Theme 7. Deep-marine clastic depositional systems

General Session

Poster presentation

Architecture, evolution, and controls of channel–levee: Complex 4 from the Tachrift System (Taza–Guercif Basin, NE Morocco)

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The sedimentary architecture of channelised turbidites can be highly complex as it reflects the response of submarine channels to several interplaying factors, both allocyclic and autocyclic. Although largely studied through seismic imaging, turbidite channel fills are not satisfactorily understood for sedimentary facies and small-scale architectures at a sub-seismic scale. This contribution reports on the sedimentary architecture and the controls on the evolution of a ca. 20 m-thick channel–levee Complex 4 of the Tachrift system, which accumulated during the Late Tortonian onto the southern slope of the Neogene Taza–Guercif Basin (Rifean Corridor, NE Morocco). The elemental building blocks of studied channel–levee complex are single-storey channel fills and associated levees. Single-storeys are made of a few to several event beds that in channel fills can stack vertically in a cut-and-fill fashion, or laterally, forming lateral accretion packages (LAPs) with an overall sigmoidal shape. The elemental blocks are organized to form the architecture of Complex 4, which evolves from base to top: (i) a ca. 7 m-thick mud-prone interval containing relatively small and vertically stacked channel fills with poorly developed muddy levees, (ii) a ca. 4 m-thick and >1 km-wide sandstone-rich middle interval made of LAPs which is progressively less amalgamated upward and overlain by ca. 5 m of cm-thick sandstone intercalated with hemiplegic marlstones, and (iii) ca. 9 m-thick upper interval constituted by vertically stacked channel fills, made of variously directed LAPs, associated with well-developed levees. This architecture suggests that, following a phase of inception (i), the channel underwent extensive meandering with very minor vertical aggradation, prior to be blanketed by 'retrogressive' muddier deposits (ii) during a phase of reduced sediment input. In turn, the uppermost interval (iii) records a late phase of channel re-establishment and aggradation. The identified changes of architectural style are interpreted to reflect the response of variations in sediment supply and flow properties at temporal scales shorter than c. 30 kyr (estimated duration of Complex 4), and can be modulated by long-term adjustment of submarine channels to profile of equilibrium.