

## **Sedimentary evolution and chronostratigraphy of the Holocene NE coastal margin of the Caspian Sea: analogues and implications for hydrocarbon exploration and recovery**

Andrea Moscariello<sup>1</sup>, Bob Hoogendoorn<sup>1,2</sup>, Farida Akiyanova<sup>3</sup>, Fridja Ernens<sup>1</sup>, Vincent Verlinden<sup>1</sup>, and Salomon Kroonenberg<sup>1</sup>

<sup>1</sup>Delft University of Technology; section of Applied Geology

<sup>2</sup>Deltares; department of Applied Geology and Geophysics

<sup>3</sup>National Institute of Geography, Kazakhstan; Center of Earth Sciences.

This study focuses on the effects of rapid sea-level fluctuations the Caspian Sea experienced during the Late Pleistocene and Holocene, which induced numerous phases of the coastline shifts. In the North Eastern part of the Caspian Sea these shifts range at least 400 km between the estimated low- and highstand for this period, a consequence of the low gradient on- and offshore. The overall lowering of the sea level to the present level, has allowed a good preservation of sedimentary sequences and exposure of key outcrops, representing several sequence boundaries. Detailed study of the outcrops integrated with analysis of a large number of shallow cores both onshore and offshore have enabled us to reconstruct the complex and rapid succession of sedimentary and erosional processes associated with deltaic progradation, backstepping, autocyclic mouthbars shifting, shoreface development, and subsequent subaqueous and subaerial erosion, driven by marine and aeolian processes. A large number of numerical datings using both <sup>14</sup>C and OSL techniques allowed us to unravel the chronological succession of the stratigraphical units and reconstruct the dynamic evolution of this shallow marine coastal sedimentary system.

The persistence of very similar characteristics of the Caspian Sea coastal areas (closed basin, low gradient coastal plain, broad and low gradient shelf with no shelf-break, distal river-dominated, multi-channel distributary systems dominated by fine-grained sediment supply) since Late Cretaceous time, allow us to consider this modern system as a potential analogue for e.g. Tertiary oil and gas reservoirs located in the South Caspian Basin. The study of the North Eastern part of the Caspian Sea therefore offers an unprecedented insight on the sedimentary system of the Caspian area and thus the understanding of complex reservoir architecture and connectivity which may control both effectiveness of trapping mechanisms and hydrocarbon recovery of some important South and North Eastern Caspian fields.