



CONFERENCE ON THE MECHANICS OF SALT

Daily Program

Monday, July 7th

Registration

3:00 pm – 7:00 pm
Drury Plaza Hotel in Santa Fe
828 Paseo de Peralta
Santa Fe, NM 87501

Welcome Reception (Sponsored by WSP)

5:00 pm – 7:30 pm – Drury, Garden Room
Light appetizers and welcome drinks

Tuesday, July 8th

Registration

7:00 am – 12:00 pm – Drury

SaltMech XI Opening

8:00 am – 8:30 am – Drury, O'Keefe Room
Steven R. Sobolik (Sandia National Laboratories)

Session 1: Laboratory Testing

8:30 am – 9:30 am – Drury, O'Keefe Room

"Creep of Rock Salt Under a Large Range of Deviatoric Stresses: Insights from Tests in Mines and Rock Mechanics Laboratories,"

Laura Blanco Martin, Jubier A. Jiménez-Camargo, Jerzy Jaworowicz, Hakim Gharbi, Alexandre Dimanov, Michel Bornert, Benoît Brouard

"Damage-Free Cyclic Loading of Rock Salt: Experiments and Constitutive Modeling,"

Benjamin Reedlunn, Hiroko Kitajima, Abdullah M. J. Azzam, Omer Iqbal, In Kyu Jeon, Frederick M. Chester, Yong-Rak Kim, Kyung Won Chang, Charles Choens, Tonya S. A. Ross

PICO Rounds

"Experimental Analysis of Creep Behavior of Impure Rock Salt Under High Temperature and High Stress,"

Michael Zhengmeng Hou, Yanli Fang, Guan Wang, Lin Wu, Tian Zhang, Liangchao Huang

"Preliminary Geomechanical and Lithological Evaluation of Rock Salts for H₂ Storage: Comparisons Between Delaware Basin and Zechstein Samples,"

Mahdi Haddad, Jean Donald Minougou, Muhammed Kemal Özel, Ander Martinez-Doñate, C. Nur Schuba, Lucy Tingwei Ko, Leopoldo Ruiz-Maraggi, Lorena Moscardelli

"Secondary Creep of Rock Salt: 'New' Experimental Data Compared to Theory,"

Sibylle I. Mayr, Werner Gräsle, Kornelia Zemke (presented by Ben Laurich)

"Systematization of Laboratory-determined Site-Specific Material Properties of Different Salt Types for Optimized Use in the Geomechanical Long-Term Safety Analysis of the Radioactive Waste Repository Morsleben,"

Svetlana Lerche, Nachinzorig Saruulbayar, Abdati Laatigue

"Flat-Bedded Rock Salt – A Mechanically Anisotropic Material? Rock Fabric and Continued Triaxial Compression Tests,"

Ida Epkenhans, Michael Mertineit, Raphael Dlugosch, Lennart Paul, Joachim Stahlmann (presenter TBA)

Break - 9:30 am – 10:00 am, Refreshments provided



Session 2: Laboratory Testing

10:00 am – 11:30 pm – Drury, O'Keefe Room

"The Transition from Dislocation Creep to Pressure Solution in Natural Rock Salt and Constraints on the Threshold Stress for Pressure Solution,"

Vangelis Dialeismas, J.H.P. de Bresser, S.J.T. Hangx, J.H. Ter Heege, C.J. Spiers

"The Hydraulic Properties of Rock Salt at Elevated Thermodynamic Boundary Conditions and its Healing Potential,"

Johannes Herrmann, Joyce Schmatz, Richard R. Bakker, Christopher Rölke and Dirk Naumann

"Comprehensive Characterization of Rock Salt from the Haselgebirge Formation: Insights for Cavern Storage of Hydrogen,"

Lukas Skerbisch, David Misch, Mustafa Sari, Joel Sarout

PICO Rounds

"Trigger Action Response Planning for the Management of Mine Opening Convergence: The Waste Isolation Pilot Plant as Case Study,"

John Ejezie, Ty Zimmerlin, Dave Sjomeling

"Outcomes from the Brine Availability Test in Salt (BATS) Heater Test at WIPP,"

Melissa Mills, Kristopher Kuhlman, Philip Stauffer, Jonny Rutqvist, Charles Choens, Eric Gultinan, Courtney Herrick, Richard Jayne, Jon Davis, Shawn Otto, Daniel Eldridge, Thom Rahn, Yuxin Wu

"3D Geological Model of the Internal Structure of the Asse Salt Diapir: A New Basis for Planning Underground Infrastructure,"

York-Oliver Fischer, Evelyn Suchi, Christian Buxbaum-Conradi, Michael Warsitzka, Manuela C. Stehle, Lukas Pollok

