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Development of tectonic-controlled intraplatform basins in carbonate platforms: an analogue from the Triassic of the Dolomites (Northern Italy)

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ABSTRACT

Tectonic-controlled intra-platform (or intra-shelf) basins (depressions) are a common feature within extensive carbonate platforms, often associated with organic-rich sediments and/or evaporites. The development of these relatively shallow depressions is tectonically controlled and bounded by active fault scarps, with irregular shapes, often difficult to identify and predict using only subsurface data, due to resolution problems of seismic data. The importance of these basins rely on the fact that often are prone to develop significant source rock accumulations; the exploration and recognition of such basins is thus extremely important for the hydrocarbon exploration.

In this paper we present a model for tectonically active anoxic intraplatform depression, taking in account the outstanding outcrops of the Dolomites (Northern Italy) and comparing them with subsurface data: these outcrop has been used as analogue model for several examples of intraplatform basins found in the Southern Apennines and in the Zagros mountains.

The Moena Fm is made of black shales and carbonate breccias deposited during Anisian (Middle Triassic) in the Dolomites region, with a thickness between 50 and 90 meters. This unit, deposited in tectonically controlled intraplatform basins, is surrounded by shallow water carbonates (Contrin Fm), usually dolomitized. In order to define the depositional geometries in the Moena Fm and correlate them with the platform succession, we described several sections and acquired spectral gamma ray (SGR), comparing them with subsurface well data.

However, there are no sharp boundaries between the platform and the basinal environments, suggesting that the basin-bounding faults where morphologically degraded by erosion, thus depositing thick debris flows made of platform elements within the basins. In the case of the Moena Fm, the well bedded undisturbed black shales are quite rare, due to the strong instability within the basin.

The Moena Fm is in fact a good analogue for several subsurface examples and is helping us to better understand and identify this kind of units.
The chaotic and brecciated aspect of this unit suggests that its seismic image will be quite transparent and at the limit of the resolution of the seismic data (50-90 m), thus the use of analog data are necessary to create a proper geological model to identify its hydrocarbon potential and distribution.