

10.03: Lithology Based Prediction of Pressure, Fracture Gradient and Strength

Mark Zablocki, Tufts University

ABSTRACT

Variations in clay and silt content have been found in mudrock basin fills. Several studies have characterized the compression behavior of various silt-clay mudrock mixtures but little is known on the variation in strength parameters. This study makes use of K_0 -consolidated undrained triaxial compression tests to study the behavior of mixtures of Resedimented Gulf of Mexico Eugene Island (RGoM-EI) and Min-U-Sil. Specimens were prepared using standard resedimentation techniques and compressed to 1 MPa prior to shear.

The results provide insight into the behavior of soil mixtures through observed trends in the critical state friction angle, undrained shear strength, and lateral stress ratio. A correlation is presented based on the variation in lateral stress ratio and percent clay at a vertical consolidation stress of 1 Mpa. The correlation is used to predict the fracture gradient of the Macondo well using the lithology logs.

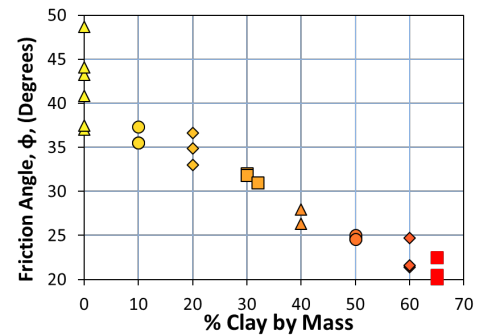
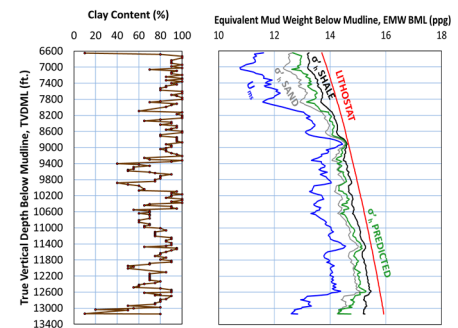


Fig 1: Variation of friction angle of mixtures with clay content at 1 MPa.



[Figure 2](#)

Fig 2: Lithology profile of Macondo Well based on logs and predicted fracture gradient profile based on lithology.

