

**ABSTRACTS OF OTHER PAPERS/POSTERS PRESENTED AT THE  
ANNUAL CONFERENCE, JANUARY 2015**



**THE SCOTT SIMPSON LECTURE**

**QUANTIFYING THE VARISCAN – A BASIN  
MODELLING ATTEMPT**

Chris Cornford

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Modern basin modelling software allows one to stack (and uplift/erode) the complete time sequence of geological strata for an area – both preserved and eroded. Indeed, this type of modelling demands that one accounts for all geological time in terms of Formations (preserved), Deposits balanced by Erosion or Hiatus events. The preserved geology of South-West England is mainly Devonian-Carboniferous, which had an exciting baptism during the Variscan orogeny where some 6-10 km of long vanished thrust slices covered our present land surface. Thereafter, most of the onshore geology is missing. Given an understanding of the palaeo-heat flow and hence geothermal gradients, limits can be placed on the thicknesses and timings of these missing strata, as defined by the thermal (kinetic) maturation of the underlying rocks. The extent of burial of the Devonian-Carboniferous is constrained by measurements on the organics (vitrinite reflectance), minerals (illite crystallinity) and the PVT properties (fluid inclusions) of the preserved strata. In addition, in modelling terms the volumes of the eroded thrusts must balance against the volumes of New Red Sandstone (Permo-Triassic) in the surrounding offshore basins of the English Channel and Approaches in the south and the Bristol Channel and South Celtic Sea basin to the north. This will be demonstrated live as a first crude attempt at a dynamic geological model of South-West England, the investigation being undertaken using Zetaware's 3-D Trinity software, a standard oil industry package. Once established, this basic model can then be used by structural geologists, stratigraphers, sedimentologists, mineralogists, etc. to test ideas, and *a priori* for risk reduction in petroleum exploration.

**HOW DO YOU TELL THE DIFFERENCE BETWEEN  
SANDSTONE FROM THE CRACKINGTON FORMATION  
AND THAT FROM THE BUDE FORMATION  
IN BUILDINGS?**

M.C.W. Barr

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Following a brief summary of the progress made in a survey of the building stone of Devon and adjacent parts of Somerset and Dorset, attention will focus on the difficulties encountered in differentiating between Crackington and Bude Formation sandstones in buildings. The views of the audience will be sought on the correct attribution of sandstone in buildings both

on and remote from the outcrop of these formations, assisted by photographs of Devon churches, houses, outbuildings, walls and embankments.

**A PROPOSAL FOR AN ARCHIVE OF PHOTOGRAPHS TO  
BE SET UP, SHOWING FEATURES OF GEOLOGICAL  
INTEREST IN THE CHINA CLAY PITS**

Colin Bristow

*China Clay History Society/Cornwall Geoconservation Group*

With the evolution of the china clay industry into the 21st Century, many geological features of considerable scientific interest formerly visible in the pits are no longer accessible. This may be because they have been quarried away, or because the pit is no longer worked and is flooded, covered in vegetation or backfilled. Some of these features provided the vital field evidence for important advances in our understanding of the petrogenesis of the granites and their mineralization. Many papers read to this Society have debated these aspects. These geological features only live on in the photographs taken by many people over the last 50 years or so. Because of this, there is a need to record and conserve these photographs. Provided suitable funding can be found, it is proposed that an archive be set up which could receive photographs from geologists who have photographically recorded important geological features. These could then be entered into the archive or electronically copied and sent back to the contributor. Provenance information would be essential and some form of copyright waiver given. Some slides showing the kind of geological features no longer visible and worth recording will be shown. The need for a photographic archive would also apply to the ball clay industry.

**THE BURTLE BEDS REVISITED: NEW DATES AND  
PALAEOENVIRONMENTAL INTERPRETATIONS**

A.G. Brown<sup>1</sup>, A. Imeson, R. Brunning, R. Herbert,  
K. Penkman and S. Taylor

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The Burtle Beds Formation underlie the 'burtles' or 'islands' within the valleys of the Somerset Levels and are a key late Quaternary lithostratigraphic unit in South-West England. There has been significant debate over their environment of deposition and their age and as a result they were one of the first sediment bodies to be dated using amino-acid racemization (AAR) in the 1980s. This paper presents new lithostratigraphic, sedimentological, molluscan data and AAR dating from recent sampling at Greylake in the Brue Valley. The results provide both confirmation of the existing frameworks and add further detail concerning both age and the environment of deposition.