"Syn depositional Evaporite Deformation in the Northern Delaware Basin, Southeastern New Mexico, USA"

Dennis Powers, Omonde S. Akakpo, Robert M. Holt

"Numerical Modeling of Gas Storage in Salt Caverns Considering a Wide Range of Deviatoric Stresses and Dilatancy"

Jubier A. Jimenez-Camargo, Laura Blanco-Martín, Ahmed Rouabhi, Faouzi Hadj-Hassen

"Physical and Mechanical Properties of a Deep Rock Salt Formation Evaluated for Hydrogen Geo-Storage in a Solution-Mined Cavern"

Mustafa Sari, Joel Sarout, Lionel Esteban, Yevhen Kovalyshe, Ludwig Monmusson and Laetitia Imbert

"Modeling of the Compaction Behavior of Crushed Salt Based on Micromechanical Deformation Mechanisms,"

Ann-Kathrin Gartzke, Wenting Liu, Steffen Beese, Jan Thiedau

"Controls on Intrasalt Shear Zones Caused by Active Basement Fault"

Maria A Nikolina, Mahdi Heidari, Michael R. Hudec

"Machine-Learning Enabled Model Calibration in the Context of Digital Twinning of an Emplacement Drift in Rock Salt,"

Lennart Paul, Jorge Humberto Urrea-Quintero, Umer Fiaz, Joachim Stahlmann

"Subsidence Above the Deep Barradeel Caverns: The Influence of a Threshold Stress for Pressure Solution on Potential Rebound,"

Luuk Hunfeld, Brecht B.T. Wassing, Jaap N. Breunese

"Challenges in Geomechanical Simulation of Nuclear Waste Disposal in Rock Salt - Advanced Simulation of THM Processes Using JIFE,"

Jan Thiedau, Steffen Beese, Ralf Eickemeier, Wenting Liu, Georgios Maniatis, Ann-Kathrin Gartzke, Bernhard Faust, Adam Lucke, Stephan Tertel

In Memoriam

Lunch - 11:30 am – 1:00 pm – Drury, Palace Ballroom

Session 3: Micromechanics & Microstructures

1:00 pm – 2:50 pm – Drury, O'Keefe Room

"Composition, Microstructure and Rheology of Triaxial Tested Carnallite (Kaliflöz Staßfurt, Upper Permian),"

Michael Mertineit, Steffen Beese, Ralf Eickemeier, Wenting Liu, Georgios Maniatis, Ann-Kathrin Gartzke, Bernhard Faust, Adam Lucke, Stephan Tertel

"Microstructural Evolution of Natural Rock Salt Under Low Deviatoric Stress,"

Joyce Schmatz, Benoit Brouard, Tobias Baumann, Hakim Gharbi, Richard R. Bakker



"Impact of Microfabrics on the Mechanical Properties and Deformation Behavior of Rock Salt: Insight from Micro-Scale Tests,"

Katarzyna Cyran, Tomasz Toboła, Paweł Kamiński, Katarzyna Bajda, Jerzy Karczewski

"Activation of Deformation Mechanisms in Natural Salt Rock: A Microscale Investigation Using Digital Image Correlation,"

Xinjie Li, Alexandre Dimanov, Michel Bornert, Hakim Gharbi, Simon Hallais

"Deformation and Water-Assisted Diffusive Mass Transfer in Rock Salt,"

Chris Spiers

PICO Rounds

"Geomechanical Stability and Sinkhole Evaluation for Shallow Solution Mining Caverns in Bedded Evaporite Deposits,"

Kaifang Li, Mike Hardy, Biao Qiu

"Numerical Study of Hydraulic and Thermodynamic Response of Salt Cavern Hydrogen Storage Under High Frequency,"

Michael Zhengmeng Hou, Yanli Fang, Guan Wang, Qichen Wang, Yilin Guo, Liangchao Huang

"Stability Analysis of a Salt Cavern Subjected to a Blowout Scenario,"

Mohammed Zaim, Hajar Habbani, Hippolyte Djizanne, Benoit Brouard, Amade Pouya

"Geological Overview of Kansas Salt Caverns,"

Franek Hasiuk, Wakil Bailumi

"Influence of Water Content on Crushed Salt Pressure Solution Creep Rate: A Capillary Condensation and Sorption Model,"

Jibril B. Coulibaly, Benjamin Reedlunn

"Improvement in the Numerical Simulation of Crushed Salt Compaction Processes,"

Larissa Friedenber, Sebastia Olivella, Uwe Düsterloh

"A Step Toward Simulation of Salt Pressure Solution in 3D Granular Packs,"

