THE TACHRIFT PROJECT: SEDIMENTARY ARCHITECTURE OF TURBIDITE CHANNEL-LEVÉE DEPOSITS (TACHRIFT SYSTEM, TAZA–GUERCIF BASIN, TORTONIAN, NE MOROCCO)

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ABSTRACT

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Turbidite channel-levée complexes have been the focus of extensive research from a number of modern and ancient deep-water turbidite systems over more than fifty years. Although high-resolution 3D-seismic studies have recently yielded unprecedented imaging of these deposits, their internal facies complexity remains elusive. To fill this gap, extensive well-exposed outcrops are particularly important, as they provide information on fine-scale facies heterogeneity.

This contribution reports on the ongoing 'Tachrift-Project', which aims to explore spectacular outcrops of several superimposed channel-levée complexes belonging to the Tachrift turbidite system (Late Tortonian) of the Taza–Guercif Basin (NE-Morocco). Arid climate and deep incision by ephemeral streams make for world-class, extensive, unexplored outcrops spread over an area of ~ 16 km^2.

The objectives of the project are threefold: (i) to document and interpret the depositional architecture of deep-water channel-levée complexes, including different types of channel-fill and levée elements; (ii) to present a generalized evolution of the channel-levée complexes, from inception to their deactivation, and (iii) to establish a model for stratigraphic geometries and facies relationships in levéed-channel complexes.

These aims are achieved through the following steps: i) geological mapping of the system; ii) reconstruction of internal architecture and facies distribution by means of closely spaced detailed sedimentological logs, bed-by-bed physical correlation and interpreted 2D and 3D cross-sectional profiles; iii) statistical analysis via an exploratory data analysis (EDA). A future development of the project will aim to create building 3D digital outcrop models of selected outcrops through photogrammetric data analyses acquired from UAVs (Uncrewed Aerials Vehicles).

Preliminary results provide valuable insights into facies and geometry of channel-fills and correlative levées over a ~150 m-thick and ~4 km wide transect largely oblique to palaeoflow, which may contribute to improving existing models of turbidite channel belt sedimentary heterogeneity and stratigraphic evolution, applied to understand the composition of subsurface analogues.