



# The Penrose conference on Advances in salt tectonics: observations, applications and perspectives

in honor of Martin P.A. Jackson

11-16 February, 2018 • Ein Boqueq, Dead Sea, Israel



# Program

## 11 February, Sunday

- 09:00 - 14:30 Guided tour in the old city of Jerusalem (Optional - Free) -  
Meeting point - Crowne Plaza Hotel
- 14:30 - 16:30 Shuttle bus, Jerusalem - Ein Boqueq (Optional - Free) -  
Meeting point - Crowne Plaza Hotel
- 16:30 - 19:00 Registration / Check in
- 18:00 - 19:00 Icebreaker**
- 19:00 - 20:30 Dinner
- 20:30 - 22:00 Free beer, mingling

## 12 February, Monday

- 06:45 - 07:30 Breakfast
- 08:00 - 08:30 Opening ceremony, honoring Martin Jackson
- 08:30 - 09:45 **Salt in passive Atlantic margins** (Convener – Chris Jackson)
- 08:30 - 08:45 New evidence of diapir piercement onto the ocean floor, Santos Basin, offshore Brazil. Uri Schattner, Francisco José Lobo, Marga García, and Michel Michaelovitch de Mahiques
- 08:45 - 09:00 Influence of base-salt topography on differential translation and salt tectonics in the São Paulo Plateau, Santos Basin, Brazil. Leonardo Muniz Pichel, Frank Peel, Christopher A.-L. Jackson, Mads Huuse
- 09:00 - 09:15 The influence of base salt relief on the structural evolution of salt and overburden: case study from the outer Kwanza Basin, offshore Angola. Sian Evans, Christopher A.-L. Jackson
- 09:15 - 09:30 Salt tectonics in extensional strike-slip settings in the deep water Campos Basin, offshore Brazil: analogies with the Dead Sea and Zagros fold belt in Iran. Webster Mohriak, Stephanie Wischer
- 09:30 - 09:45 How, where and when do radial faults grow near salt diapirs? observations from the Santos Basin, offshore Brazil. Alexander J. Coleman, Christopher A.-L. Jackson, Oliver B. Duffy, Maria A. Nikolinakou
- 09:45 - 10:15 Coffee break
- 10:15 - 12:15 **Exposed diapirs and halokinetic sequences** (Convener – Mark Rowan)
- 10:15 - 10:30 Salt welds in outcrop: deformation at a range of scales. Mark G. Rowan, Thomas E. Hearon IV, Oskar Vidal Royo, Mark P. Fischer, Nicholas J. Williams, Katherine A. Giles, Timothy F. Lawton, Oriol Ferrer
- 10:30 - 10:45 Salt Tectonics in the Sivas Basin (Turkey): Outstanding seismic analogues. Jean-Claude Ringenbach, Jean-Paul Callot and the Sivas Group
- 10:45 - 11:00 Holocene rising rate of Mount Sedom salt diapir: comparison of independent results. Amos Frumkin, Shachak Pe'eri
- 11:00 - 11:15 Halokinetic sequences in carbonate depositional settings: the case-study of the Bakio diapir (Basque-Cantabrian basin, northern Spain). Johann Poprawski
- 11:15 - 11:30 Characterization and evolution of an exposed megaflap and expulsion-rollover structure flanking Witchelina diapir, Willouran Ranges, South Australia. Gannaway, C. Evelyn, Katherine A. Giles, Mark G. Rowan, Thomas E. Hearon IV, J. Carl Fiduk
- 11:30 - 11:45 Revealing the internal flow of salt structures using anisotropy of magnetic susceptibility. Richardson, C. Jack, G. Ian Alsop, Craig Magee, Marco Maffione and Carl T. E. Stevenson
- 11:45 - 12:00 Rock salt flow along a strain gradient in deeply eroded extrusive salt diapir (Kuh-e-Namak, Dashti, Iran). Prokop Závada, Karl Schulmann, Ondrej Lexa, Janos Urai, Guillaume Desbois, Matej Machek, Zuzana Kratinová, Vladimír Kusbach

