

**ABSTRACTS OF OTHER PAPERS READ AT THE  
ANNUAL CONFERENCE, JANUARY 1996**



**THE USE OF FORAMINIFERAL DATA IN THE  
DETERMINATION OF SEA-LEVEL CHANGES IN THE  
TURONIAN OF SOUTH-WEST ENGLAND.**

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The life-cycle of planktonic foraminifera allows the depth of water available to the plankton to be assessed. Using measurements of maximum test diameter, relative changes in sea-level can be determined and these show a major deepening episode in the latest Early Turonian and Middle Turonian followed by a marked shallowing in the Late Turonian. Isotopic data appear to confirm this pattern as does the characteristic distribution of *Labyrinthidoma southerhamensis*, a large, internally complex benthonic foraminiferid.

**THE INTERPRETATION OF LINEAMENTS FROM  
LANDSAT TM IMAGERY OF SOUTH-WEST ENGLAND  
AND THEIR RELATIONSHIP TO REGIONAL  
STRUCTURAL TRENDS.**

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Two scenes of Landsat TM imagery covering south-west England have been interpreted for lineament trends and densities. Using a coarse pixel resolution of 150 m, the local pixel variance reflecting small anthropogenic features is decreased, cleaning the interpreted map of spurious lineaments. Once cleaned, the scaling effects on directional lineament families have been investigated for a single sub-scene from north Cornwall.

The main lineament trend identified in south-west England is E-W with subordinate trends to N-S, NW-SE and NE-SW. The distribution of lineaments along subordinate trends across the region can be identified using computer-generated contour maps of lineament length and frequency. Major E-W lineament trends are thought to reflect the trend of regional Variscan structures such as folds, lithostratigraphy and major thrust faults. Minor trends correspond with regional fracture patterns of uncertain origin. This apparently simple regional pattern implies little vertical axis rotation along major late and post-Variscan structures. At increased resolutions, however, a higher directional complexity in the lineament populations is observed as smaller linear features fall within the image observation threshold. Consequently large scale lineaments may reflect linear zones of deformation or rotated linear features. The regional lineament trends may therefore oversimplify the actual nature of the deformation in south-west England.

**SM-ND ISOTOPIC EVIDENCE FOR THE AGE AND  
ORIGIN OF CROSSCOURSE MINERALIZATION IN  
SOUTH-WEST ENGLAND.**

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Previous work demonstrated a Triassic (Ladinian/Carnian) age for N-S trending Pb-Ag-Zn-F veins in the Bere Alston district of the Tamar Valley. Similar veins in the Menheniot district of east Cornwall are rich in fluorite and samples of this mineral from two vein systems have been studied by the Sm-Nd and Rb-Sr techniques. The Sm-Nd data have yielded an isochron age which also places the Menheniot fluorite mineralization in the Middle to Late Triassic. The fluorite data are compared with Sm-Nd analyses for samples of Late Permian to Late Triassic red bed sediments from the eastern margin of the Wessex Basin. Similarity between the Nd isotope signatures of the fluorites and those of the Permian and Triassic sedimentary rocks provide further evidence for the involvement of basinal fluids in the crosscourse mineralization of the south-west England orefield.

**HYDROGEOLOGICAL BEHAVIOUR OF THE OTTER  
VALLEY AQUIFER.**

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The Triassic sandstone aquifer in the Otter Valley comprises the Otter Sandstone and underlying Budleigh Salterton Pebble Beds Formations, confined to the east beneath the Mercia Mudstone Group. Field permeability of the aquifer varies between 1 m and 7 m per day, with transmissivities between 50 and 700m<sup>2</sup> m/day. Moisture balance analyses show that the average annual groundwater recharge over the aquifer is about 305 mm/year. Some recharge comes from surface runoff from the valley slopes of the River Otter.