**NEW P-T CONSTRAINTS ON PEAK METAMORPHISM AND CRUSTAL MELTING DURING EMPLACEMENT OF THE LIZARD COMPLEX: IMPLICATIONS FOR THE PETROGENESIS OF THE KENNAK GNEISS**

R. Buchanan

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The Devonian-age Lizard Complex (Cornwall, England) includes a well-exposed sub-ophiolitic unit containing highly sheared metagabbro and antigorite serpentinite associated with pelitic and mafic amphibolites. An enigmatic suite of banded composite magmas – known as the Kennack ‘Gneiss’ – intrudes the overriding mantle peridotites, and appears to bear a significant crustal source. In this study, amphibole-plagioclase and Ti-in-quartz thermobarometry has been used to quantify the metamorphic evolution of several key lithologies from below the ophiolite. The Traboe metagabbro attained peak metamorphic conditions at ~700°C and ~7.5 kbar. However, significantly lower-grade conditions (~620°C and ~3.8 kbar) are recorded in the Landewednack amphibolites that directly underlie the basal thrust of the ophiolite, suggesting that they did not undergo melting. Combined Ti-in-quartz geothermometry and oxybarometry from a granitic portion of the Kennack Gneiss suggests melt emplacement at considerable pressures (3.5-4.5 kbar), and synchronous with the on-going decompression of the entire complex to 2 kbar. A tectonic model involving lithospheric uplift-driven decompression and widespread muscovite dehydration from the Givetian to Frasnian stage is therefore proposed to explain the petrogenesis of the Kennack Gneiss. It is strongly suggested that shear heating during ophiolite emplacement may not have been a primary control on crustal melting.

**NEW INFORMATION ON THE SEVERNSIDE LEVELS**

A. Cattell

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The geology and engineering properties of the estuarine alluvium of the Severnside Levels were investigated and reported on in the 1960s to 1980s, spurred by the construction of the M5, culminating in Hawkins' (1984) observations on engineering consequences of the geology. Structural Soils have carried out many site investigations on the Severnside Levels in subsequent years, which have included >140 boreholes, most of which reached bedrock, and many extended into bedrock by rotary coring. In addition, recent investigations have included CPT (cone penetration test) probes, which give a continuous theoretical soil profile which can be correlated with borehole logs. The new data allow locally detailed maps of geological features to be drawn, showing the distribution of features such as peats, sand bodies, and depth to bedrock, which are of engineering importance. In addition, the CPT profiles show the presence and continuity of thin layers of contrasting soil type in the alluvium. These are difficult to log and correlate in conventional boreholes but are critical in estimating likely settlement rates, a key factor in engineering design. The new boreholes also help better delineate the limit of basal gravels, and the variation in lithology in the underlying Mercia Mudstone.

**FLUID AND QUARTZ EVOLUTION DURING ASCENT AND EMPLACEMENT OF THE LAND'S END GRANITE**

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In order to unravel the chemical evolution of quartz and coexisting aqueous fluid, we have studied fluid inclusions and trace elements in quartz from the megacrystic biotite granite that dominates the composite Land's End granite. Two main stages of quartz growth are recognized: an early phenocrystic stage and a later stage of fine-grained quartz growth. Phenocrysts show resorbed cores of varying size with dull cathodoluminescence (CL), and brighter luminescing rims with oscillatory zoning. Total CL intensity is correlated to the Ti content, and is indicative of major variation in P-T conditions (i.e. resorption) and minor stages of non-equilibrium growth (i.e. oscillatory zoning) during formation of quartz phenocrysts. The phenocrysts grew together with K-feldspar megacrysts at a deeper level. The fine grained groundmass quartz shows strong CL zoning with brightly luminescing cores containing up to 215 µg<sup>-1</sup> Ti, and dull rims with Ti between 30-60 µg<sup>-1</sup>. In the cores, Al correlates with Ti and represent a stage of rapid non-equilibrium growth and high nucleation rate. Three types of fluid inclusions are observed in the described quartz generations. The varying total salinity and Na:Ca ratio represents exsolution of progressively less saline H<sub>2</sub>O from the silicate melt. Calculated isochores show that the different fluid inclusion types were trapped in the groundmass quartz over a pressure range during final period of ascent of the magma.

