A. M. Beitler, D. L. Mamrosh, and O. E. Hileman	587
<i>Unit 14/Sulphur Springs H₂S Abatement Process Screening and Stretford Improvements Study – Part 2</i>	
Clark, C., C. Harto, J. Sullivan, and M. Wang	593
<i>Water Use and Geothermal Power Plants</i>	
Pina, C., M. Flores, and J. Hernandez	597
<i>Boron Removal of Steam Condensate, from Los Humeros and Los Azufres Geothermal Fields in Mexico, using Reverse Osmosis Process</i>	

Geochemistry

Barragán, R. M., V. M. Arellano, A. Mendoza, and L. Reyes	603
<i>Chemical and Isotopic ($\delta^{18}\text{O}$, δD) Behavior of Los Azufres (Mexico) Geothermal Fluids Related to Injection as Indicated by 2010 Data</i>	
Gallup, D. L.	609
<i>Brine pH Modification Scale Control Technology. 2. A Review</i>	
Haizlip, J., and F. S. Tut.	615
<i>High Noncondensable Gas Liquid Dominated Geothermal Reservoir, Kizildere, Turkey</i>	
Igunza, G., and I. Kanda	619
<i>Geochemical Characteristics of the Mwananyamala Geothermal Prospect in the Kenyan Coast</i>	
Izquierdo, G., A. Aragon, and D. Diaz	625
<i>Evidence of Deep Acid Fluids in the Los Humeros Geothermal System, Mexico</i>	
Kanda, I.	631
<i>Aquifer Fluid Chemistry Characteristics for the Domes Geothermal Wellfield at Olkaria, Kenya</i>	
Kipng'ok, J.	637
<i>Geochemical Assessment of Korosi-Chepchuk Geothermal Prospect, Kenya Rift Valley</i>	
Klein, K., and L. Gaines	645
<i>Reducing Foreign Lithium Dependence through Co-Production of Lithium from Geothermal Brine</i>	

Malimo, S. J.	651
<i>Use of Radon and Carbon Dioxide in Geochemical Exploration – Case Study of Silali Geothermal Project, Kenya</i>	
Shevenell, L., and M. Coolbaugh	657
<i>A New Method of Evaluation of Chemical Geothermometers for Calculating Reservoir Temperatures from Thermal Springs in Nevada</i>	
Spycher, N., E. Sonnenthal, and B. M. Kennedy	663
<i>Integrating Multicomponent Chemical Geothermometry with Parameter Estimation Computations for Geothermal Exploration</i>	

Geology/Exploration

Akar, S., O. Atalay, Ö. Ç. Kuyumcu, U. Z. D. Solaroğlu, B. Çolpan, and S. Arzuman	669
<i>3D Subsurface Modeling of Gümüşköy Geothermal Area, Aydın, Turkey</i>	
Albrecht, M., F. Goff, J. Gardner, S. Kelley, G. WoldeGabriel, W. Dewhurst, P. Sirles, and G. Kaufman	677
<i>Multi-Disciplinary and Integrated Geothermal Exploration at the Pueblo of Jemez, New Mexico</i>	
Allis, R., J. Moore, B. Blackett, M. Gwynn, S. Kirby, and D. Sprinkel	683
<i>The Potential for Basin-Centered Geothermal Resources in the Great Basin</i>	
Arcos, R., J. Clavero, A. Giavelli, S. Simmons, I. Aguirre, S. Martini, C. Mayorga, G. Pineda, J. Parra, and J. Soffia	689
<i>Surface Exploration at Pampa Lirima Geothermal Project, Central Andes of Northern Chile</i>	
Autenrieth, K. D., M. McCurry, J. Welhan, and S. Polun	695
<i>Conceptual Subsurface Model of the Blackfoot Volcanic Field, Southeast Idaho: A Potential Hidden Geothermal Resource</i>	
Benavente, O., and F. Gutiérrez	699
<i>Magmatic-Hydrothermal System Associated to Planchon-Peteroa and Descabezado Grande-Quizapu-Cerro Azul Volcanic Complexes, VII Region, Chile</i>	
Bennett, S.	703
<i>Geothermal Potential of Transtensional Plate Boundaries</i>	
Biasi, G., and L. Preston	709
<i>Regional P-Wave Tomographic Imaging with Geothermal Application</i>	
Bjornstad, S., S. Alm, W. Huang, A. Tiedeman, L. Frazier, C. Page, A. Sabin, and D. Veazey	713
<i>An Update on Geothermal Energy Resource Investigations, Chocolate Mountains Aerial Gunnery Range, Imperial Valley, California</i>	
Blackett, R.	721
<i>Temperature Profiles of Groundwater Monitor Wells in Western Juab and Millard Counties, Utah</i>	
Boschmann, D. E., J. Dilles, A. Meigs, and P. Walsh	727
<i>Structural and Volcanic Evolution of the Glass Buttes Area, Oregon</i>	