A two-dimensional finite difference model was constructed to simulate the regional distributions of groundwater level and its variation with time. The model used a constant mesh spacing of 0.25 km, covering an area of 130 km<sup>2</sup>. Transmissivities and storage coefficients vary from node to node. Daily nodal inflows and outflows were estimated for a period of 30 years. Adequate agreement was obtained between simulation and field data. The model was then used to predict the aquifer behaviour over the future development of the Otter Valley aquifer.

**EVIDENCE FOR MULTIPHASE DEFORMATION ASSOCIATED WITH MOVEMENT ALONG THE START BOUNDARY ZONE AT HOPE COVE, SOUTH DEVON.**

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The Start Boundary Zone is a major E-W trending high strain zone separating the Start Schists to the south from the Dartmouth Slates to the north. The boundary zone is well exposed at Hope's Cove, south Devon, where it forms a wave-cut platform on Outer Hope Beach.

Sinistral and dextral strike-slip geometries can occur in both brittle and ductile structures, suggesting a multiphase movement history along the boundary. A polyphase ductile history of foliation development and folding appears to have been associated with early shear along the zone. Asymmetrical quartz fish and conjugate shear bands developed in both the Start Complex and Dartmouth Slates indicate overall dextral simple shear. Subsequent brittle structures, mainly quartz vein arrays, indicate phases of both sinistral and dextral shear. Early sinistral transtensional arrays are consistently overprinted by dextral transpressional arrays. Discrepancies between the fold hinge and shear band orientations across the boundary zone indicate approximately 20° anticlockwise relative rotation of the Dartmouth Slates with respect to the Start Complex and the boundary, a model for which is presented.

**TOWARDS AN INTERGRATED STRATIGRAPHY OF THE SELBOURNE GROUP (UPPER GREENSAND AND GAULT CLAY) OF SOUTHERN ENGLAND.**

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Since their description in the last century, the Late Albian-earliest Cenomanian sediments of southern England have been known to show marked lateral facies variations related to a shelfal

("Upper Greensand") to basal ("Gault Clay") west to east transition. In this study we place recent sedimentological analysis of these deposits into a sequence stratigraphic setting and examine how changes in relative sea-level have influenced sedimentation. A compilation of the available biostratigraphic data (from both macro- and microfossils) provides a chronostratigraphic framework within which to develop the sequence stratigraphy model. By using sequence stratigraphy techniques we can examine and predict facies distribution by constructing gross depositional environment maps for each system tract recognised.

A new lithostratigraphic scheme is proposed for the studied sediments reflecting facies interrelationships. The Upper Greensand is renamed the Wessex Greensand Formation and placed with the Gault Clay Formation into the Selborne Group. Also included in this Group is the Haldon Sands Formation of south Devon. A number of Members are designated within the Wessex Greensand Formation in recognition of distinct facies differences.

The Selborne Group represents a classic example of a 3rd order sequence. This is evident from chronostratigraphically controlled outcrop correlations whilst well log signatures and seismic evidence are currently equivocal. Within the Wessex Greensand Formation, changes in sedimentological processes interpreted from the detailed logging of outcrop sections can in turn be related to changes in accommodation space and the development of a transgressive systems tract and highstand systems tract. The relative sea-level changes indicated by the Late Albian-earliest Cenomanian succession in southern England are compared with those indicated by similarly aged sediments from other parts of the world in order to investigate the degree of eustatic influence. This can be shown, within the limitations of biostratigraphic control, to be significant.

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**ABSTRACTS OF POSTER PRESENTATION**



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**LOW-FLIGHT AERIAL PHOTOGRAPHY AND ENVIRONMENTAL MONITORING.**

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Aerial photographs of ten environmentally important sites in south-west Cornwall were taken using hand-held cameras, to investigate the cost-effectiveness and value of frequent aerial monitoring. The photography has been used to develop thematic maps of vegetation cover and land use in a variety of environments; to monitor coastal erosion and mining activities. Considerations of ground resolution and geometric distortion have been made and it is hoped that digital imagery may be obtained from the photographic material,

Current indications are that the technique is extremely cost-effective as both a research and as a teaching tool. The research report is expected to be available by May 1966.