Geophysical Research Abstracts
Vol. 16, EGU2014-5708, 2014
EGU General Assembly 2014

The internal structure of salt: insights from a regional 3D seismic study of the Permian Zechstein 3 intra-salt stringer in the Northern Netherlands, and its implications for salt tectonics

Frank Strozyk (1,2), Janos L. Urai (2), Heijn van Gent (2,4), Martin de Keijzer (3), and Peter A. Kukla (1)

(1) RWTH Aachen University, EMR - Energy and Mineral Resources, Geology, Aachen, Germany (frank.strozyk@emr.rwth-aachen.de), (2) RWTH Aachen University, EMR - Energy and Mineral Resources, Structural Geology, Tectonics & Geomechanics, Aachen, Germany, (3) Nederlandse Aardolie Maatschappij B.V., Postbus 28000, 9400 HH Assen Office: Schepersmaat 2, 9405 TA Assen, The Netherlands, (4) now at: Shell Global Solutions International (GSNL), Kessler Park 1, 2288 GS Rijswijk, The Netherlands

In this study we aim to understand effects of internal layering on the structural evolution of the Late Permian Zechstein onshore the northern Netherlands. We study the well-imaged reflections of the 30-150 m thick Zechstein 3 anhydrite-carbonate intra-salt stringer across 6500 km^2 of 3D seismic data. We show that the Z3 stringer can be used to provide an unprecedented, basin-scale view of the 3-D internal structure of the salt. The seismic interpretation is used to evaluate the regional variation in structural style defined by rupture and folding of the stringer, and to assess the relationship with the sub- and suprasalt sediments.

Before its disruption the stringer was a continuous sheet with a complex pattern of thickness variation. This thickness variation played an important role in the initiation of down-building of Early Triassic post-salt sediments and associated passive deformation of the salt. The stringer's further deformation was controlled by regional variation in salt flows, which finally caused a high heterogeneity of its structural styles across the study area.

Regional trends of salt flows in the northern study area for example, caused a high disruption and northward drainage of the stringer. In contrast, the southern study area was partially decoupled from this process by fast and deep sediment down-building along major fault zones and shows less disruption of the stringer. The intra-salt structures that formed in both areas are hence very different, while top salt geometries can be rather similar.

It is implied therefore that the outer shape of the salt deposits does not reflect its deformation history, but that it is also controlled by differences in the internal structure and cumulative salt flow.