Clavero, J., G. Pineda, C. Mayorga, A. Giavelli, I. Aguirre, S. Simmons, S. Martini, J. Soffia, R. Arriaza, E. Polanco, and L. Achurra	731
<i>Geological, Geochemical, Geophysical and First Drilling Data from Tinguiririca Geothermal Area, Central Chile</i>	
Crowell, A. M., and W. Gosnold	735
<i>Correcting Bottom-Hole Temperatures: A Look at the Permian Basin (Texas), Anadarko and Arkoma Basins (Oklahoma), and Williston Basin (North Dakota)</i>	
Dingwall, R., and D. Blackwell	739
<i>Geothermal Map of Colorado, Wyoming, Montana, and Nebraska</i>	
Dougherty, A. J., and B. Y. Lynne.	743
<i>Utilizing Ground Penetrating Radar and Infrared Thermography to Image Vents and Fractures in Geothermal Environments</i>	
Drakos, P., P. Spielman, and G. Björnsson.	751
<i>Jersey Valley Exploration and Development</i>	
Easley, E., L. Garchar, M. Bennett, B. Beasley, R. Vest Woolf, and J. Hoopes	761
<i>Investigation of Geothermal Resource Potential in the Northern Rio Grande Rift, Colorado and New Mexico, USA</i>	
Ellis, R.	769
<i>A Restated Conceptual Resource Model for the Humboldt House-Rye Patch Geothermal Area, Pershing County, Nevada</i>	
Faulds, J. E., N. H. Hinz, M. F. Coolbaugh, P. H. Cashman, C. Kratt, G. Dering, J. Edwards, B. Mayhew, and H. McLachlan	777
<i>Assessment of Favorable Structural Settings of Geothermal Systems in the Great Basin, Western USA</i>	
Fowler, A. P. G., M. Wildgoose, R. Zierenberg, P. Schiffman, and G. Suemnicht	785
<i>Hydrothermal Alteration and Geochemistry in Core Hole BC12-31: Implications for Segregation of Transient Flow Regimes in the Long Valley Geothermal System</i>	
Gerner, E., A. J. Meixner, A. Kirkby, R. Weber, D. Champion, A. Budd, and T. Jones	791
<i>Heat Flow Determinations and Geothermal Potential Assessment of the Australian Continent: Support for an Emerging Geothermal Industry</i>	
Gosnold, W., J. Majorowicz, R. Klenner, and S. Hauck	795
<i>Implications of Post-Glacial Warming for Northern Hemisphere Heat Flow</i>	
Hardwick, C. L., and D. S. Chapman.	801
<i>Geophysical Delineation of the Crater Bench, Utah, Geothermal System</i>	
Haselwimmer, C., A. Prakash, and G. Holdmann	805
<i>Geothermal Exploration at Pilgrim Hot Springs, Alaska using Airborne Thermal Infrared Remote Sensing</i>	
Helton, E., J. W. Bell, P. H. Cashman, M. Lazaro, and S. Alm	811
<i>Structural Analysis of Southern Dixie Valley using LiDAR and Low-Sun-Angle Aerial Photography, NAS Fallon Geothermal Exploration Project, Dixie Valley, Nevada</i>	

Hickson, C. J., F. Ferraris, C. Rodriguez, G. Sielfeld, R. Henriquez, T. Gislason, J. Selters, D. Benoit, P. White, J. Southon, G. Ussher, J. Charroy, A. Smith, B. Lovelock, J. Lawless, O. Quinlivan, L. Smith, and R. Yehia	817
<i>The Mariposa Geothermal System, Chile</i>	
Hinz, N. H., J. E. Faulds, and C. Stroup	827
<i>Stratigraphic and Structural Framework of the Reese River Geothermal Area, Lander County, Nevada: A New Conceptual Structural Model</i>	
Huang, L., S. Kelley, Z. Zhang, K. Rehfeldt, M. Albrecht, and G. Kaufman	833
<i>Imaging Faults with Reverse-Time Migration for Geothermal Exploration at Jemez Pueblo in New Mexico</i>	
Kessler, J., and J. P. Evans	839
<i>Fracture Distribution in Slimholes Drilled for Project Hotspot: The Snake River Geothermal Drilling Project and the Implications for Fluid Flow</i>	
Klingel, E. J., T. Fischer, and J. Hanson.	843
<i>Shallow Hydrothermal Gas Sampling and Analysis as an Exploration Tool for Magmatic Geothermal Sources</i>	
Kolker, A., A. Bailey, and W. Howard	847
<i>The 2010 Akutan Exploratory Drilling Program: Preliminary Findings</i>	
Kratt, C.	853
<i>Hyperspectral, Shallow Temperature, and Gravity Surveys: A Roundup of Recent Exploration Activity at Silver Peak, Alum, and Columbus Salt Marsh, Esmeralda County, Nevada</i>	
Kuyumcu, Ö. Ç., U. Z. D. Solaroğlu, S. Hallinan, B. Çolpan, E. Turkoğlu, and W. Soyer	861
<i>Interpretation of 3D Magnetotelluric (MT) Surveys: Basement Conductors of the Menderes Massif, Western Turkey</i>	
Lamb, A., C. Kratt, and W. Calvin	867
<i>Geothermal Exploration using Hyperspectral Analysis over Dixie and Fairview Valleys, Nevada</i>	
Lazaro, M., S. Alm, A. Tiedeman, C. Page, D. Meade, J. Shoffner, and K. Bucher.	873
<i>Department of the Navy Geothermal Exploration on Naval Air Station Fallon (NASF) Managed Lands in Dixie Valley, Nevada</i>	
Legault, J. M., J. B. Witter, P. Berardelli, S. Lombardo, and M. Orta	879
<i>Recent ZTEM Airborne AFMAG EM Survey Results over Reese River and other Geothermal Test Areas</i>	
Lynne, B. Y., M. Pender, and T. Glynn-Morris.	885
<i>Insights into Geothermal Subsurface Processes from Core at Steamboat Springs, USA, and Tauhara, New Zealand, using 3D Scanning Electron Microscopy Imaging</i>	
Makovsky, K. S., S. Pezzopane, L. Culp, L. Mink, D. Hand, D. Silveria, E. Colohan, M. Doublas, and K. Johnson	889
<i>Evolution of the Northwest Basin and Range Province: Implications for Geothermal Exploration in Southeast Oregon</i>	

