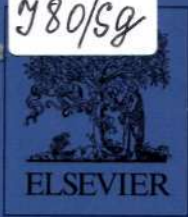


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# JOURNAL OF STRUCTURAL GEOLOGY



# Journal of Structural Geology

Volume 46, Pages 1-284 (January 2013)

## Photograph of the month

*Page 1*

### **Fractal-geometry techniques in the quantification of complex rock structures: A special view on scaling regimes, inhomogeneity and anisotropy**

Review Article

*Pages 2-21*

Jörn H. Kruhl

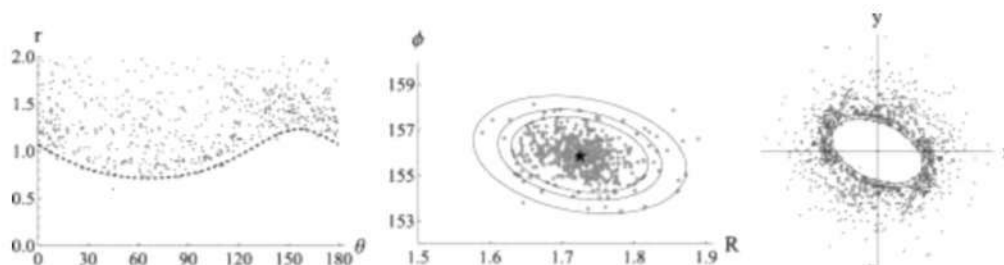
### **Fitting the void: Data boundaries, point distributions and strain analysis**

Original Research Article

*Pages 22-33*

Kieran F. Mulchrone

## Graphical abstract



## Highlights

- An objective method for analysis of point data in rocks is developed.
- A non-linear, least squares analysis is performed which automatically assigns a high weighting to points near the void boundary.
- A simulation indicates that the method performs best for tightly packed data under moderate strain.
- Sampling errors are estimated using a bootstrap.

### **From intra-oceanic subduction to arc accretion and arc-continent collision: Insights from the structural evolution of the Río San Juan**



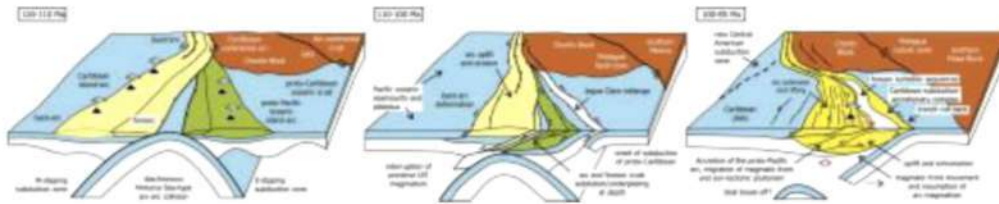
## metamorphic complex, northern Hispaniola

Original Research Article

Pages 34-56

Javier Escuder-Viruete, Pablo Valverde-Vaquero, Yamirka Rojas-Agramonte, Janet Jabites, Andrés Pérez-Estaún

### Graphical abstract



### Highlights

- Model of arc–arc collision and underplating of arc terranes along the northern Caribbean plate convergent margin.
- 120–110 Ma: Subduction of oceanic crust took place under the opposite Caribbean and proto-Pacific island-arc systems.
- 110–100 Ma: Subduction/underplating of the proto-Pacific arc beneath the Caribbean island-arc.
- 100–85 Ma: Trench roll-back is accompanied by Caribbean island arc rifting and exhumation of the accreted arc terranes.

## Polyhalite microfabrics in an Alpine evaporite mélange: Hallstatt, Eastern Alps

Original Research Article

Pages 57-75

Anja Schorn, Franz Neubauer, Manfred Bernroider

### Highlights

- The investigation of polyhalite rocks of Hallstatt salt mine reveals.
- A wide variety of polyhalite microfabrics including mylonites and vein fillings.
- Metamorphic reaction fabrics between polyhalite, blödite and anhydrite (<62 °C).
- Cataclastic and metamorphic reaction fabrics are characteristic for Hallstatt.
- Polyhalite microfabrics will allow to date the tectonic history of Hallstatt body.

## Mountain front migration and drainage captures related to fault segment linkage and growth: The Polopos transpressive fault zone (southeastern

## **Betics, SE Spain)**

Original Research Article

*Pages 76-91*

Flavio Giaconia, Guillermo Booth-Rea, José Miguel Martínez-Martínez, José Miguel Azañón, Joaquín Pérez-Romero, Irene Villegas

### **Highlights**

► First structural maps of the 30 km long active Polopos Fault Zone in SE Betics. ► Structural analysis and mapping to determine fault segmentation and growth. ► Fault displacement, growth and linkage controlled the topography evolution. ► Fault related mountain front migration influenced Pleistocene fluvial captures. ► We analyze the different tectonic processes controlling uplift in the area.

