

ZAGROS GEOLOGICAL MAPS & CROSS-SECTIONS: ZAGROS OUTCROP ORIENTED MAPPING & ZAGROS REGIONAL MAPPING

Project Summary

GRL offers a digital product suite that integrates surface geology and topography, sub-surface structure and hydrocarbon systems for the entire Zagros region. Our map-based products are fully compatible with ArcGIS and GoogleEarth, and are supplemented with charts and reports that correlate stratigraphy, tectonic events, and regional geodynamics.

Phase 1 of our Zagros mapping is already complete, and the following products are now available:

- › Mapped formation tops for the main geological formations in the Zagros.
- › Structural elements (anticline crests, syncline axes, thrusts, faults).
- › Nine balanced cross-sections (with a combined length of over 2,900 km).
- › Comprehensive meta-data and explanatory information.

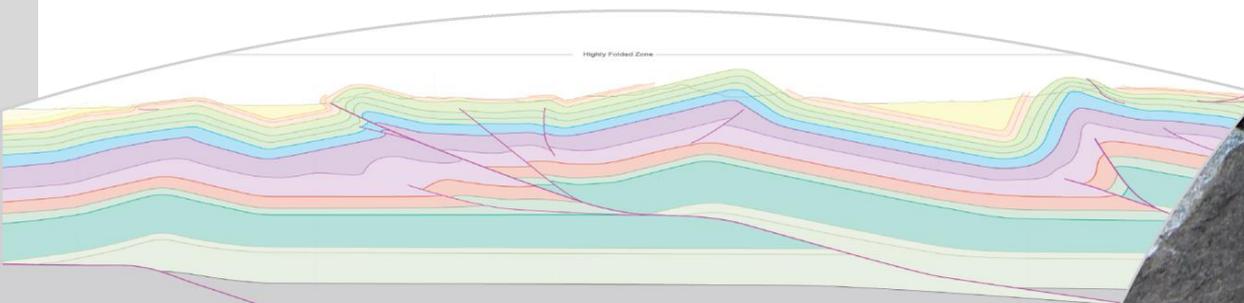
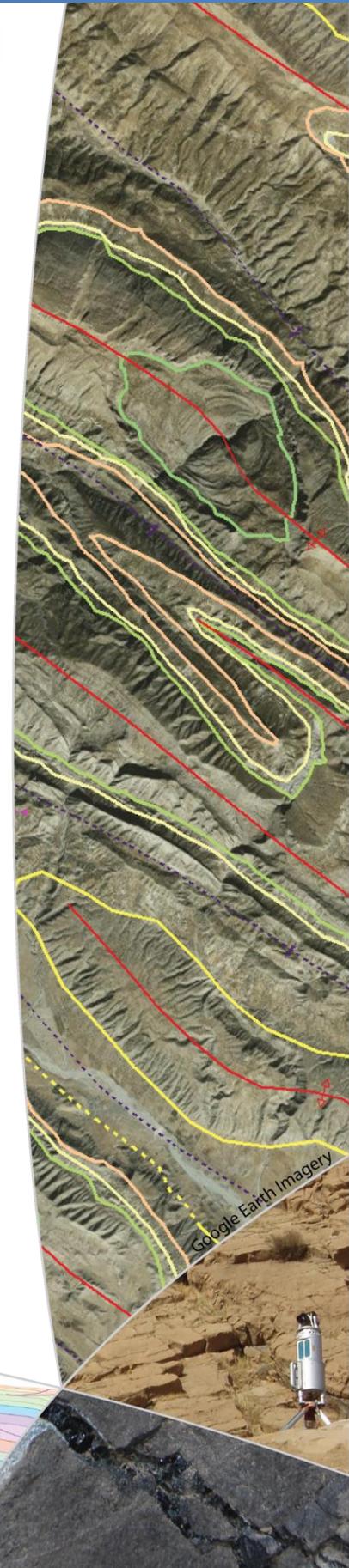
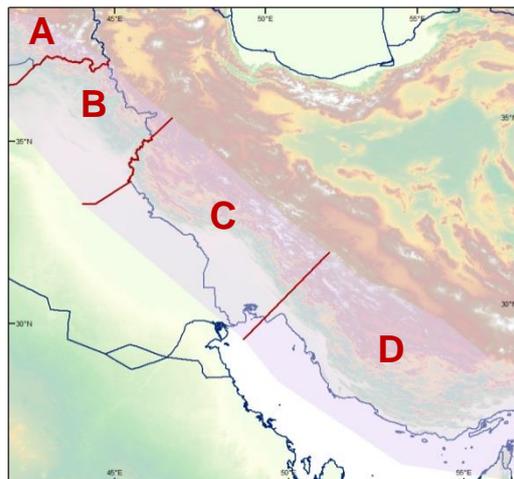
Phase 2 of the project is already underway, and will be delivered in mid 2016:

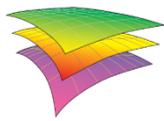
- › Our new Zagros Outcrop Oriented Mapping ("ZOOM") for SE Turkey and N Iraq (Kurdistan Region): unrivalled detail based on very extensive fieldwork and structural interpretation.
- › Reappraisal and enhanced resolution of geological mapping in Iran.
- › More extensive integration of data describing the hydrocarbon systems.
- › Additional balanced and restored cross-sections.
- › Conversion of mapped formation boundaries to solid-fill map polygons.
- › Additional structural data (including structural dips), reports and interpretation.

Sector Coverage

Our Zagros product range covers **four regional sectors**. Product availability varies according to sector (see following page for details and costs).