Martini, B., C. Lide, L. Owens, P. Walsh, B. Delwiche, and A. Payne.	897
<i>Geothermal Resource Definition at Mt. Spurr, Alaska</i>	
Massiot, C., G. Bignall, S. Alcaraz, A. Rae, F. Sepulveda, and H. van Moerkerk	905
<i>Testing the Effectiveness of Leapfrog Geothermal 3D Integrated Geological Modelling as a Geothermal Resource Exploration and Management Tool</i>	
Mboin, I.	911
<i>Application of Landsat TM Satellite Imagery to Map Geothermal Resources and Land Cover: Case Study of Silali Prospect</i>	
McCurry, M., J. Welhan, S. Polun, and K. Autenrieth.	917
<i>Geothermal Potential of the Blackfoot-Soda Springs Volcanic Field: A Hidden Geothermal Resource and Natural Laboratory in SE Idaho</i>	
McLachlan, H., W. R. Benoit, and J. Faulds.	925
<i>Structure Framework of the Soda Lake Geothermal Area, Churchill County, Nevada</i>	
Mousavi, Z., A. Darvishzadeh, J. Ghalamghash, and M. V. Abedini.	931
<i>Discusion on Stratigraphy Questions at Sabalan Volcano and Sabalan Geothermal Exploration Project, Meshkinshahr, Iran</i>	
Muñoz, M., M. A. Alam, M. A. Parada, and A. Lahsen.	935
<i>Geothermal System Associated with the Sierra Nevada Volcano, Araucania Region, Chile</i>	
Mutua, J., and G. Mibei	943
<i>Remote Sensing Application in Geothermal Exploration: Case Study of Barrier Volcanic Complex, Kenya</i>	
Nash, G.	949
<i>Volcan Casita, Nicaragua: A GIS Based Geothermal Assessment</i>	
Ng'eno, D., and L. Ochieng	955
<i>Geothermal Exploration in the Kenya Rift: A Case Study of Silali Geothermal Prospect</i>	
Payne, J., J. Bell, W. Calvin, and K. Spinks.	961
<i>Active Fault Structure and Potential High Temperature Geothermal Systems: Lidar Analysis of the Gabbs Valley, Nevada, Fault System</i>	
Potter, K., R. Bradshaw, C. J. Sant, J. King, J. W. Shervais, and E. J. Christiansen.	967
<i>Project Hotspot: Insight into the Subsurface Stratigraphy and Geothermal Potential of the Snake River Plain</i>	
Powell, T.	973
<i>Natural Subsidence at the Rotokawa Geothermal Field and Implications for Permeability Development</i>	
Price, L., T. S. Powell, and L. Atkinson.	977
<i>Geothermal Fluid Evolution at Rotokawa: Hydrothermal Alteration Indicators</i>	
Reyes, N., A. Vidal, E. Ramirez, K. Arnason, B. Richter, B. Steingrímsson, O. Acosta, and J. Camacho	983
<i>Geothermal Exploration at Irruputuncu and Olca Volcanoes: Pursuing a Sustainable Mining Development in Chile</i>	