- 12:00 - 12:15 Spatial and temporal patterns of newly recognized halokinetic features in the Paradox Salt Basin, Utah and Colorado, USA. Katherine A. [Giles](#), [Jessica Thompson Jobe](#), [Mark G. Rowan](#), [Thomas E. Hearon IV](#), [Bruce Trudgill](#), [Richard P. Langford](#)
- 12:15 - 12:30 **General discussion**
- 12:30 - 13:45 Lunch
- 13:45 - 14:15 **(Invited) The Dead Sea Transform – tectonic setting, history and structure.** [Zvi Garfunkel](#)
- 14:15 - 15:30 **Salt tectonics in the Mediterranean Sea** (Convener – [Virginie Gaullier](#))
- 14:15 - 14:30 Thin-skinned salt tectonics as a response to crustal movements in a recent convergent setting. [Bruno C. Vendeville](#), [Virginie Gaullier](#), [Jacques Déverchère](#)
- 14:30 - 14:45 Salt tectonics and thin-skin contractional deformation in the Deep Levant Basin. [Thomai Anagnostoudi](#), [Uri Schattner](#), and [Michael Lazar](#)
- 14:45 - 15:00 Salt tectonics in the Levant Basin. [Zohar Gvirtzman](#)
- 15:00 - 15:15 Direct calibration of the kinematics of a thick salt sheet during plate-scale gravity driven deformation. [Joe Cartwright](#), [Chris Kirkham](#), [Claudia Bertoni](#), [Karyna Rodriguez](#), [Neil Hodgson](#)
- 15:15 - 15:30 Early rise and contractional reactivation of distal salt diapirs in the western Mediterranean: a new two-step scenario. [Virginie Gaullier](#), [Bruno C. Vendeville](#), [Françoise Sage](#), [Laurence Droz](#), [Johanna Lofi](#)
- 15:30 - 17:00 Posters session + Coffee break
- 17:00 - 18:15 **Salt dissolution and caprocks** (Convener – [Katherine Giles](#))
- 17:00 - 17:15 Characterization and geochemistry of lateral carbonate caprock associated with the Gypsum Valley salt wall, Paradox Basin, Colorado: Evidence supporting the drape-fold model for lateral caprock emplacement. [Poe Piper](#), [Katherine Giles](#), [Benjamin Brunner](#), [Troy Rasbury](#), [James Edmond](#)
- 17:15 - 17:30 Origin of the 'Rim Dolomite' at the salt-sediment interface of Patawarta salt sheet, Flinders Ranges, South Australia. [Rachelle Kernen](#), [Katherine Giles](#), [Piper Poe](#), [Joseph Carl Fiduk](#), [Thomas E. Hearon IV](#), [Mark G. Rowan](#), [Benjamin Brunner](#)
- 17:30 - 17:45 Limits on solute transport in an actively deforming terrestrial salt system, Canyonlands Utah, USA. [Karl Mueller](#), [Nadine Reitman](#), [Katherine Kravtiz](#), [Shemin Ge](#)
- 17:45 - 18:00 Dissolution of Pennsylvanian salt causes regional collapse of the landscape in Colorado, USA. [Robert M. Kirkham](#).
- 18:00 - 18:15 Internal structure and composition of megabreccias derived from dissolution of salt walls and domes in the Central African copperbelt, Democratic Republic of Congo. [Murray W. Hitzman](#)
- 18:15 - 18:45 **General discussion**
- 18:45 - 19:00 Instructions for the fieldtrip (Ian & Rami)
- 19:00 - 20:30 Dinner
- 20:30 - 22:00 Poster session, free beer + mingling

## 13 February, Tuesday

- 06:45 - 07:30 Breakfast
- 07:15 - 17:00 **Field trip – Bus** ([Rami Weinberger](#), [Ian Alsop](#), [Amos Frumkin](#), [Elchanan Zucker](#), [Tsafrir Levi](#), [Shmulik Marco](#))
- 19:00 - 20:30 Dinner
- 20:30 - 22:00 Poster session, free beer + mingling

