



BADLEY GEOSCIENCE LIMITED

Geoscience News

Practical Structural Geology Course,

July 6-9th, 2004

Now in its 11th year, the course content has been revised to reflect the most up-to-date developments. A 4-day PSG course is now being offered in our Lincolnshire offices on **July 6-9 2004** with instructors Dr Graham Yielding, Dr Alan Roberts and Dr Stephen Dee.

Please contact us at info@badleys.co.uk or +44 (0) 1790 753472 for further details on course contents, and costs.

Key concepts

Basic revision of stress/strain, mechanisms of fracture, faulting & folding. Fault terminology.

Formation of extensional basins

Stretching models for rift basins and continental margins. Isostasy, flexure and thermal effects. Role of faults in lithospheric stretching. Backstripping techniques (1D, 2D, 3D).

Fault geometry and displacement patterns

Fault shapes (planar/listric), fault-displacement contouring, fault growth mechanisms and scaling, growth/strike-slip/reverse faults.

Fault linkage

Displacement partitioning. Hard/soft linkage. Branch-lines and branch-points. Closure patterns.

Structural interpretation of seismic data

Interpretation of faults and horizons on 2D and 3D seismic. Pros & cons of autotracking. Dip/azimuth analysis. Coherency techniques.

Fault seal techniques

Juxtaposition analysis with Allan Diagrams. Controls on fault seal mechanisms. Predictive algorithms, column-height risking. Fault transmissibilities in production.

Fault populations

Sampling of fault-population statistics, 1D and 2D. Prediction of sub-seismic faults. Pelican case study.

Fractured reservoir characterisation

Core and image logging, dynamic understanding of fractured reservoirs, fault and fracture modelling (using geomechanical modelling, Discrete Fracture Network - DFN modelling etc.).

AAPG 2004 Prize draw winner.

Thanks to all of you who entered our prize draw at AAPG 2004, in Dallas. The winner was Allan Driggs, from Anadarko, who received the cut glass tumblers with our best wishes.

Basin-modelling enhancements

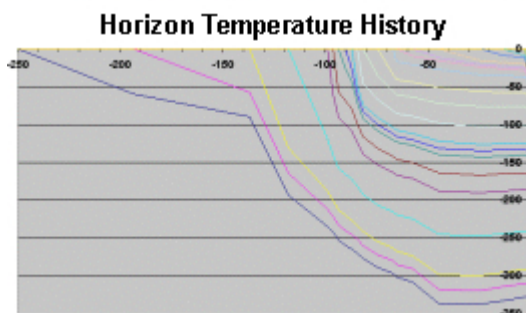
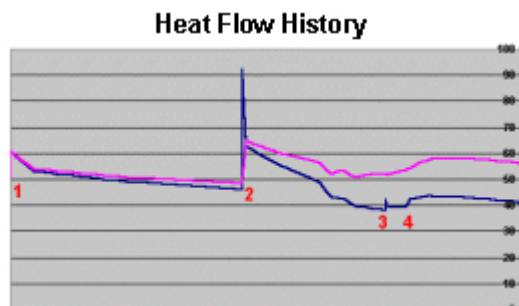
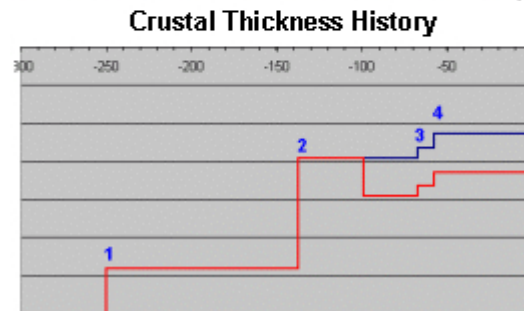
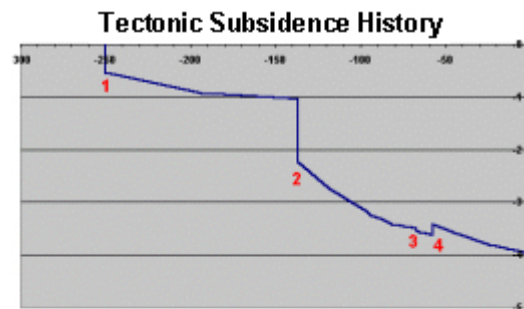
Our basin-modelling capabilities have recently been significantly enhanced, courtesy of our long-term collaboration with Prof. Nick Kusznir and his [Geodynamics research group at Liverpool University](#). In this newsletter we outline on some of the latest developments, but for more in-depth information please contact [Alan Roberts](#) at Badleys.

WinHeatXL

WinHeatXL is an upgrade to our existing Heat thermal modelling package. Where Heat scores over traditional thermal modelling software is in

its ability to incorporate in its calculations the whole-lithosphere thermal consequences of a complex tectonic and volcanic history. Thermal perturbation resulting from both uniform whole-lithosphere stretching and depth-dependent stretching can be modelled, making Heat equally useful in rift basins and at continental margins.

Heat takes a stratigraphic sequence and applies to it a tectonic and volcanic history, in order to forward model the full thermal evolution of the stratigraphy. Calibration against downhole temperature and vitrinite data ensures accurate prediction.