Sant, C. J., and J. W. Shervais.	987
<i>Project Hotspot: Preliminary Analysis of Secondary Mineralization in Basaltic Core, Central Snake River Plain</i>	
Shako, L.	991
<i>Determination of Reservoir Extent and Priority Drilling Zones in a Geothermal Prospect Using GIS (A Case for Paka Geothermal Project)</i>	
Shervais, J. W., J. P. Evans, E. J. Christiansen, D. R. Schmitt, L. M. Liberty, D. D. Blackwell, J. M. Glen, J. E. Kessler, K. E. Potter, M. M. Jean, C. J. Sant, and T. G. Freeman	995
<i>Hotspot: The Snake River Geothermal Drilling Project — An Overview</i>	
Shevenell, L., G. Johnson, R. Zehner, and R. Penfield	1005
<i>New Geothermal Map Products at the Nevada Bureau of Mines and Geology as Part of the National Geothermal Data System</i>	
Shevenell, L., and R. Zehner.	1009
<i>Recent Exploration Activity in Nevada — Spring 2011</i>	
Skord, J., P. H. Cashman, M. Coolbaugh, and N. Hinz,	1017
<i>Mapping Hydrothermal Upwelling and Outflow Zones: Preliminary Results from Two-Meter Temperature Data and Geologic Analysis at Lee Allen Springs and Salt Well Basin</i>	
Skord, J., C. Sladek, M. Coolbaugh, P. H. Cashman, M. Lazaro, and C. Kratt.	1023
<i>Two-Meter Temperature Surveys for Geothermal Exploration Project at NAS Fallon</i>	
Susanto, A., N. Tsuchiya, E. Suparka, N. Hirano, A. Kishita, and Y. I. Kusumah	1029
<i>Geology and Surface Hydrothermal Alteration of Malabar Area, Northern Part of the Wayang Windu Geothermal Field, Indonesia</i>	
Thorsteinsson, H., and A. I. Greene.	1033
<i>Exploration Technologies Roadmapping</i>	
Tiedeman, A., S. Bjornstad, S. Alm, L. Frazier, D. Meade, C. Page, M. Lazaro, J. Woolford, and B. Crowder.	1037
<i>Intermediate Depth Drilling and Geophysical Logging Results at Superstition Mountain, Naval Air Facility El Centro, California</i>	
Waibel, A.	1045
<i>Structural Controls on the Location of Geothermal Cells in and adjacent to Dixie Valley, Nevada</i>	
Wamalwa, L.	1053
<i>Multi-Criteria Suitability Modelling for Geothermal Exploration Well Siting — A Case Study of the Silali Geothermal Prospect, North Rift Kenya</i>	
Weides, S., I. Moeck, and E. Huenges.	1061
<i>Exploration of Geothermal Resources in the Central Alberta Basin (Canada)</i>	
Williams, M. and D. Blackwell	1065
<i>2011 Geothermal Map of Arizona and New Mexico</i>	

Heat Pump

Chiasson, A.	1071
<i>Technical and Economic Feasibility of a District Hybrid Geothermal Heat Pump System in a Cold Climate</i>	

Chuanshan, D., X. Siming, L. Haiyan, Y. Wang, and S. Pingle	1077
<i>A Case Study of Space Heating using a Downhole Heat Exchanger in China</i>	
Clutter, T. J.	1081
<i>GEO — A New Advocate for the U.S. Geothermal Heat Pump Industry</i>	
Farrer, R., R. Corff, and G. Nelson	1087
<i>The First Year of Implementing the Oklahoma Comfort Program</i>	
Fu, W., J. Zhu, and W. Zhang	1091
<i>Thermal Response Test for Borehole Thermal Properties in Tianjin</i>	
Fujii, H., Y. Komaniwa, T. Nomoto, and N. Chou	1095
<i>Reduction of Thermal Resistance of Ground Heat Exchangers using Large Grain Size Materials</i>	
Fujimoto, M., H. Fujii, K. Nagano, and A. Hiromatsu	1101
<i>Numerical Modeling of Large-Scale Cluster of Vertical Ground Heat Exchangers</i>	
Glassley, W., and E. Battocletti	1107
<i>Measuring the Costs and Economic, Social, and Environmental Benefits of Nationwide Geothermal Heat Pump Deployment: A Progress Report on the Geological Impacts</i>	
Gu, J., H. Wang, and C. Qi	1111
<i>Unsteady Simulation of Heat Transfer around a Borehole Heat Exchanger with Groundwater Flow</i>	
Haiyan, L., and C. Dai	1115
<i>Analysis of Different Heat Transfer of Different Utilization Ways in Shallow Geothermal Energy Applications</i>	
Henrich, D., and J. Geyer	1119
<i>Computer-Aided Design for Geothermal Heat Pump Systems</i>	
Li, T., J. Zhu, and W. Zhang	1121
<i>Principal Component Analysis of Heat Transfer for Ground Heat Exchanger</i>	
Slater, H., J. Kleissl, M. Datlen-Mino, M. Hernandez, C. Mendoza, M. Morris, R. Rethoret	1127
<i>E7: Heat Pump Water Heater MAE 171B: Mechanical Engineering Laboratory Course II</i>	
Wang, H., J. Lu, and C. Qi	1135
<i>Thermal Conductivity of Sand-Bentonite Mixtures as a Backfill Material of Geothermal Boreholes</i>	