## **Inverse modeling for estimating fluid-overpressure distributions and stress intensity factors from an arbitrary open-fracture geometry**

Original Research Article

*Pages 92-98*

Shigekazu Kusumoto, Agust Gudmundsson, Trine H. Simmenes, Nobuo Geshi, Sonja L. Philipp

### **Highlights**

► Analytical solution giving aperture geometry using the Fourier cosine series. ► Inversion model estimating the overpressure variation from the fracture geometry. ► The overpressure distribution increasing toward the tip of the mineral vein. ► The Fourier coefficients related to overpressure and critical stress intensity factor.

## **Geometry of co-seismic surface ruptures and tectonic meaning of the 23 October 2011 $M_w$ 7.1 Van earthquake (East Anatolian Region, Turkey)**

Original Research Article

*Pages 99-114*

Bülent Doğan, Ahmet Karakaş

### **Highlights**

► The 23 October 2011 Van earthquake occurred in the eastern Anatolia region where the continental crust is thickest. ► The Van earthquake was generated by an active thrust fault. ►

The geometry of the surface ruptures is related to intra-continental compressional tectonic system. ► The earthquake occurred in the compressional province.

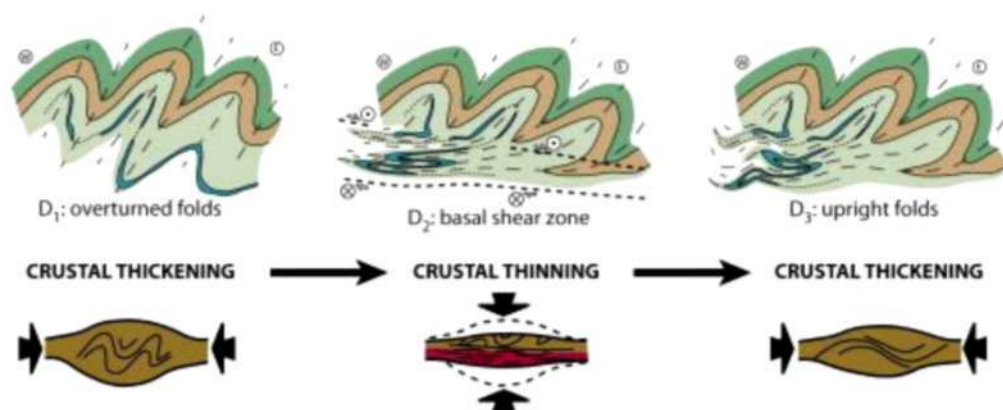
## **Crustal thickening and attenuation as revealed by regional fold interference patterns: Ciudad Rodrigo basement area (Salamanca, Spain)**

Original Research Article

Pages 115-128

Rubén Díez Fernández, Juan Gómez Barreiro, José R. Martínez Catalán, Puy Ayarza

### **Graphical abstract**



### **Highlights**

► Fold interference patterns are revealed in the hinterland of the Variscan belt. ► Amplification and rotation of previous folds occurred during crustal thinning. ► Structural evolution includes shifting between crustal thickening and attenuation.

## **The microstructure and internal architecture of shear bands in sand-clay sequences**

Original Research Article

Pages 129-141

M.B. Kristensen, C. Childs, N.Ø. Olesen, J.A. Korstgård

### **Highlights**

► Examined microstructures of cm-scale faults in unlithified sands, silts and clays. ► Recognised two primary deformation mechanisms; granular shearing and cataclasis. ► Different shear band architectures are related to different deformation mechanisms. ► Deformation mechanisms and structures may relate to burial depth during faulting.

## **Coupled micro-faulting and pressure solution creep overprinted on quartz schist deformed by intracrystalline plasticity during exhumation of the Sambagawa metamorphic rocks, southwest Japan**

Original Research Article

*Pages 142-157*

Toru Takeshita, Abdel-Hamid El-Fakharani

### **Highlights**

► Quartz microstructures in quartz schist were once formed by intracrystalline plasticity. ► These were overprinted by deformation at the frictional–viscous transition conditions. ► Intracrystalline microstructures became obliterated with increasing shear. ► The obliteration of microstructures is probably caused by dominant pressure solution creep. ► This is evidenced by the increasing portion of quartz–newly precipitated mica interface.

