

## **Construction of Cambrian and Early Permian depositional and sequence stratigraphic model of Eastern Potwar Basin, Punjab, Pakistan: Using gamma ray tool.**

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### **Abstract**

Wireline Log data of Turkwal Deep-01 well is used to construct depositional model and transgressive-regressive sequences of Cambrian and Lower Permian strata in Eastern Potwar region of Punjab, Pakistan. Based on Gamma Ray (GR), Resistivity log (LLD), Density log (RhoB) and self-potential log (SP) along with published literature data different, environments of deposition are assigned to the Cambrian and Lower Permian rock units.

The Cambrian Khewra Sandstone has 6 facies KH1 shows a marginal marine deepening upward sequence, KH2 facies is storm dominant lower shelf or storm dominant pro delta, KH3 facies indicates channel fill and point bar deposits of delta front, KH4 shows a switching delta lobe environment due to marine influx, KH5 shows a changing delta environment, KH6 facies is a distributary channel fill environment. Overall Khewra Sandstone depositional environment ranges from shallow marine to transitional (deltaic) and terrestrial facies indicating a regression phase of sea level. The Kussak Formation has two facies, KS1 indicates a shallow marine environment with deepening upward sequence. KS2 facies is indicative of shallow marine environment with a deeper influx as log shows a more shale in the facies. Overall Kussak Formation mark a transgression of sea level. The Jutana Formation is showing another episode of regression, while its facies are documented as shallow marine (JT1), followed by subtidal (JT2), intertidal (JT3) and some supratidal (JT4) facies.

The Tobra Formation which contains glacial facies shows a fall in the sea level. It consists of Diamictite glacial deposits (TB1), wash out plain deposits (TB2) and followed by subaqueous Diamictite facies (TB3). The Dandot Formation record a rise in sea level as its facies are ranging from marginal marine lower to middle shore (DT1) then to outer shore to inner shelf (DT2) and then outer shelf (DT3) environment. The Dandot Formation is followed by terrestrial fluvial sediments of the Warchha Sandstone which marks a prominent fall in the sea level and contains channel facies of abandoned channel (WR1), Meander channel (WR2) and Multistory channel deposits (WR3), while upward the Sardhai Formation record transitional channel sheet deposits (SR1), lagoonal delta environment (SR2), lagoonal environment (SR3) and inner lacustrine environment (Lagoon) (SR4) facies which were deposited in the transgression phase.