International

Aguirre, I., J. Clavero, S. Simmons, A. Giavelli, C. Mayorga, J. M. Soffia	1141
<i>"Colpitas" — A New Geothermal Exploration Project in Chile</i>	
Alexander, K. B., and G. Ussher	1147
<i>Geothermal Resource Assessment for Mt. Longonot, Central Rift Valley, Kenya</i>	
Bendall, B., B. Goldstein, A. Long, and A. Budd	1155
<i>Converting Geothermal Plays to Projects in Australia — A National Review</i>	

Brophy, P., G. Nelson, Widiatmoko, and R. Majumdar	1159
<i>The Emerging Geothermal Development Sector in Indonesia</i>	
Chandrasekhar, V., and D. Chandrasekharam	1165
<i>Geothermal Systems in the Himalayas</i>	
Erbas, K., M. S. Jaya, I. Moeck, F. Deon, M. Brehme, S. Regenspurg, S. Frick, S. Kranz, R. Bäßler, and E. Huenges,	1169
<i>Concepts for Sustainable Geothermal Energy Development in Remote Geothermal Areas of Indonesia</i>	
Goldstein, B., G. Hiriart, L. Gutierrez-Negrin, J. Tester, R. Bertani, C. Bromley, E. Huenges, A. Ragnarsson, H. Muraoka, V. Zui, and M. Mongillo	1175
<i>Great Expectations for Geothermal to 2100 – Messages for Now</i>	
Kimball, S.	1185
<i>Resource, Infrastructure, and Market Factors in a Geothermal Favourability Map of British Columbia, Canada</i>	
Lu, Y., S. Song, C. Liu, and E. Yeh	1195
<i>Factors Controlling the Termination of a 3-Mw-Pilot Power Plant in the Chingshui Geothermal Field, Taiwan</i>	
Njue, L.	1201
<i>The Menengai Caldera Structure and its Relevance to Geothermal Potential</i>	
Rangel, G., A. Franco, R. Cabecas, and C. Ponte	1209
<i>Use of Geothermal Resources in the Azores Islands: A Contribution to the Energy Self-Sufficiency of a Remote and Isolated Region</i>	
Sanchez, P., D. Morata, A. Lahsen, and M. A. Parada	1215
<i>Current Status of Geothermal Exploration in Chile and the Role of the New Andean Geothermal Center of Excellence (CEGA)</i>	

Operations and Maintenance

Akasaka, C., I. Shimizu, S. Nakanishi, and S. Tezuka	1221
<i>A Large Wellfield Steam Explosion at the Onikobe Geothermal Power Station</i>	
Amend, B.	1227
<i>The Role of Specifications, Quality Assurance, and Inspection in the Successful Use of Corrosion-Resistant Alloys in Geothermal Applications</i>	
Carroll, P., C. Ershen, and T. Cushman	1233
<i>Level Measurement Challenges in Geothermal Power Plants and Improved Solutions</i>	
Dell, R., C. Wei, G. Sidebotham, M. T. Jonsson, and R. Unnþórsson	1237
<i>A Thermoelectric-Based Point of Use Power Generator for Steam Pipes</i>	
Gill, J. S., and G. T. Jacobs	1243
<i>Development of New Silica Inhibitor – Laboratory and Field Study</i>	
Kutschera, U. A. , Phair, K. A., and J. R. Avery	1249
<i>Development of a Computer Model of the Aidlin Geothermal Power Plant for Performance Monitoring, Performance Prediction, and Performance Improvement</i>	

Kuyumcu, Ö. Ç., U. Z. D. Solaroğlu, O. Atalay, S. Akar, B. Ipek, and M. Çiftçi	1255
<i>Perforation and Acidizing Applications of GK-3 Well, Gümüşköy Geothermal System, Aydın, Turkey</i>	
Weres, O.	1261
<i>Use Byproduct Carbon Dioxide to Control Scale and Hydrogen Sulfide</i>	
Yanagisawa, N., and T. Matsumura	1269
<i>Scale Removing and Preventing by Using High-Frequency Electrolysis System</i>	