## 14 February, Wednesday

- 06:45 - 07:30 Breakfast
- 08:00 - 09:15 **Salt in contractional settings** (Convener – Josep Anton Muñoz)
- 08:00 - 08:15 Role of salt in the hyperextended and inverted margins of the Mesozoic Pyrenean rift. [Pierre Labaume](#), [Antonio Teixell](#)
- 08:15 - 08:30 Halokinetic deformations and contractional megaflaps related to the evolution of detachment folds to diapirs on multi-layered evaporitic sequences: Experimental results and application to the Ebro Foreland Basin (Iberian Peninsula). [Oriol Ferrer](#), [Oriol Pla](#), [Eduard Roca](#), [Josep Anton Muñoz](#), [Oscar Gratacós](#)
- 08:30 - 08:45 Salt diapirism in compression: a reassessment of the fold-and-thrust belt of the Southern Pyrenees from the perspective of salt tectonics. [Laura Burrell](#), [Antonio Teixell](#)
- 08:45 - 09:00 Salt tectonics in fold and thrusts belts: examples from case studies and analogue modelling. [Josep Anton Muñoz](#), [Eduard Roca](#), [Oriol Ferrer](#), [Mark Rowan](#), [Esther Izquierdo](#), [Oriol Pla](#), [Núria Carrera](#), [Pablo Santolaria](#), [Pablo Granado](#) and [Oscar Gratacos](#)
- 09:00 - 09:15 Fluid-assisted, evaporate-enhanced décollements: localized brittle-plastic transitions. [Robert D. Hatcher, Jr.](#)
- 09:15 - 10:00 Posters session + Coffee break
- 10:00 - 11:30 **Numerical modeling, analogue models, and mechanics of salt systems** (Convener – Michael Hudec)
- 10:00 - 10:15 The role of salt as a basal and intermediate décollements in fold-thrust belts. [Hemin Koyi](#)
- 10:15 - 10:30 Why do squeezed diapir provinces have such variable structural styles? [Oliver B. Duffy](#), [Tim P. Dooley](#), [Michael R. Hudec](#), [Christopher A-L. Jackson](#), [Naiara Fernandez](#)
- 10:30 - 10:45 Bricks, ellipses, and hourglasses: a tale of contrasting welding during shortening. [Tim P. Dooley](#), [Martin P. A. Jackson](#) and [Michael R. Hudec](#)
- 10:45 - 11:00 Why do minibasins tilt? A 2D numerical study of the bowl-to-wedge transition in minibasins., [Naiara Fernandez](#), [Michael Hudec](#)
- 11:00 - 11:15 Numerical modelling study of mechanisms of mid-basin salt canopy evolution and their potential applications to the NW Gulf of Mexico. [Sofie Gradmann](#), [Christopher Beaumont](#)
- 11:15 - 11:30 Stress, deformation and failure associated with salt-sheet emplacement. [Maria A Nikolinakou](#), [Mahdi Heidari](#), [Michael R Hudec](#), [Peter B Flemings](#)
- 11:30 - 12:00 Coffee break
- 12:00 - 13:00 **Central Europe salt basins** (Convener – Piotr Krzywiec)
- 12:00 - 12:15 New Data Compilation and Assessment of Northern Germany's Salt Structures: Correlations between Distribution, External Shapes, Internal Structures, and Genesis. [Lukas Pollok](#), [Sascha Gast](#), [Markus Hölzner](#)
- 12:15 - 12:30 Salt deposition during Middle Miocene Badenian Salinity Crisis as a complex combination of glacio-eustatic sea-level lowering and tectonic activity of the Carpathians. [Krzysztof Bukowski](#)
- 12:30 - 12:45 Interaction between basement faulting, diapirism and cover deformation in inverted sedimentary basins – integration of geological, seismic and analogue modelling data. [Stanislaw Burliga](#), [Hemin A. Koyi](#), [Piotr Krzywiec](#)
- 12:45 - 13:00 "Salty" versus "non-salty" inversion tectonics and its control on depositional systems - Late Cretaceous evolution of the Polish Basin. [Piotr Krzywiec](#), [Łukasz Grzybowski](#), [Aleksandra Stachowska](#)
- 13:00 - 14:30 Lunch
- 14:30 - 15:00 (Invited) From evaporation to evaporites: Novel observations and concepts from the Dead Sea, the modern analog for deep halite-depositing basins (Nadav Lensky)
- 15:00 - 16:30 **Mechanics and mechanisms of salt systems** (Convener – Janos Urai)
- 15:00 - 15:15 Salt deformation and fluid flow in tectonic deformation and in engineered structures: natural laboratories, analogue and numerical models, rheology and microstructural evolution: towards a unified model. [Janos L. Urai](#)