**QUATERNARY LANDSCAPE CHANGE AND HOMININ OCCUPATION IN THE AVON VALLEY, HAMPSHIRE**

E. Egberts<sup>1</sup>, L.S. Basell<sup>2</sup>, A.G. Brown<sup>3</sup>, P. Toms<sup>4</sup> and K. Welham<sup>1</sup>

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This paper will focus on the preliminary results of research on the Avon Valley, Hampshire. It is concerned with understanding Quaternary landscape change and hominin occupation in southern England using a geoarchaeological approach. During the Pleistocene, the Avon was a major tributary of the now submerged River Solent. Like the Solent, it is characterised by flights of river terraces, formed by fluvial processes initiated by climate cycles and tectonics. Interestingly, the area is home to two of the few known ‘super sites’; exceptionally large concentrations of Palaeolithic artefacts, among many smaller sites. Studying the river gravels and artefacts contained in them can elucidate past landscape change and hominin behaviour, as extensively done on the Solent terraces. In contrast, the terraces of Avon have been largely neglected due to a lack of dateable materials. This project aims to bridge this gap by OSL-dating the Avon terraces, recording new exposures and analysing the artefacts recovered from them. This may lead to a better understanding of the

relationship of the Avon terraces to those of the Solent, the context and formation of the large concentrations of implements, and a broader understanding of the influence of landscape change on hominin presence in Britain.

### THE POSITION OF THE PERMO-TRIASSIC BOUNDARY IN DEVON

R.W. Gallois

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An almost complete Permo-Triassic succession over 3 km thick is exposed on the south Devon coast between Torbay and Lyme Regis. With the exception of the youngest (Rhaetian) part, the succession is in red-bed facies that includes breccias that were deposited in wadis and on fans, aeolian and fluvial sandstones, and playa-lake and sabkha mudstones. Few of the formations can be dated with any certainty. Radiometric dates from contemporaneous igneous rocks in the older part of the succession indicate Early Permian ages; a miospore and a reptile track from the middle and upper part of the succession indicate Early or Middle Permian ages. These are overlain by up to >1000 m of sediments, almost all of which are exposed in the coastal cliffs, for which there is no direct age-related evidence. Vertebrate assemblages in the higher part of the succession indicate a Middle Triassic age, and this has been confirmed by magnetostratigraphy. Re-examination of the field evidence has shown that there are numerous sedimentary breaks in the succession which represent time intervals of unknown duration. The succession is best interpreted as relatively continuous sedimentation punctuated by numerous hiatuses, many of which resulted from climatic change and/or tectonic events.

### SQUID 'EAR BONES' (STATOLITHS) FROM THE JURASSIC SUCCESSION OF SOUTH-WEST ENGLAND

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Squid 'ear bones' – or statoliths – are a part of the balancing organs of modern and probably most fossil squids. Over the course of the last 10 years fossil statoliths have been discovered in the Jurassic sediments of the Wessex Basin (South-West England). They are probably all related to teuthids, such as *Belemnotheutis antiquus* of Callovian–Oxfordian age. Thus far, we have identified four possible 'species' of statolith that are in the process of being formally described, named and their possible relationships determined. The sediments from which these statoliths have been recorded also contain squid hooks (oncytes), otoliths (fish 'ear bones') and other microfossils (including foraminifera). All are, therefore, of marine origin. In the case of the Christian Malford and Ashton Keynes lagerstätten (of late Callovian age), the statoliths are associated with exceptional, soft-bodied preservation of squids and it may be possible to determine the parent animal of the recorded statoliths. A number of museum collections (Natural History Museum London, Natural History Museum Paris, Smithsonian Institution Washington, etc.) are being investigated in order to trace the possible host animals for all of the recorded statoliths. Despite many thousands of samples of Cretaceous sediments being investigated for foraminifera over the past 40+ years, no statoliths have been recorded.

### FORAMINIFERA FROM THE FOWEY ESTUARY, CORNWALL

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Foraminifera are described from the estuary of the Fowey River in South-East Cornwall. Part of the estuary has recently (November 2013) been designated as the 'Upper Fowey and Pont Pill' Marine Conservation Zone (MCZ) and this paper reports the first investigation of the foraminifera (marine and brackish water protists) that live in the area. Foraminifera assemblages are described from the saltmarsh environments near Lostwithiel, at the head of the estuary, seawards to the sea grass meadows in Polruan Pool. The latter are outside the designated MCZ, though still represent an important marine habitat. The foraminifera are typical of comparable communities all along the South Cornwall and South Devon coastline, an area in which some of the earliest research on near-shore foraminifera began with the pioneering work of George Montagu (1753–1815), Fortescue Millett (1833–1915), Edward Heron-Allen (1861–1943) and Arthur Earland (1866–1958).