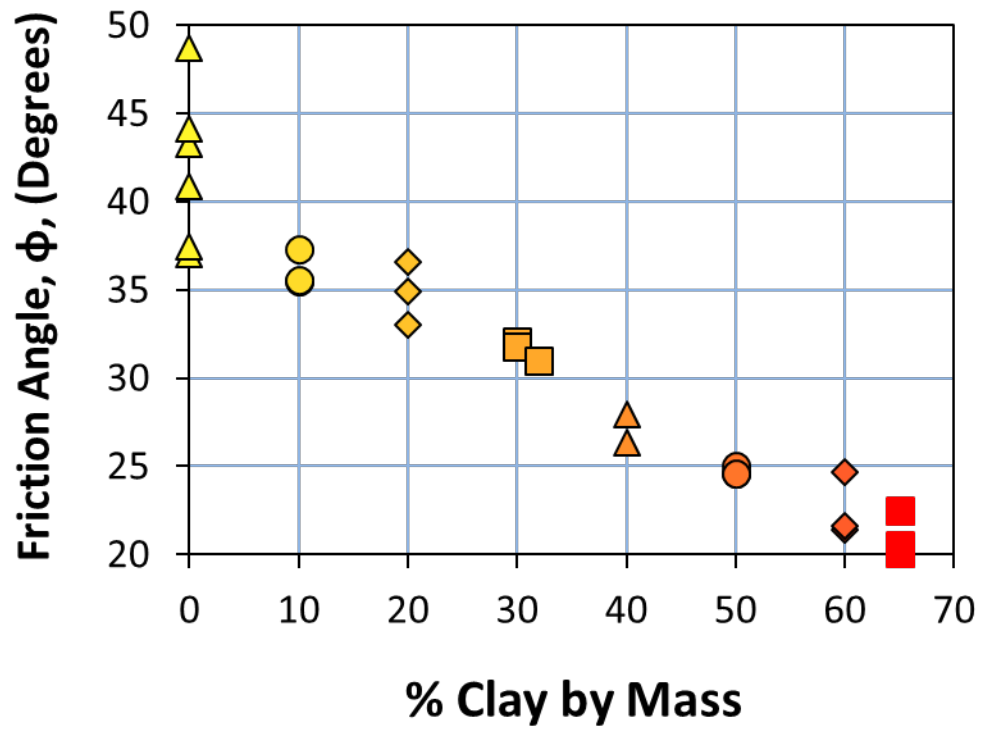


Fig. 1: Variation of friction angle of mixtures with clay content at 1 MPa.

[Back](#)

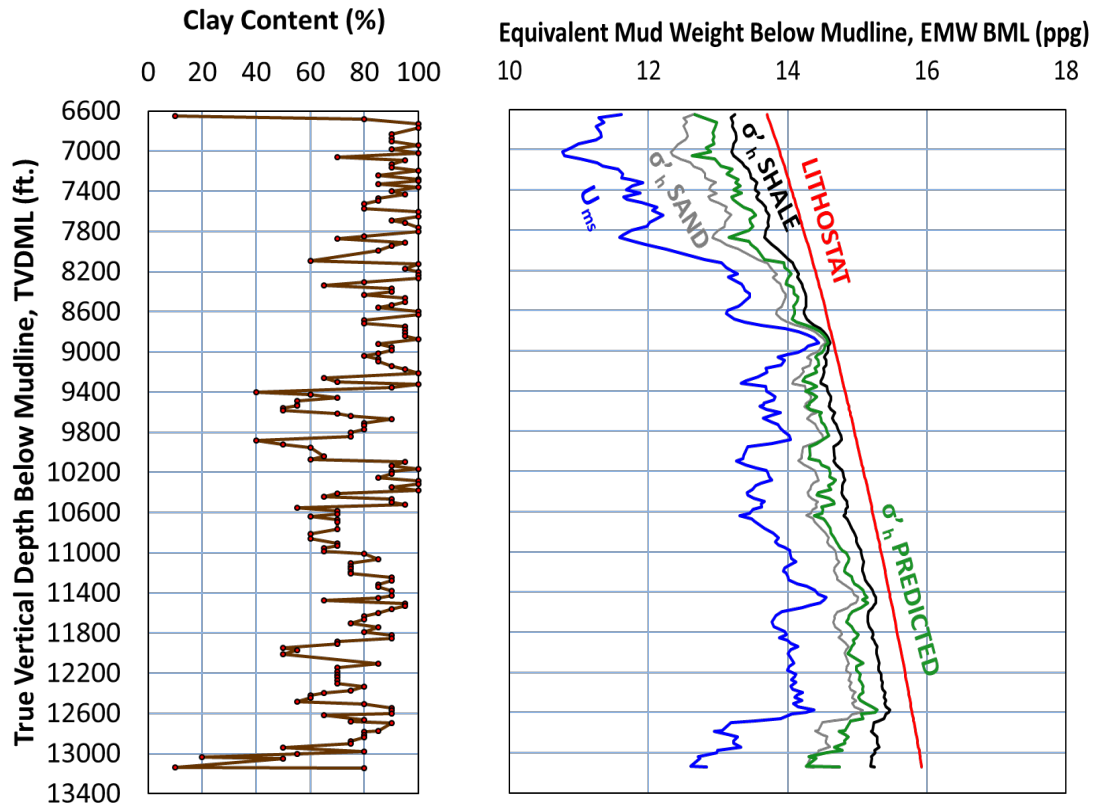


Fig. 2: Lithology profile of Macondo Well based on logs and predicted fracture gradient profile based on lithology.

[Back](#)