Robert Lander, James Guilkey, Linda Bonnell, Edward Matteo, Chven Mitchell

"Hydraulic Evolution in the Shaft Sealing System of a Generic Salt Repository,"

Eric Simo, Victoria Burlaka, Tymofiy Gerasimov, Kris Kuhlman, Thomas Nagel, Ajmal Gafoor (Presenter TBA)

Break - 2:50 pm – 3:20 pm, Refreshments and snacks provided

Session 4a: Micromechanics & Microstructures

3:20 pm – 4:10 pm – Drury, O'Keefe Room

"Deformation of Synthetic Rock Salt Investigated by X-Ray Micro-Computed Tomography: Effect of Brine, Confining Pressure and Loading Rate,"

Nina Du, Michel Bornert, Alexandre Dimanov, Patrick Aïmedieu, Andrew King

"Grain Size Effects in Salt Rheology,"

Jan ter Heege, Hans de Bresser

"3D Visualization of Pore Space in Glacier Salt: Insights from Microfabric Analysis, μ CT Imaging, and SEM-EDS,"

Julia Schmitz, Joyce Schmatz, Mingze Jiang

Session 4b: Constitutive Modeling

4:10 pm – 5:00 pm – Drury, O'Keefe Room

"A Modified Munson-Dawson Model Within the Framework of Continuum Thermodynamics,"

Alessandro Cirone, Eurípedes Vargas Jr, Raquel Velloso

"3D THM-Coupled Simulations of Low-Stress Creep Experiments Using Digital Twins of Heterogeneous Rock Salt,"

Maximilian Oskar Kottwitz, Tobias S. Baumann, Joyce Schmatz, Anton Popov, Benoit Brouard, Richard R. Bakker

"Influence of Pore Pressure on the Ductile Deformation of Salt,"

Brandon Lampe, John Stormont, Howard Schreyer

Wednesday, July 9th

Session 5: Crushed Salt Engineered Barriers

8:00 am – 9:30 am – Drury, O'Keefe Room

"A Constitutive Model for Crushed Salt Pressure Solution Creep Based on an Orthorhombic Unit Cell with Contact Face Intersection,"

Jibril B. Coulibaly, Benjamin Reedlunn



"Multi-Scale Experimental and Numerical Analysis of Crushed Salt Material Used as Engineered Backfill in a Nuclear Waste Repository in Rock Salt (MEASURES),"

Larissa Friedenberg, Jeroen Bartol, Steffen Beese, Hans de Bresser, Jibril B. Coulibaly, Uwe Düsterloh, Ralf Eickemeier, Ann-Kathrin Gartzke, Suzanne Hangx, Kyra Jantschik, Matthew Kirby, Ben Laurich, Christian Lerch, Svetlana Lerche, Lingyun Li, Wenting Liu, Christoph Lüdeling, Melissa M. Mills, Dirk Naumann, Simon Norris, Bart van Oosterhout, Sam Parsons, Michael Rahmig, Benjamin Reedlunn, Christopher J. Spiers, Jan Thiedau, Kornelia Zemke

"Unravelling the In-Situ Compaction of a Salt Backfill Body: The Critical Role of Pressure Solution,"

Ben Laurich, Kristoff Svensson, Bart van Oosterhout, Christopher J. Spiers

"Numerical Simulations of Compaction of Salt Rubble for Use in Predictions of Fluid Transport Properties,"

James Guilkey, Robert Lander, Linda Bonell, Ed Matteo, Chven Mitchell

"Permeability and Porosity of Loose Granular Salt,"

John Stormont, Evan Babcock, Melissa Mills, Edward Matteo

Break - 9:30 am – 9:55 am, Refreshments provided

Session 6: Geological & Engineered Barriers

09:55 am – 11:20 am – Drury, O'Keefe Room

"Long-Term Safe Shaft Seals in Salt Repositories (Part 1): Safety Concept, Building Materials and Geo-Mechanical Integrity Analysis,"

Till Popp, Dorothea Weise, Matthias Gruner, Daniela Freyer

"Morsleben Repository - Anhydrite Drift Seal Demonstration Structure,"

Stephan Gehne, Dr. Ali Hussein, Jan Bauer, Martin Miehlbradt, Matthias Mohlfeld, Dr. Antje Carstensen, Volker Busse

"The Thermomechanical Influence of Curing Building Materials on Structural Behavior in a Repository,"

Christian Lerch, Nina Müller-Hoeppe, Ali Hussein, Mirko Polster

"Rock Melt Sealing System,"

John ("Butch") Knight, Koby Dobler, Eric Krantz, Sam Voegeli, Stuart Buchholz, Jake Hladysz