- 15:15 - 15:30    Ediacaran to recent Salt Tectonics in Oman – an integrated approach unravelling salt deformation mechanisms. [Kukla, Peter, Janos Urai, Lars Reuning, Stefan Becker, Johannes Schoenherr](#)
- 15:30 - 15:45    Diapirs or convection cells in the type salt canopy of Central Iran? [Chris Talbot, Nastaran Abdolmaleki](#)
- 15:45 - 16:00    Topographic influence on the three-dimensional mechanics of a salt system, Canyonlands National Park, Utah. [Kravitz, Katherine, Karl Mueller, Phaedra Upton](#)
- 16:00 - 16:15    Can deep mantle processes influence regional salt tectonics? [Gillian Apps, Alex Bump, Tim P. Dooley](#)
- 16:15 - 16:30    Seismic imaging in and around salt bodies. [Ian Davison and Ian F. Jones](#)
- 16:30 - 17:00    Coffee break
- 17:00 - 18:30    **Salt in the Gulf of Mexico (Convener – Van Mount)**
- 17:00 - 17:15    Subsurface expression of a tertiary salt weld from the Gulf of Mexico. [Christopher A-L. Jackson, Yue Zhang, Donald Herron, Peter Fitch](#)
- 17:15 - 17:30    Salt interpretation for velocity model building using long offset multi-WAZ data - improving the subsalt image in eastern Mississippi Canyon, Gulf of Mexico. [Dan Chaikin](#)
- 17:30 - 17:45    Reassessment of the deposition of the Louann Saline Giant – a deepwater basin with extreme rates of precipitation? [Frank Peel](#)
- 17:45 - 18:00    A reversal in the roles of salt and sediment in the northern Gulf of Mexico: the rare effect of allochthonous salt advancement and inflation on over-pressured sediment. [Carl Fiduk](#)
- 18:00 - 18:15    Structural Configuration and Evolution of Subsalt Hydrocarbon Traps adjacent to Salt Walls in the Deepwater northern Gulf of Mexico. [Van Mount, Scott Wilkins, Brian Lindsey, Todd Butaud, Peter Gamwell, Todd Fowler, Carlos Morris, Haryanto Adiguna, Lara Heister, Byron McDonald](#)
- 18:15 - 18:30    Upper Jurassic structure and evolution of the Yucatan and Campeche subbasins, southern Gulf of Mexico. [Michael R. Hudec](#)
- 18:30 - 19:00    **General discussion**
- 19:00 - 19:15    Instructions for the fieldtrip (Ian & Rami)
- 19:15 - 20:30    Dinner
- 20:30 - 22:00    Poster session, free beer

## 15 February, Thursday

- 06:45 - 07:30    Breakfast
- 07:00 - 17:00    **Field trip – 4x4 vehicles (Rami Weinberger, Ian Alsop, Amos Frumkin, Elchanan Zucker, Tsafir Levi, Shmulik Marco)**
- 19:00 - 20:30    Dinner
- 20:30            Free evening, free beer, walk along the Dead Sea Esplanade

## 16 February, Friday

- 06:45 - 07:30    Breakfast / checkout
- 08:00 - 11:00    Guided tour at Masada (including cable car up/down)
- 11:00 - 12:00    Light brunch
- 12:00 - 14:00    Jerusalem (Crowne Plaza hotel)
- 14:00 - 15:00    Ben-Gurion airport
- 15:00 - 16:00    Tel Aviv

