University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Papers in the Earth and Atmospheric Sciences | Earth and Atmospheric Sciences, Department of

10-1-2007

Drainage Diversion Patterns and Landform Morphology as an Indicator of Deformation Style: Examples from the Zagros Simply Folded Belt, Islamic Republic of Iran (ABSTRACT)

Caroline M. Burberry
University of Nebraska - Lincoln, cburberry2@unl.edu

John W. Cosgrove
Imperial College, London

J.-G. Liu
Imperial College, London

Follow this and additional works at: http://digitalcommons.unl.edu/geosciencefacpub

Part of the Earth Sciences Commons

Burberry, Caroline M.; Cosgrove, John W.; and Liu, J.-G., "Drainage Diversion Patterns and Landform Morphology as an Indicator of Deformation Style: Examples from the Zagros Simply Folded Belt, Islamic Republic of Iran (ABSTRACT)" (2007). *Papers in the Earth and Atmospheric Sciences.* Paper 249.
http://digitalcommons.unl.edu/geosciencefacpub/249

This Article is brought to you for free and open access by the Earth and Atmospheric Sciences, Department of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Papers in the Earth and Atmospheric Sciences by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Published in *Complexity in Geomorphology: The 38th Annual Binghamton Geomorphology Symposium*, held October 5-7, 2007, at the Levine Science Research Center, Duke University, Durham, North Carolina, USA, p. 18-19. Paper 15 under the sections "Symposium Posters with Abstracts" ... "Observations of Natural Systems." Copyright 2007, Binghamtom Geomorphology Symposium. Used by permission.

15) Drainage Diversion Patterns and Landform Morphology as an Indicator of Deformation Style: Examples from the Zagros Simply Folded Belt, Islamic Republic of Iran (ABSTRACT)

- Caroline M. Burberry, Department of Earth Science and Engineering, Imperial College London
- John W. Cosgrove, Department of Earth Science and Engineering, Imperial College London
- J.-G. Liu, Department of Earth Science and Engineering, Imperial College London

In the NW-SE trending Zagros Simply Folded Belt, landform organisation is shown to be a straightforward response to tectonic forcing processes using remote sensing. Two end-member fold types (detachment folds and fault-bend folds) interact with streams flowing into the Persian Gulf. Using drainage network analysis and geomorphologic methods, the organisation of emergent landform morphologies is mapped and the distribution of different fold types is inferred.

Detachment folds are characterised by symmetric, periclinal geometry and fault-bend folds are characterised by long, linear hinges and marked asymmetry. At a specific point on a detachment fold the uplift rate varies with time and at a particular time the uplift rate varies along the fold hinge. In contrast, the uplift rate of fault-bend folds is approximately uniform along the hinge length.

Stream networks in the Zagros form a trellis pattern where the prominent direction parallels the NW-SE trending fold hinges. Growing folds create characteristic stream diversions, alterations in channel pattern and wind or water gap distributions, controlled by different uplift histories and characterising each fold type. The minor channel network reflects the inherent symmetry of the folds. Landform morphology is classified by hinge length, aspect ratio and symmetry.

Anomalously long, high-aspect ratio folds are marked by lines of wind gaps that transect the folds. These are inferred to be fault-bend folds overlying major thrust faults, which formed sequentially as the defor-

mation front migrated to the SW, causing diversion of stream channels. Movement up a thrust ramp creates these fault-bend folds and as the stresses build up, serial folding develops in the cover rocks to the NE. Eventually continued deformation of the block requires stresses in excess of those required to form a new thrust. The original thrust is abandoned, the footwall collapses and the process repeats, creating a distinct spatial pattern of landforms.