Geophysical Research Abstracts
Vol. 12, EGU2010-5766, 2010
EGU General Assembly 2010

Mixing mechanisms in siliciclastic-carbonate successions of Khan Formation (Permian), Central Iran

Mahdi Shadan and Mahboubeh Hosseini-Barzi
Geology Department, Faculty of Earth Science, Shahid Beheshti University,Tehran. Iran (hosseini@khayam.ut.ac.ir)

Mixing mechanisms in siliciclastic-carbonate successions of Khan Formation (Permian), Central Iran

M. Shadan & M. Hosseini-Barzi
Geology Department, Faculty of Earth Science, Shahid Beheshti University, Tehran, Iran
shadangeo@gmail.com

Mixing mechanisms in siliciclastic-carbonate successions of Khan Formation (Permian) have been studied in two sections (Chahroof with 197 m thick in north and Cheshmeh Bakhshi with 204 m thick in south) along basement Kalmard fault in Posht-e-Badam block, Central Iran. Siliciclastic units are characterized by well sorted, fine to medium grain quartzarenites with laterite interbeds, deposited in shoreline zone (foreshore, upper and lower shoreface) influencing wave and longshore currents. Longshore sands which have been transported along the coast made the sand bars in the shoreface. Further along the coast, returning of these currents as rip currents produced erosive channel inlets and caused to carry fine grain into the deeper regions of the basin. Based on this sedimentary model we introduced longshore currents as a probable agent for mixing, by transporting some volumes of sands into the adjacent carbonate environments.
Vertically, clastic units of Khan Formation underlined by carbonate units of a tidal flat and high-energy inner ramp system. Repeating of this pattern produced 3 cycles in each section.
Cyclic evolution, in studied sections, is accompanied with discrepancy in erosion and sedimentation. These factors caused to disperse local sub-aerial exposures in successions which are recognizable by laterite and conglomerate interbeds. These horizons of sub-aerial exposures are more often in Chahroof section than in Cheshmeh Bakhshi section and indicate more fluctuations of relative sea level probably due to more local tectonic activity in the northern part of the Kalmard fault than in the southern part of it. Also, thicker siliciclastic units in Chahroof section show higher rate of sediment supply and/or more accommodation space there.
Moreover, the late Paleozoic glacial conditions in Gondwana lands supported the large volume of clastic supply into the basin by intense weathering and erosion of vast exposed regions in Posht-e-Badam block. Also, tectonic activity along Kalmard basement fault mainly controlled local sea level changes and lithology of outcrops in the hinterlands. Therefore, interplay of these factors during lowstand of relative sea level, with lower accommodation space and higher gradient led to high rate of sediment input and distribution of siliciclastics in the base of each cycles. In contrast, relative sea level rises have been corresponded to the more accommodation space and reducing of siliciclastic entrance into the sedimentary basin that made a suitable condition for carbonate production. Therefore, during relative sea level rise, verities of carbonate-producing organisms tend to more rates of biogenic carbonate products and eventually formation of carbonate units upon the preexistence silisiclastics.
Therefore, mixing of siliciclastics with carbonate deposits in Khan Formation have mainly been controlled temporally by sea level fluctuations due to local and/or eustatic sea level changes and spatially by variations in local tectonic activities and lateral facies mixing by longshore currents.