USING REMOTE SENSING IMAGERY TO LOCATE SUBSURFACE STRUCTURES IN LOW RELIEF BASINS

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ABSTRACT

Surface indications of deep subsurface structure can be identified from remote sensing imagery. This technique can locate structures in the low relief basins of west Texas and the Gulf Coast. Interpretation of Multispectral Scanner (MSS) and Thematic Mapper (TM) Landsat and National High Altitude Photography Program (NHAP) images can identify changes in surface geology, topography, drainage patterns, and soil moisture associated with subsurface structures.

In the Gulf Coast, surface structures associated with salt diapirs, listric normal faults, and rollover anticlines have been identified from imagery. In west Texas, differential compaction and drape over carbonate buildups are reflected in the surface geology and can be located by image analysis. Imagery has also been used in west Texas to identify faults and structures that have undergone periodic reactivation.

Computer manipulation improves interpretation by accurately integrating image, surface, and subsurface data. Potential surface structures are compared by computer to geographically correlated subsurface structure, seismic, production, gravity, and magnetic maps. Image analysis can guide data acquisition relative to surface anomalies and interpreted structures in areas where little subsurface information exists.

Satellite imagery is a useful exploration tool enabling the interpretation of regional structural styles and the surface geology of entire basins. Prospective structures in frontier basins can be identified from imagery where other data are lacking or of poor quality. Image analysis combined with subsurface data can be used in mature basins to locate structures overlooked by other methods. Integrating multiple image, surface, and subsurface data can identify structures that have escaped detection.

PERMIAN BASIN PLAYS: TOMORROW'S TECHNOLOGY TODAY, October 31-November 1, 1991