Power Plant

Ashwood, A., and D. Bharathan	1275
<i>Hybrid Cooling Systems for Low-Temperature Geothermal Power Production</i>	
Buchanan, T., and L. Nickerson	1281
<i>Expansion and Repowering of Mammoth Geothermal Resource: Selection of Generation Cycle and Expander Technology</i>	
Cunningham, K., D. Clews, and M. Hurgin.	1285
<i>Extending Asset Life and Enhancng Value Through Steam Path Retrofits</i>	
Dickey, H. K., and D. R. Leger	1291
<i>Geothermal Resource Sustainability through Innovative Air Cooled Combined Cycle Hybrids</i>	
Dickey, H. K., G. Forscha, M. Forscha, G. Forscha, and R. Linden.	1295
<i>A New High Efficiency Binary Expander Design: Low Temperature Geothermal Application Bottoming Beowawe Geothermal Flash Plant</i>	
Gehringer, M.	1301
<i>Economic Cost Comparison of Geothermal and Other Technologies</i>	
Jalilinasrabad, S., R. Itoi, H. Gotoh, and R. Yamashiro	1305
<i>Exergetic Optimization of Proposed Takigami Binary Geothermal Power Plant, Oita, Japan</i>	
Kaleikini, M., P. Spielman, and T. Buchanan	1313
<i>Puna Geothermal Venture 8MW Expansion</i>	
Kaplan, U., Z. Reiss, and B. Sullivan	1315
<i>Evaporative Cooling Enhancement at the Steamboat Complex and Condenser Performance Research and Development Efforts</i>	
Louw, R., K. Wallace, and W. Harvey	1319
<i>Air Cooling Options for Flash Plants</i>	
Maedomari, J., and J. Avery.	1325
<i>Turbine Upgrade for Geysers Geothermal Power Plant</i>	
Pierce, M., K. Fryrear, and D. Marshall	1331
<i>Improving Binary Cycle Efficiency by Eliminating Parasitic Loads</i>	
Riaz, M., M. Sanchez, and S. Grace	1337
<i>Mitsubishi's Reliable Solutions and Domestic Service Infrastructure</i>	
Schuller, S.	1343
<i>Best Exergy Point For ORC</i>	

Welch, P., P. Boyle, M. Giron, and M. Sells.	1351
<i>Construction and Startup of Low Temperature Geothermal Power Plants</i>	
Wendt, D., and G. Mines	1357
<i>Effect of Ambient Design Temperature on Air-Cooled Binary Plant Output</i>	
Wendt, D., and G. Mines	1365
<i>Effect of Mixed Working Fluid Composition on Binary Cycle Condenser Heat Transfer Coefficients</i>	

Reservoir Engineering

Alaskar, M., M. Ames, C. Liu, S. Connor, R. Horne, K. Li, and Y. Cui.	1371
<i>Smart Nanosensors For In-Situ Temperature Measurement in Fractured Geothermal Reservoirs</i>	
Alvarez, R. R., and F. R. Cinco	1383
<i>Use of Wellbore Simulation as a Tool to Evaluate Well Issues in Mature Geothermal Fields</i>	
Aragón, A., G. Izquierdo, and V. Arellano	1389
<i>A Review of the Production Parameters for Analysis of the Reservoir Performance</i>	
Axelsson, G.	1393
<i>Using Long Case Histories to Study Hydrothermal Renewability and Sustainable Utilization</i>	
Buscheck, T. A., Y. Sun, Y. Hao, M. Chen, B. Court, M. A. Celia, W. L. Bourcier, and T. J. Wolery.	1401
<i>Geothermal Energy Production From Actively-Managed CO₂ Storage in Saline Formations</i>	
Co, C. K., and R. Horne	1411
<i>Characterization of Geothermal Interwell Connectivity Using Thermal and Tracer Data</i>	
Dawud, A. H., J. Roberts, A. Sugandhi, J. Setiawan, and P. Molling	1417
<i>The Comparison of Boron Cycling and Tracer Test Result at Darajat Geothermal Field and Its Usefulness for Production and Injection Management</i>	
Fahad, M. S., S. Rahman, and Y. Cinar	1425
<i>A Numerical and Experimental Procedure to Estimate Grid Based Effective Permeability Tensor for Geothermal Reservoirs</i>	
Gettings, P., D. S. Chapman, and R. G. Allis	1433
<i>4-D Gravity at The Geysers</i>	
Itoi, R., S. Yamashita, T. Tanaka, and J. Takayama.	1437
<i>Numerical Simulation of Reinjecting Water Return to Production Wells in Ogiri Geothermal Reservoir, Japan</i>	
Juliusson, E., and R. Horne	1443
<i>Optimization of ReInjection Scheduling in Fractured Reservoirs based on Tracer Tests</i>	
Juliusson, E., R. Horne, J. Sweeney, M. Hart, J. Rich, and J. Sandler.	1457
<i>Optimal Extraction of Geothermal Resources</i>	