"Analytical Perspective on Resin Application to Enhance Wellbore Integrity,"

Mahya Hatambeigi, Scyller J. Borglum, Ishtiaque Anwar, Timothy Masterlark

Group Photo - 11:20 am – 11:40 am

Lunch - 11:40 am – 1:00 pm – Drury, Palace Ballroom

Session 7: Mining & Mine Integrity

1:00 pm – 2:10 pm – Drury, O'Keefe Room

"Long-Term Safe Shaft Seals in Salt Repositories (Part 2): Construction of the Saale Shaft Seal - The Challenge: from Planning to Final Realization,"

Vera Boettge, Till Popp, Danny Bodenstab, Alexander Proske, Thomas Balde, Dorothea Weise, Matthias Brand

"Thermally Induced Acoustic Emissions in Salt at the Waste Isolation Pilot Plant (WIPP),"

R. Charles Choens, Kristopher L. Kuhlman, Courtney Herrick, Shawn Otto, Jon Davis

"A New Technology to Increase the Extraction Rate in Old Potash Mining Areas – An Approach for a Safe Mining Concept,"

Jan-Peter Schleinig, M. Knauth, J. Barnasch, O. Jungmann, M. Günther, H. Zienert, J. Mühlbauer, R.-M. Günther

"An Updated Internal State Variable Model to Capture Short- and Long-Term Transient Inelastic Behavior of Rock Salt Around Mining Excavations,"

Jonathan D. Aubertin, Michel Aubertin, Abtin Jahanbakhshzadeh

Break - 2:10 pm – 2:45 pm, Refreshments and snacks provided

Session 8: Modeling & Simulation

3:00 pm – 4:45 pm – Drury, O'Keefe Room

"Large-Scale Complex 3D-Models with Realistic Capture of the Mine Geometry for Geomechanical Long-Term Safety Analysis of the Radioactive Waste Repository Morsleben,"

Svetlana Lerche, Nachinzorig Saruulbayar, Christian Dörner

"Modeling Dilatancy-Induced Damage in Rock Salt Using DISROC: A Joint Enriched Finite Element Analysis for UHS,"

Hajar Habbani, Hippolyte Djizanne, Benoit Brouard, Amade Pouya



"Treatment of Uncertainties in Numerical Modelling to Rate the Integrity of Rock Salt Barriers in Repositories Using Generic Models,"

Michael Rahmig, Martin Herklotz, Natalie Kluge, Mirko Polster, Thomas Schröpfer, Beatrix Stielow, Johanna Wolf

"Impact of Pressure Solution Creep and Threshold Stress on Deformation and Stress State Around a Salt Cavern,"

Gaurav Jain, Brecht Wassing, Suzanne Hangx, Jan ter Heege, Hans de Bresser

"Geomechanical Investigation of a Solution Mining Field in Northeast Brazil,"

Ali Taghichian, Wolfgang Minkley, Dirk Naumann, Matthias Brandt, Ali Taghichian

"TH2M-Coupled Numerical Simulation of the Pressure-Driven Infiltration/Percolation Process Occurring in Salt Rock Mass Surrounding a Generic Storage Cavern with Special Consideration of Inhomogeneous and Anisotropic Material Behaviour,"

Ralf Wolters-Zhao, Karl-Heinz Lux, Eleni Gerolymatou (Presenter TBA)

Banquet & Cocktail Hour - 5:00 pm – 9:00 pm (Sponsored by RESPEC)

Inn and Spa at Loretto
211 Old Santa Fe Trail
Santa Fe, NM 87501

Thursday, July 10th

Session 9: Geological Storage of Hydrogen

8:00 am – 10:00 am – Drury, O'Keefe Room

"Integrity of Existing Caverns with Regard to Conversion for Hydrogen Storage,"

René Buzogany, Heike Bernhardt, Juan Zhao, Amir Ehteshami, K.-H. Lux

"Mechanical and Transport Properties of Rock Salt Under Simulated Cavern Wall Conditions in the Framework of Cyclic Hydrogen Storage,"

Johanna Heeb, S.J.T. Hangx, J.H.P. de Bresser

"Geomechanical Behavior of Storage Caverns in Salt Domes for Hydrogen Storage,"

Tonya Ross, Kyung Won Chang

"A Preliminary Site Selection of Underground Hydrogen Storage Based on a Generic Model in Bedded Rock Salt,"

Michael Zhengmeng Hou, Yanli Fang, Guan Wang, Liangchao Huang, Qianjun Chen

"Hydromechanical Behavior and Hydraulic Integrity of Rock Salt at the Cavern Scale: Implications for Hydrocarbon and Hydrogen Storage & Abandonment,"