### THE ORIGIN OF THE LATE-VARISCAN LAMPROPHYRES OF SOUTH-WEST ENGLAND

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Late-Variscan lamprophyres and basalts are common in South-West England. A radiometric age of *c.* 291 Ma (Killerton) suggests that volcanism was coeval with the earliest phase of Cornubian granitoid magmatism. Our results on the Posbury basalts and the Killerton, Knowle Hill Quarry, and Hick's Mill lamprophyres provide new insights into the source of these volcanics. Subalkaline basaltic volcanism centered to the east of Dartmoor suggests high degree of melting in the underlying mantle. (Highly) alkaline volcanics in the rest of Devon and Cornwall are produced by lower degrees of mantle melting. New Sr-Nd isotope data provide unambiguous evidence that the source magmas were mantle-derived and that crustal contamination was negligible. Epsilon<sub>Nd(200)</sub> values for Knowle Hill Quarry (+4.2), Killerton (+1.6) and Posbury (+1.5) suggest a contribution from a depleted mantle source, whereas the epsilon<sub>Nd(200)</sub> value for Hick's Mill (-0.4), and published values for Dunchideock and Holmead, suggest an enriched source, probably the subcontinental mantle lithosphere. Post-orogenic lithospheric thinning led to partial melting of the sublithospheric mantle as well as the lithosphere. Our results suggest that the lithosphere was thinnest underneath the

Crediton graben, and that the subcontinental lithosphere on either side of the graben was enriched by Variscan slab-derived fluids/melts.

### **GROUNDWATER IN THE CARDINHAM WATER CATCHMENT, A TRIBUTARY OF THE FOWEY SYSTEM**

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Cardinham Water, a tributary of the River Fowey, rises on Bodmin Moor and flows southwards in a deeply incised valley. Evaluation of the magnitude and quality of groundwater in the catchment has been attempted. Rain falling on the impervious steep gradients runs off rapidly with flashy flow in tributaries and the main stream. The study area occupies the important 90% of the catchment, within the outcrop of Devonian sedimentary rocks. In contrast to the relatively massive country rock outside the catchment, the valley follows strongly jointed and faulted terrain. This in turn is intruded by peripheral dykes and dislocated quartzitic stringers. The stringers provide conduits to convey groundwater down gradient from the jointed country rock to the local drainage base level. The resulting springs are perennial, though discharge fluctuates seasonally. Rapid aquifer response to rain, short travel distance and residence time give the water little time to collect solutes, though at the discharge point Quaternary peat contributes organic acidity. TDS are low; pH is slightly acid. Discharges from two important spring groups were monitored and used as a base for attaining a first approximation of the total yield of springs in the catchment.

### **DEAN QUARRY GABBRO – PLAYING A KEY ROLE IN THE UK'S RENEWABLE ENERGY STRATEGY**

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The UK's first tidal lagoon power station, to be constructed in Swansea Bay by Tidal Lagoon (Swansea Bay) plc, will utilize around 4 million tonnes of high density gabbro armour stone sourced from Dean Quarry on the Lizard Peninsula. Dean Quarry, a geological SSSI and GCR Site, was mothballed in 2007 after intermittent operation as an aggregate quarry since the 1890's. Preparations to restart quarrying operations, in accordance with planning permission under the Review of Mineral Planning (ROMPS), local and statutory requirements, are underway with the construction of loading facilities and a breakwater to accommodate 10,000 tonne vessels for transportation of blasted rock by sea to Swansea and measures to retain access along the South West Coast Footpath. The geological importance lies in the paragenetic sequence demonstrated by the zeolites contained in the gabbro, alteration to clay minerals and the deep Tertiary weathering of the gabbro forming corestones of geomorphological interest. The educational geotechnical interest lies in the slope stability analyses required to enable safe pit slopes to be designed both as the excavation proceeds and for final overall slopes for long term restoration. It is therefore both an important educational site and a source of the best examples of zeolite minerals on mainland Britain. The quarry operator, in conjunction with Wardell Armstrong and Cornwall Geoconservation Group, will

be preparing protocols for responsible collection of material, study of important features and preservation of significant sections of quarry face in order to meet the requirements of the restoration masterplan for the site.