Kanda, I.	1467
<i>Conceptual Model Based on Preliminary Observation of Ongoing Geothermal Resource Appraisal at the Domes Wellfield, Olkaria, Kenya</i>	
Katayama, Y., R. Itoi, N. Kumagai, and T. Iwasaki	1475
<i>Flow Characteristics of Geothermal Production Well with Multi-Feed Zones</i>	
Martiady, K., A. Dawud, F. Pasaribu, J. Roberts, and A. Sugandhi	1481
<i>Managing the Decline Rate at the South Sector Production Area of Darajat Geothermal Field, Indonesia</i>	
McClure, M., and R. Horne	1487
<i>Pressure Transient Analysis of Fracture Zone Permeability at Soultz-sous-Forêts</i>	
Menzies, A. J.	1499
<i>Correlating Reservoir Pressure Changes with Production and Injection in the Tiwi Geothermal Field, Republic of the Philippines</i>	
Molina Martinez, A., and G. Axelsson.	1505
<i>Assessment of Thermal Interference in the Northern Part of Los Azufres Geothermal Field, Mexico, By Tracer Test Analysis</i>	
Podgorney, R., G. Gunnarsson, and H. Huang	1513
<i>Numerical Simulation of Temperature Dependent Fluid ReInjection Behavior, Hellisheidi Geothermal Field, Southwest Iceland</i>	
Podgorney, R., J. Ketilsson, T. Driesner, and K. Regenauer-Lieb	1519
<i>The Next Generation of Geothermal Reservoir Simulators: A Draft Summary of the Recommendations from the International Partnership for Geothermal Technology Reservoir Modeling Working Group</i>	
Siratovich, P. A., I. Sass, S. Homuth, and A. Bjornsson.	1529
<i>Thermal Stimulation of Geothermal Reservoirs and Laboratory Investigation of Thermally Induced Fractures</i>	

Resource Assessment

Blackwell, D. D., F. Moerchen, B. L. Cutright, W. Gosnold, M. Kay, S. Nagihara, C. Robinson, and J. Tester	1539
<i>Data Integration into the National Geothermal Data System (NGDS)</i>	
Blackwell, D. D., M. Richards, Z. Frone, J. Batir, A. Ruzo, R. Dingwall, and M. Williams	1545
<i>Temperature-At-Depth Maps for the Conterminous U. S. and Geothermal Resource Estimate</i>	
Boyd, T., J. Hall, R. Boyle, S. Cole, K. McBride, C. Hass, A. Anderson, J. Miranda, M. Benedict, P. Maddi, J. Evans, and C. Coulson.	1551
<i>The Feasibility of Geothermal Potential in the Rio Grande Rift Area of New Mexico and Texas</i>	
Crowell, A. M., R. Klenner, and W. Gosnold	1557
<i>GIS Analysis for the Volumes and Available Energy of Selected Reservoirs: Williston Basin, North Dakota</i>	

Esposito, A. and C. Augustine	1563
<i>Geopressed Geothermal Resource and Recoverable Energy Estimate for the Wilcox and Frio Formations, Texas</i>	
Kuyumcu, Ö. Ç., U. Z. D. Solaroğlu, S. Akar, O. Atalay, and B. Colpan.	1573
<i>Estimation of Permeability using Simple Multi Criteria Decision Analysis in Gümüşköy, Aydın, Turkey</i>	
Lee, S. W. , G. Dong, and J. Rey	1581
<i>Interpreting the Structural Characteristics of Underground Natural Flows to Determine the Productivity Potential of Hydrothermal Reservoirs</i>	
Welhan, J. A., R. M. Breckenridge, D. L. Garwood, J. D. Kauffman, R. S. Lewis, and V. S. Gillerman.	1589
<i>The Idaho Geological Survey's Activities in the National Geothermal Data Program: Data Compilation and Heat-Flow Drilling</i>	
Welhan, J. A., K. W. Neely, and C. F. Hersley	1595
<i>Idaho's Geothermal Prospects and Development Potential</i>	
Williams, C. F., and J. DeAngelo.	1599
<i>Evaluation of Approaches and Associated Uncertainties in the Estimation of Temperatures in the Upper Crust of the Western United States</i>	

Seismicity/Geophysics

Adelinet, M., J. Fortin, A. Schubnel, M. Le Ravalec, C. Dorbath, Y. Guéguen, and L. Geoffroy.	1609
<i>Petrophysical and Geophysical Characterization of an Icelandic Geothermal Reservoir, Case Study on the Reykjanes Peninsula</i>	
Asanuma, H., S. Mitsumori, M. Adachi, K. Saeki, K. Aoyama, H. Ozaki, Y. Mukuhira, and H. Niitsuma.	1613
<i>Characteristics of Microearthquakes at Yanaizu-Nishiyama Geothermal Field</i>	
Bakku, S., M. Fehler, and D. Burns	1617
<i>Fracture Characterization from Tubewaves in Boreholes</i>	
Bruhn, D., E. Huenges, K. Ágústsson, A. Zang, G. Kwiatek, X. Rachez, S. Wiemer, J. D. Van Wees, P. Calcagno, T. Kohl, C. Dorbath, G. De Natale, and V. Oye	1623
<i>Geothermal Engineering Integrating Mitigation of Induced Seismicity in Reservoirs — The European GEISER Project</i>	
Dreger, D. S., S. Boyd, and R. Gritto	1627
<i>Deviatoric Moment Tensor Analysis at The Geysers Geothermal Field</i>	
Echols, J., W. R. Benoit, M. Ohren, G. Oppliger, and T. Van Gundy.	1633
<i>Integration of a 3D-3C Reflection Seismic Survey over a Known Geothermal Resource: Soda Lake, Churchill County, Nevada</i>	
Eisses, A., A. Kell, G. Kent, N. Driscoll, R. Karlin, R. Baskin, J. Louie, and S. Pullammanappallil.	1643
<i>Marine and Land Active-Source Seismic Imaging of Mid-Miocene to Holocene-Aged Faulting near Geothermal Prospects at Pyramid Lake, Nevada</i>	

