Deepwater Carbonate Signal - the Central High Atlas as a Type Example

Christopher G. and C. Kendall
University of South Carolina

Turbidite and other non-cohesive density flow carbonate sediments and mass-transport deposits (MTD) accumulate downslope from the carbonate margins of the Jurassic High Atlas Basin as functions of local and global controls. Downslope carbonate elements include channels sands, levee sands, distal overbank supra fan mud sheets and slumped downslope small-scale soft-sediment deformation features. Tectonic history suggests that local uplift in the basin was penecontemporaneous with deposition.

Deepwater carbonate sediments of High Atlas range from sand to mud prone with differerences tied to sediments eroded from the adjacent carbonate shelves and the Liassic basin margin. Finer carbonate mud sediments comprise at least 70% of total succession and is “mud-rich”. Closer to the margin more “sand-rich” with a high net-to-gross ratio of carbonate sand and mud accumulations are thicker than the mud-dominated successions basinward. Sediment transport was driven by slope, tectonic movement and sea level change, with mud bypassing the fans to reach the outer basin though net-to-gross ratio patterns vary across the High Atlas Basin. Coarse-grained, sand-rich turbidite systems are uncommon. Evidence of sea level change is expressed by basinwide repeated and cyclic changes in the lithology and occurrence of condensed sequences with ammonites and organic and/or radioactive shales. These condensed layers are believed to be the result of high positions in the sea.

It is proposed climatic changes accentuating the signal of carbonate versus clastic shale beat, though most of basin fill was carbonate. Carbonate sediment sequestration on upslope shelves but local cementation reduced erosion of carbonates during sea level lows.