

Petroleum Systems and Play Types Associated With Permian Salt in Europe, North Africa, and the Atlantic Region

Gabor C. Tari¹, Joan Flinch³, and Juan I. Soto²

¹Exploration, OMV, Vienna, Vienna, Austria.

²Granada University, Granada, Spain.

³REPSOL, Madrid, Spain.

ABSTRACT

The amount of discovered hydrocarbons associated with Permian evaporites in the vast geographic area of Europe, North Africa and the Atlantic region is very significant. These evaporites have a very wide ranging impact on the petroleum system elements. The most variable impact appears to be the one affecting the trapping style which is subdivided into the broad categories of postsalt and presalt plays. The exceptionally large presalt petroleum accumulations are due to the impermeable character of the evaporites providing the ultimate top seal in many cases. The interaction of evaporites with reservoir units is typically underappreciated although it could be critical, especially in the case of carbonate reservoirs. A similarly overlooked aspect generally is the effect of salt on the thermal regime and therefore on the maturation of source rocks. There are hundreds of discoveries and producing oil and gas fields which are related to Permian salt in the study area, therefore only the critical elements in the very broad spectrum of proven and speculative petroleum plays are highlighted. Besides the proven plays, some conceptual untested plays are presented for future exploration. The salt-related plays and petroleum systems are subdivided into two major categories, i.e. postsalt and presalt petroleum systems. Six examples were selected to highlight the various postsalt plays in Mauritania, Morocco (Safi and Essaouira Basins), France (Aquitaine Basin), Albania (Dinarides/Albanides thrust fold belt) and the North Sea rift system (UK, Norway, Denmark, the Netherlands and Germany). The presalt plays are highlighted by four examples from Morocco (Atlas Mountains), Algeria/Tunisia (TAGI/TAGS plays), the Netherlands (Rotliegend play/Groningen Field) and Poland (Zechstein play/BMB Field). All these examples are illustrated by play type cartoons in a consistent graphic style. Finally, a systematic compilation of most of the salt-related plays, discoveries and producing fields related to Permian evaporites provides a useful starting point for future exploration efforts.