Eneva, M., G. Falorni, W. Teplow, J. Morgan, G. Rhodes, and D. Adams	1647
<i>Surface Deformation at the San Emidio Geothermal Field, Nevada, from Satellite Radar Interferometry</i>	
Espanola, O., J. Branch, and S. Johnson	1655
<i>2D Seismic Imaging at the Orita Geothermal Area, Imperial Valley, California</i>	
Falorni, G., J. Morgan, and M. Eneva	1661
<i>Advanced InSAR Techniques for Geothermal Exploration and Production</i>	
Gasperikova, E., G. Newman, D. Feucht, and K. Arnason	1667
<i>3D MT Characterization of Two Geothermal Fields in Iceland</i>	
Guglielmetti, L., Y. Abdelfettah, C. Comina, E. Schill, and G. Mandrone	1673
<i>Gravimetric Survey to Detect Geological Structures Involved in Thermal Water Circulation in the Italian Western Alps</i>	
Hutchings, L., S. Jarpe, K. Boyle, G. Viegas, and E. Majer	1679
<i>Inexpensive, Automated Micro-Earthquake Data Collection and Processing System for Rapid, High-Resolution Reservoir Analysis</i>	
Ishido, T., and J. W. Pritchett	1687
<i>Effects of Diffusion Potential on Self-Potential Distribution in Geothermal Areas</i>	
Kangogo, D.	1693
<i>Resistivity Structure of the Silali Geothermal Prospect in Kenya</i>	
Kohn, S. B., C. Bonet, D. DiFrancesco, and H. Gibson.	1699
<i>Geothermal Exploration Using Gravity Gradiometry – A Salton Sea Example</i>	
Lin, Y., L. Huang, and Z. Zhang.	1703
<i>Quantitative Monitoring for Enhanced Geothermal Systems using Double-Difference Waveform Inversion with Spatially-Variant-Total-Variation Regularization</i>	
Lindblom, S., J. A. Henfling, A. Macrae, K. Yeung, K. Baran, G. Fong, J. Qu, T. McAuley, and J. Parks	1709
<i>A High Speed, High Temperature Datalink for Geothermal Applications</i>	
Muturia, C., and A. Wamalwa.	1713
<i>Joint Inversion of TEM and MT Data from Paka Geothermal Prospect in Kenya</i>	
Mwakirani, R.	1719
<i>Resistivity Structure of the Paka Geothermal Prospect in Kenya</i>	
Myers, S. C., G. Johannesson, and R. J. Mellors.	1725
<i>BayesLoc: A Robust Location Program for Multiple Seismic Events Given an Imperfect Earth Model and Error-Corrupted Seismic Data</i>	
Nathwani, J., E. Majer , and J. Ziagos	1731
<i>Technology Strategy Roadmap for Geothermal Induced Seismicity</i>	
Poletto, F., P. Corubolo, A. Schleifer, B. M. Farina, J. Pollard, and B. Grozdanich.	1737
<i>Seismic While Drilling For Geophysical Exploration in Geothermal Well</i>	
Seher, T., H. Zhang, M. Fehler, H. Yu, V. Soukhovitskaya, M. Commer, and G. Newman	1743
<i>Temporal Velocity Variations beneath the Coso Geothermal Field Observed using Seismic Double Difference Tomography of Compressional and Shear Wave Arrival Times</i>	

Shoffner, J. D., Y. Li, A. Sabin, and M. Lazaro1747
*Understanding the Utility of Gravity and Gravity Gradiometry for Geothermal
Exploration in the Southern Walker Lake Basin, Nevada*

Smith, D., J. Hild, J. Pfeiffer, and P. Drakos1753
*Source-Generated Seismic Noise in 2-D Reflection Surveys in the Basin and Range
Physiographic Province: Issues, Attenuation and Case Histories*

Spichak, V., and O. Zakharova1759
*Indirect Electromagnetic Geothermometer — A Novel Approach to the Temperature
Estimation in Geothermal Areas*

Tibuleac, I., and M. Eneva.1767
*Seismic Signature of the Geothermal Field at Soda Lake, Nevada,
from Ambient Noise Analysis*

Viegas, G., and L. Hutchings.1773
*Characterization of Induced Seismicity near an Injection Well
at the Northwest Geysers Geothermal Field, California*

Wang, J., D. C. Templeton, and D. B. Harris1781
*Discovering New Events Beyond the Catalog — Application of Matched Field
Processing to Salton Sea Geothermal Field Seismicity*

Wannamaker, P., V. Maris, D. Hasterok, and W. Doerner.1787
*Crustal Scale Resistivity Structure, Magmatic-Hydrothermal Connections,
and Thermal Regionalization of the Great Basin*

Alphabetical List of Authors