### **MANGANESE MINERALISATION AND MINING IN PERMIAN ROCKS NEAR EXETER**

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Manganese was mined to the north of Exeter, from about 1770. The black manganese oxide was used in glass making to remove the yellow, green or blue tinge in the production of clear glass. The initial discovery was made at Upton Pyne and the deposit was subsequently worked along an east-west transect, over a distance of nine km, from Huxham in the east to Newton St Cyres and Woodley in the west. The manganese ore occurred in sandstones of the Permian Newton St Cyres Breccia close to the southern boundary of the Crediton Trough, where it was found as both a cement and as nodules. Contemporary descriptions of the workings are given by Maton (following visits in 1794 and 1796), Hatchett (1796) and Berger (1811). The richness of the ore was stated to diminish with depth, with shallow surface and underground workings. The main phase of mining ended about 1815, but mines at Newton St Cyres were briefly reopened in 1853 and again in the 1870s. Although the deposits were not exhausted, they ceased to be economic and the workings were finally abandoned in 1882. The mineralisation involved low-temperature deposition from highly evolved basinal brines in admixture with meteoric water. Minerals include manganese carbonate and oxide phases in a complex paragenetic sequence.

### **A NEW INTEGRATED STRATIGRAPHICAL STUDY OF THE CANDIDATE GLOBAL STRATOTYPE SECTION AND POINT (GSSP) FOR THE BASE OF THE OXFORDIAN STAGE OF THE JURASSIC SYSTEM NEAR REDCLIFF POINT, WEYMOUTH, DORSET, ENGLAND, UK**

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The Oxford Clay Formation east of Redcliff Point, Weymouth, Dorset (England) exposes a remarkably complete section through the boundary between the Callovian and Oxfordian stages of the Jurassic System and has been proposed as a candidate GSSP for the base of the Oxfordian Stage. Initial multidisciplinary sampling in 2002-2003 revealed that a range of stratigraphical tools were available to correlate the section, including macrofossils (in particular ammonites), microfossil (foraminifera, ostracods, nannofossils), geochemical (carbon and strontium isotopes) and magnetostratigraphy. Subsequently, equivalent documentation of two additional potential candidate GSSP sections has been developed in SE France (Thoux) and Russia (Dubki). In order to reaffirm the potential of the UK candidate section as a GSSP, as well as to improve its documentation, a field meeting of the Oxfordian Working Group of the International Subcommittee on Jurassic Stratigraphy was held in June 2014 and sampling continued throughout 2014. This new study has revealed an even more complete sequence than was previously suspected, including a wealth of new ammonite, geochemical and microfossil data. These data, which will be introduced here, will strengthen the candidacy of the Redcliff section as a potential GSSP, as well as improving correlations with both the other candidate sections as well as, crucially, globally.

**DIFFICULT GROUND CONDITIONS IN FAULTED PERMIAN STRATA FOR GAS PIPELINE TUNNEL BENEATH THE EXE ESTUARY BETWEEN LYPMPSTONE AND POWDERHAM**

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A gas pipeline tunnel constructed beneath the River Exe estuary near Exeter, between Lymptstone and Powderham in 2007-08, encountered difficult tunnel ground conditions which led to a claim for additional payments. Byzak, the tunnel subcontractor, commissioned David Roche GeoConsulting to prepare and present expert evidence on the engineering geology and ground conditions, and how these varied from the information available at time of tender. The tunnel was excavated by a tunnel boring machine (TBM) through mainly Permian red rock strata comprising mainly breccias and also some sandstones and mudstones, between two access shafts on either sides of the estuary. Progress was slowed by clay clogging in the mudstones and the breccia strata which had not been foreseen, and by the rapid variability of the geology attributable to faulting which had not been anticipated. Also buried river channels were locally encountered which had not been expected.

**RESOLVING THE REGIONAL CONTEXT OF THE CORBYN'S HEAD MEMBER USING AUTOMATED MINERALOGY**

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The Corbyn's Head Member of the Torbay Breccia Formation has been described and compared to the surrounding red bed strata. Also, provenance interpretations have been made with respect to the heavy mineral assemblage which includes minerals such as; apatite, zircon rutile, ilmenite, garnet and APS group minerals. The interpretation was contextualised with an explanation of the sedimentary environment, and linking specific heavy minerals to contemporaneous volcanic sources, which are likely to be related to an early expression of the felsic magmatism of the Cornubian batholith. Supporting electron-microprobe data on selected minerals was used to further develop the interpretation and indicate three possible mica varieties with one dominating, most likely from a contemporaneous volcanic source. Whole rock analysis using automated mineralogy was used as a comparison to the heavy mineral suite. This allowed the importance of specific heavy minerals to be put into context, and demonstrated the advantage of heavy mineral separations over whole rock analysis techniques for geochemical correlation. The talk highlights the application of automated mineralogy in heavy mineral provenance studies and how it can be used to resolve specific provenance sources.

