

# GRAVITY AND MAGNETIC SURVEYS IN WEST-CENTRAL LOUISIANA IMPLICATIONS FOR LIGNITE EXPLORATION

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## ABSTRACT

Lignite is the product of swamp and marsh peat accumulations and is a component of fluvial, deltaic, and strandplain-lagoonal facies. In a fluvial system, the lignite is associated with the floodplain deposits. Deltaic lignites occur as delta-plain interdistributary deposits. Lagoonal lignites occur in barrier-bar and strandplain deposits, or in a bay-lagoon system, where lignite forms as an undip facies.

Rivers have been noted to stack in the Gulf Coast, favoring the locations of previous riverbeds to new locations. A cross-section perpendicular to regional stream flow shows the channel and near channel deposits of each stream to occur as a vertical sequence. This preference has localized river deposits and delta orientation, thus stabilizing the position of the facies favorable to lignite accumulation.

A model which explains the restriction of river channels to relatively narrow belts is that basement tectonics creates lows to which the rivers are restricted.

Properly filtered gravity and magnetics data should reveal the resulting topography of the crust-sediment interface.

Gravity and magnetic data from a 2 mile by 2 mile grid over 2,224 square miles in west-central Louisiana result from geologic features of various origins and areal extent. Total field magnetic data contain a pronounced high in the northwest portion of the data which is interpreted as being due to the Sabine Uplift. Unfiltered Bouguer gravity data are dominated by a planar trend which is high in the east and low in the west. This is probably due to topography on the crust-mantle boundary. Removal of this regional trend by polynomial surface fitting reveals a gravity anomaly which shows remarkable similarity to the magnetic anomaly interpreted as due to the Sabine Uplift. Further filtering by polynomial fitting has accentuated higher order anomalies which are probably due to variations in basement sediment interface topography.

Qualitative interpretation of the data (three dimensional geologic modeling based on the data is in progress) indicates that radial grabens exist at least on the southeast flank of the Sabine Uplift and that at least one strong low (possibly a graben) circumferential to the Sabine Uplift exists in the study area. Correlations of the data with the stratigraphic data of Coates *et al* (GCAGS, 1980) are high and indicate that the river channels in the Wilcox were influenced by these basement features.

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## REFERENCES CITED

- Coates, E. J., C. G. Great and George F. Hart, 1980, Subsurface Wilcox Lignite in West-Central Louisiana: Gulf Coast Assoc. Geol. Socs. Trans., v. 30, p. 309-332.