## **Investigating new materials in the context of analog-physical models**

Original Research Article

*Pages 158-166*

Caroline Janette Souza Gomes

### **Highlights**

► We investigate the mechanical behaviors of quartz sand and two sand mixtures. ► The sands have similar peak friction angles but different shear strength magnitude. ► In analog models, distinct fault kinematics and different grain flows were produced. ► The sand mica mixture shows the most plastic elasto-frictional rheology.

## **Structural style and early stage growth of inversion structures: 3D seismic insights from the Egersund Basin, offshore Norway**

Original Research Article

*Pages 167-185*

C.A.-L. Jackson, S.-T. Chua, R.E. Bell, C. Magee

### **Highlights**

► 3D seismic data constrain early-stage development of inversion structures. ► Inversion structural style controlled by geometry of underlying normal fault system. ► Strike variability of fault strength and height cause development of periclinal structures. ► Seismic-stratigraphic analysis

constrain timing of inversion. ► Onset of deformation varied by c. 6 Myr due to strain partitioning.

### **Characterisation of interactions between a pre-existing polygonal fault system and sandstone intrusions and the determination of paleo-stresses in the Faroe-Shetland basin**

Original Research Article

*Pages 186-199*

D. Bureau, R. Mourgues, J. Cartwright, M. Foschi, M.M. Abdelmalak

#### **Highlights**

► Sandstone intrusions and polygonal faults interactions are classified into 3 types. ► These types are characterised geometrically. ► N145° faults are intruded during N°55 faults arrest sandstone intrusion propagation. ► This basin was undergoing extensional regime at the time of intrusion.

### **Low stress deformation of garnet by incongruent dissolution precipitation creep**

Original Research Article

*Pages 200-219*

Sara Wassmann, Bernhard Stöckhert

#### **Highlights**

► Eclogite facies garnet poikiloblasts truncated by stylolites during exhumation. ► Incongruent dissolution precipitation creep as low stress deformation mechanism. ► Interphase boundaries as effective sites of dissolution. ► Weakness of subduction interface due to incongruent dissolution precipitation creep.

### **Transition from extensional to compressional magnetic fabrics in the Cretaceous Cabuérniga basin (North Spain)**

Original Research Article

*Pages 220-234*

Belén Oliva-Urcia, Teresa Román-Berdiel, Antonio M. Casas, M. Felicidad Bógalo, M. Cinta Osácar, Cristina García-Lasanta

#### **Highlights**

► Transition of extensional to compressional magnetic fabrics in an inverted sedimentary basin. ► Progressive transition of extensional structures to compression-related cleavage is seen. ►

Palaeostress analysis from syn-sedimentary faults better constrains the extensional episode. ►  
Extensional magnetic fabrics are found when there is a certain distance to the cleavage front. ►  
Methodology applicable to the study of the conditions of tectonic inversion of other basins.

### **Behaviour of an isolated rimmed elliptical inclusion in 2D slow incompressible viscous flow**

Original Research Article

*Pages 235-254*

Neil S. Mancktelow

#### **Highlights**

► Analysis of a rimmed viscous inclusion as a model for clasts with incoherent boundaries. ► FEM models used to determine instantaneous rates of rotation and stretch. ► Initial value ODE approach used to model development with progressive matrix strain. ► ODE model compared to results from high strain numerical models of single inclusions. ► Establishes that a simplified model of rimmed inclusions matches the SPO of natural porphyroclasts.

### **Mountain building processes in intracontinental oblique deformation belts: Lessons from the Gobi Corridor, Central Asia**

Review Article

*Pages 255-282*

Dickson Cunningham

#### **Highlights**

► The Gobi Corridor region north of Tibet represents the ‘soft’ core of Central Asia. ► Region is characterized by diffuse sinistral transpressional deformation. ► Basement is a terrane collage mechanically and thermally predisposed to crustal reactivation. ► Kinematics of Late CZ deformation dependent on angle between SHmax and older structural trends. ► The life cycle of orogenic belts may include an important later stage of intraplate reactivation.

### **Corrigendum to “Conditions for veining and origin of mineralizing fluids in the Alpi Apuane (NW Tuscany, Italy): Evidence from structural and geochemical analyses on calcite veins hosted in Carrara marbles” [Journal of Structural Geology 44 (2012) 76–92]**

*Page 283*

Luca Vaselli, Gianni Cortecchi, Sonia Tonarini, Giuseppe Ottria, Mario Mussi