## List of Posters

1. The role of a basement fault and lithological heterogeneity in evolution of a salt structure during basin extension and inversion – numerical modelling result. [Burliga Stanislaw](#), [Marta Adamuszek](#), [Marcin Dabrowski](#)
2. Shortening of diapir provinces: translation, tilting and rotation of minibasins in isolated minibasin systems. [Dooley Tim P.](#), [Michael R. Hudec](#), [Oliver B. Duffy](#) and [Naiara Fernandez](#)
3. Shortening of salt basins containing isolated diapirs: a synthesis and new insights. [Duffy Oliver B.](#), [Tim P. Dooley](#), [Michael R. Hudec](#), [Christopher A-L. Jackson](#), [Naiara Fernandez](#)
4. The righting moment of minibasins: a simple stability analysis of subsiding minibasins. [Fernandez Naiara](#), [Michael R. Hudec](#)
5. Relationships between salt/overburden thickness and salt structures deformation patterns during extension and subsequent inversion of a domino-style basement fault system. [Ferrer Oriol](#), [Ken McClay](#)
6. Basement inheritance and salt tectonics in the SE Barents Sea: Insights from new potential field data. [Gernigon Laurent](#), [Marco Broenner](#), [Marie-Andrée Dumais](#), [Sofie Gradmann](#), [Arne Grønlie](#), [Aziz Nasuti](#), [David Roberts](#)
7. Fractal-like thickness and topography of the salt layer in a pillows province of the southern North Sea. [Hernandez Karina](#), [Neil C. Mitchell](#), [Mads Huuse](#)
8. A decadal snapshot of displacement length scaling and linkage of creeping faults in an extensional salt system using interferometric synthetic aperture radar. [Kravitz Katherine](#), [Karl Mueller](#), [Masato Furuya](#), [Kristy Tiampo](#)
9. Origin, characteristics, and distribution of intrasalt non-halite stratal packages at Patawarta diapir, Flinders Ranges, South Australia. [Kernen Rachelle](#), [Katherine Giles](#), [Mark G. Rowan](#)
10. Miocene evaporites of the Carpathian foredeep basin and their role in compressional tectonics - 250 years perspective. [Krzywiec Piotr](#), [Aleksandra Stachowska](#), [Mateusz Kufrasa](#), [Łukasz Słonka](#)
11. Stable isotope geochemistry of caprock from Damon Mound, TX: A closed system within a dynamic setting? [Labrado Amanda](#), [Benjamin Brunner](#), [Piper Poe](#), [Katherine Giles](#), [Stefano M. Bernasconi](#)
12. Salt tectonics on the Eastern Sardinian Margin (Western Tyrrhenian Sea): A proxy to reveal recent post-rift crustal tectonics. [Lymer Gaël](#), [Bruno C. Vendeville](#), [Virginie Gaullier](#), [Frank Chanier](#), [Morgane Gaillard](#)
13. Classification of caprock associated with salt diapirs. [Poe Piper](#), [Katherine Giles](#), [Benjamin Brunner](#), [Rachelle Kernen](#), [Amanda Labrado](#), [Kevin Lerer](#)
14. Salt growth in the Basque-Cantabrian basin (northern Spain): a review. [Yohann Poprawski](#)
15. Surface-piercing salt domes in Oman: A window into the deep subsurface of the Ghaba Salt Basin. [Reuning Lars](#), [Johannes Schoenherr](#), [Janos L. Urai](#), [Peter A. Kukla](#)
16. The early life of a salt giant: syndepositional basement faulting in the Zechstein of NE Netherlands. [Urai Janos L.](#), [Alexander F. Raith](#), [Raúl Michalón](#), [Marco A. S. Alquicira](#) and [Jessica Barabasch](#)
17. Glaciers of salt or deformed gypsum rich caprock? A new perspective on the episodic halokinesis in the eastern Fars province, Iran. [Závada Prokop](#), [Jiří Bruthans](#), [Sadegh Adine](#), [Mohammad Zare](#)
18. Internal structure and the uplift of the Sedom salt wall revealed by a deformed solution surface. [Zucker Elchanan](#), [Amos Frumkin](#), [Amotz Agnon](#), [Ram Weinberger](#)
19. Mineralogical assemblage of caprocks on salt domes: an archive for fluid flow. [Brunner Benjamin](#), [Katherine Giles](#), [Rachelle Kernen](#), [Amanda Labrado](#), [Kevin Lerer](#), [Piper Poe](#), [Stefano M. Bernasconi](#), [Jörn Peckmann](#)
20. The forgotten salt basin: Sivas Basin, Turkey. [Callot Jean-Paul](#), [Jean-Claude Ringenbach](#) and the Sivas Group