In the upgrade to **WinHeatXL**, which was kindly supported by Statoil, the output has been fully redesigned so that all plotting is handled automatically in the Excel spreadsheet, giving fast access to fully-customisable plots. At the same time new tectonic output options have been added to WinHeatXL, such that its full range of predictive outputs is now:

- Top-basement tectonic-subsidence history
- Basement crustal-thickness history
- Heat-flow history for top basement and top sediment
- Present-day whole-lithosphere temperature vs depth
- Horizon burial history
- Horizon temperature histories
- Horizon %VR history
- Past whole-lithosphere temperature vs depth profiles

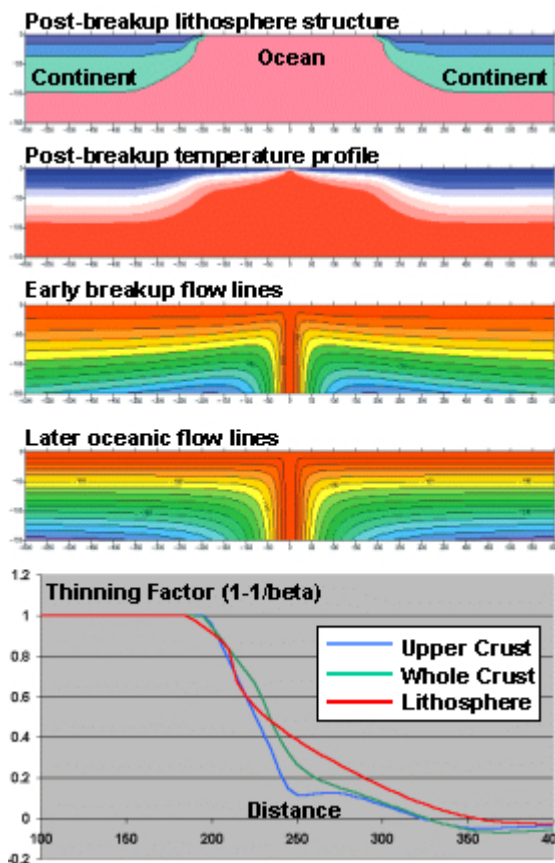
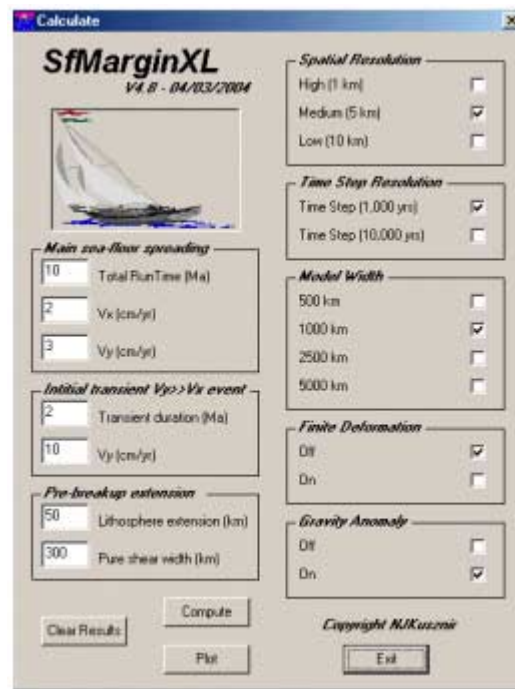
WinHeatXL is available now for evaluation.

SfMargin - iSIMM

Badleys are research partners in the [iSIMM research project](#), together with Liverpool University, Cambridge University and Schlumberger Cambridge Research. iSIMM is investigating the tectonic and magmatic evolution of rifted continental margins and part of its remit is to produce new modelling software which can accurately describe the processes observed at rifted continental margins.

Nick Kusznir and his research group at Liverpool have now developed the initial version of this software (working title SFMargin) which has been passed to Badleys for testing and longer-term commercial implementation within our consultancy workflows.

SFMargin looks at the breakup and post-breakup lithosphere stretching history of a continental margin formed in the presence of an oceanic spreading centre, both "active" volcanic and "passive" non-volcanic margins can be considered.



In its current implementation SFMargin can predict:

- Lithosphere and crustal structure (cross-sections) through time
- Subsidence/uplift history of the margin
- Whole-lithosphere and depth-dependent stretching factors
- Lithosphere thermal history and top basement heat-flow across the margin
- Gravity anomaly across the margin

Further development of SFMargin will continue throughout the duration of the iSIMM project. Work on iSIMM is supported by NERC (Liverpool and Cambridge), the DTI (Badleys) and the following companies as full commercial Partners: Amerada Hess, Anadarko, BP, ConocoPhillips, ENI, Shell, Statoil, WesternGeco.

Both WinHeatXL and SFMargin sit comfortably alongside our other, longer established, basin-modelling software and services, embracing STRETCH forward modelling and FLEX DECOMP 2D and 3D flexural backstripping of rift basins and continental margins. For more information on any of our basin-modelling software and services please [contact us](#).

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