Markus Knauth, Christoph Lüdeling, Ralf-Michael Günther

"Advanced Constitutive Models for Dimensioning Salt Caverns in Underground Hydrogen Storage,"

Hippolyte Djizanne, Dirk Zapf, Hajar Habbani, Feline Körner, Benoit Brouard

"Geomechanical Aspects Regarding the Operation of Combined Hydrogen and Compressed Air Storage Caverns in Conjunction with a HCAES Power Plant,"

Junqing Sun-Kurczinski, Karl-Heinz Lux, Tianjie Pan (Presenter TBA)

Break - 10:00 am – 10:30 am, Refreshments provided

Session 10: General Storage

10:30 am – 11:20 am – Drury, O'Keefe Room

"Geomechanical Investigations on Planned Radioactive Waste Retrieval Methods in Asse II Mine,"

Johannes Kupper, Wolf-Peter Kamlot, Sebastian Rehde, Jhonatan Sosa, Ralf-Michael Günther, Stephan Gehne, Grit Gärtner

"In Situ Regasification of LNG in Salt Caverns – Effects of Cryogenic Temperatures on Structural Integrity and Operating Parameters,"

Christian Schmidt, Svetlana Lerche, Karl-Heinz Lux

"The Dutch Performance Assessment: Summary and Outlook,"

Jeroen Bartol, Marja Vuorio

Lunch on Your Own, 11:20 am – 1:00 pm

Session 11a: Field & Geological Investigations

1:00 pm – 1:35 pm – Drury, O'Keefe Room

"A Field-Based Method to Determine Pressure Solution Creep In-Situ at Cavern Scale,"

Benoit Brouard, Tobias S. Baumann, Joey Bruinsma, Richard R. Bakker



"Development of a Method for the Evaluation of Salt Structures with Unknown Internal Structure as Underground Storage Facilities,"

Lukas Pollok, Fabian Jähne-Klingberg, Benjamin Paul

Session 11b: Salt Caverns, Cavern Abandonment & Long-Term Integrity

1:35 pm – 2:30 pm – Drury, O'Keefe Room

"Salt Cavern Interference: A Numerical Investigation,"

Peter Fokker, Santiago Peno Clavijo, Brecht B.T. Wassing

"Consequences of Gas Spreading in the Salt Rock Formation: Insights from Pore-Scale Permeability Model for Bedded Salt Rock,"

Tongtao Wang, Youqiang Liao, Chunhe Yang Chao Zhang, Tao He, Dongzhou Xie, Juan Yang, Guibin Wang, Hongling Ma, Zixue Luo, Guoxiu Liu

"Laboratory Investigations of the Effects of Additional Axial Deformation due to the Operational Convergence of the Cavern on the Wellbore Integrity at the Casing Shoe Area,"

Tianjie Pan, Karl-Heinz Lux, Ralf Wolters-Zhao (Presenter TBA)

Break - 2:30 pm – 3:00 pm, Refreshments provided

Session 12: Salt Caverns, Cavern Abandonment & Long-Term Integrity

3:00 pm – 4:45 pm – Drury O'Keefe Room

"A Coupled Thermal-Fluid Model for Operation of Salt Cavern Gas Storage Facilities and Implications,"

Youqiang Liao, Tongtao Wang, Chunhe Yang, Tao He¹, Jiasong Chen

"Study on Salt Crystals Growing on the Debrining Tubing Surface for Salt Cavern Gas Storage,"

Tingting Jiang, Dongzhou Xie, Youqiang Liao, Tao He, Yiyun Zhang, Junwei Wang

"Determining the Optimal Salt Cavern Shape in Mechanically Stratified Bedded Rock Salt Formation: Insights from Numerical Simulations,"

Marta Adamuszek, Michał Słotwiński, Marcin Dąbrowski

"Beyond Axial Symmetry: The Critical Role of 3D Salt Dome Geometry in Cavern Closure and Subsidence Modeling,"

Tobias Baumann, Benoit Brouard, Anton Popov, Maximilian O. Kottwitz

"Comparison of Dimensioning Approaches for Salt Caverns,"

Dirk Zapf, Bastian Leuger, Kevin Heiberger, Brady Mills and Sam Voegeli

Closure Discussion – End of SaltMech XI

Friday, July 11th

Optional Field Trip to Taos, New Mexico

8:00 a.m. – 5:00 p.m., Depart from Drury

Geological and cultural history in the region between Santa Fe and Taos. Sites visited will include the Rio Grande Gorge and the Taos Pueblo. Transportation and lunch at Tiwa Kitchen included.

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