**AR<sup>40</sup>/AR<sup>39</sup> EVIDENCE FOR THE AGE OF THE TORBAY BRECCIA FORMATION, TORQUAY, SOUTH DEVON: IMPLICATIONS FOR CHRONOSTRATIGRAPHY AND THE HISTORY OF FELSIC IGNEOUS ACTIVITY IN THE REGION**

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The Permo-Triassic New Red Sandstone Supergroup (NRS) in South-West England includes some 2-3,000 m thickness of continental red bed strata, mostly barren of fossils and lacking in precise evidence of age. This is particularly true of the southernmost outcrops of the supergroup around Torquay and Paignton in south Devon, where the breccias and sandstones of the Torbay Breccia Formation are without any biostratigraphical markers. Recent work has demonstrated that the Corbyn's Head Member (CHM) of the Torbay Breccia Formation (Exeter Group) includes contemporaneous volcanoclastic beds, which are notable for the presence of unaltered and eu- to subhedral crystals of biotite, as well as other mineral species and igneous clasts suggesting a local extrusive felsic source. This presentation will give the results of Ar<sup>40</sup>/Ar<sup>39</sup> analyses carried out on CHM biotite, which demonstrate an earliest Permian age for the igneous activity providing a source for the volcanoclastic sediments and suggests a similar age for the breccias and sandstones of the Torbay Breccia Formation. This is the first firm demonstration of the chronostratigraphical position of these rocks. It also suggests that local felsic igneous activity considerably preceded the emplacement of the nearby Dartmoor Granite pluton and its associated volcanic activity, with implications for the post-Variscan igneous history of the region.

**A NEW SECTION IN LATE DEVONIAN  
CEPHALOPOD-RICH PELAGIC SEDIMENTS IN  
SOUTH DEVON AND THE CONTEXT OF THE  
LATE DEVONIAN MASS EXTINCTION PHASE IN  
SOUTH-WEST ENGLAND**

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South-West England, including Devon, Cornwall and West Somerset is the historical type area for the Devonian System, as first proposed in 1839. Although the rich fossil faunas of the region featured prominently in early studies of the system – and again during a phase of renewed interest from 1960s to the 1980s – there has been very little recent study in the last 20 years or so. Elsewhere, however, current work on the Devonian System has focussed on one of the five major perturbations to disrupt the Earth's biosphere during the Phanerozoic, specifically the Late Devonian mass extinction phase. The serendipitous discovery of a rich Late Devonian ammonoid-trilobite fauna in temporary excavations in Devonian pelagic nodular limestones and mudrocks near Bovey Tracey, South Devon, in 2013, has stimulated the beginnings of a re-assessment of the expression of this major event in the type area of the System. A description of the new section will be reported, together with a preliminary assessment of the ammonoid faunas and an introduction to work in progress on categorising the expression of the Late Devonian extinction phase in South-West England.

**THE TELLUS SOUTH-WEST SURVEY:  
AN ASSESSMENT OF PRELIMINARY APPLICATIONS  
AND FUTURE RESEARCH POTENTIAL**

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The recently acquired Tellus south-west dataset consists of high resolution airborne radiometric, magnetic and LiDAR data covering the area from Land's End to Dartmouth. A preliminary review of the Tellus data is focussed on the Newquay-St. Austell area. This area provides an opportunity to assess the value of the data for correlating newly defined formations in the recently mapped districts (e.g. Newquay, Mevagissey, Falmouth) with those on the older Bodmin sheet. The study also considered known mineralised localities including the Perran Iron Lode and calc-silicate members north of St. Austell. The study identified a significant magnetic anomaly west of Indian Queens at Penrose Farm. The St. Austell Granite was also studied to determine whether it was possible to identify different radiometric signatures for the various granite facies. Further research is now underway to develop more sophisticated methods for automated lithostratigraphic mapping using radiometric and LiDAR data. This research will attempt to incorporate legacy data including gravity, seismic, electromagnetic and hyperspectral to optimise lithostratigraphic correlations across South-West England. LiDAR data will be particularly valuable for enhancing previous lineament mapping. Integration of these datasets aims to enhance our geological understanding of South-West England forming the basis for future mineral prospectivity analysis.