Sector	Regions
A	Turkey southeast, Syria northeast
B	Iraq north & northeast, Kurdistan
C	Iraq southeast, Iran west (Lurestan, Dezful, Khuzestan)
D	Iran southwest (Fars, Hormoz), The Gulf, Oman north





ZAGROS MAPPING AND CROSS-SECTIONS

Product Details

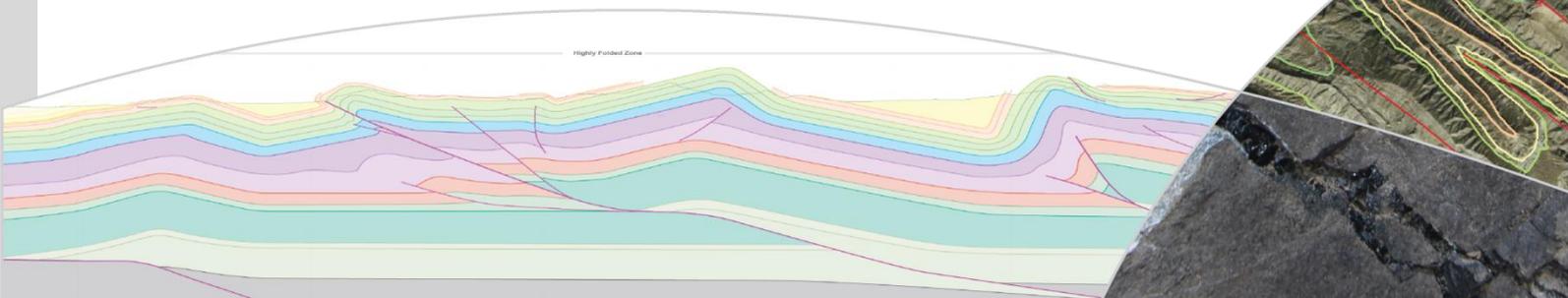
Product Series	GRL ZOOM Zagros Outcrop Oriented Mapping		GRL ZRM Zagros Regional Mapping	
	A, B (Northern Zagros)		C, D (Central & Southern Zagros)	
Zagros Sectors ¹	Extensive fieldwork (& satellite imagery)		Satellite imagery & available field data	
Primary Data Source				
Development Phase	Phase 1	Phase 2	Phase 1	Phase 2
Product Availability	Available Now!	Early 2016	Available Now!	Early 2016
Geological Maps (Arc-GIS shapefiles)				
Equivalent minimum spatial resolution ²	ASTER (~15m)	QB/SPOT+ (1-10m)	Landsat (~30m)	Landsat/ASTER (~15-30m)
Structural elements	✓	✓	✓	✓
Lithostrat. horizons (polyline shapefiles)	✓	✓	✓	✓
Solid-fill lithostrat. (polygon shapefiles)		✓		✓
Extra structural meta-data		✓		✓
Regional tectonic & geodynamic elements	✓	✓	✓	✓
Bed dip data		detailed		overview
Cover delineated		✓		✓
Maps of stratigraphic & structural uncertainty		✓		✓
Other Geological Deliverables				
Balanced cross-sections (foreland to suture)	4	+ 2 additional	5	+ 3 additional
Hydrocarbon system schematics		✓		✓
Stratigraphic correlation chart	✓	✓	✓	✓
Type localities: point shapefiles & meta-data		✓ ³		✓ ⁴
Type lithologies: photos & descriptions		✓ ³		
Report integrating hydrocarbon systems, structural styles & regional tectonics	✓	✓	✓	✓
In-house workshop		✓		
Virtual fieldtrip		✓		
Cultural Elements ⁵				
International boundaries		✓		✓
Large conurbations		✓		✓
Smaller conurbations		✓		
Main rivers		✓		✓

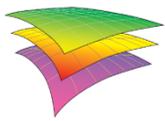
¹ see Sector map on previous page. ² minimum precision of GPS and resolution of imagery that we have used as a basis for interpretation (most areas will have higher resolution than specified here). ³ based on van Bellen et al 1959 (with spatial corrections) and extensive GRL data. ⁴ based on James & Wynd 1965 and other published & proprietary data. ⁵ re-mapped by GRL: higher resolution than commonly available datasets.

Product Availability & Pricing

	Sector A	Sector B	Sector C	Sector D
Zagros Mapping Phase 1		Available Now!		
Zagros Mapping Phase 2		Mid 2016		
Cost of Individual Sectors		Prices on Application		
Early-Bird offer – all sectors				

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ZAGROS MAPPING AND CROSS-SECTIONS

About Us

Who we are:

- » Geospatial Research Ltd. (GRL) is an independent company with close links to Durham University.
- » We produce **integrated geoscience** solutions from field, satellite and map data to inform sub-surface interpretations.
- » Our core expertise is **structural geology, tectonics & geodynamics**. We have extensive experience of deriving quantitative **fracture parameters** from outcrop to satellite scales as input for fractured reservoir modelling.
- » We have a collective experience of **more than 10,000 field days** across five continents, and we are engaged in commercial projects spanning most of the world's petroleum provinces.

Zagros specific experience:

- » Extensive field experience in the Middle East, particularly the northern Zagros. We have carried out a total of **24 successful Zagros fieldwork campaigns**, totalling many hundred field days, in over 40 license blocks, for **14 companies** since 2009.
- » Close collaboration with colleagues in Durham University with wide experience of the **Iranian Zagros**.
- » Regional mapping expertise for the entire Zagros based on interpretation of satellite data.
- » Balanced cross-section construction for regional and detailed anticline studies – we have constructed **143 sections totalling more than 6,800 km**.
- » Detailed outcrop knowledge of Cambrian-Pliocene stratigraphy.
- » Very extensive work to characterise fracture systems in Cenozoic & Mesozoic reservoirs. Contact us for further details of our comprehensive multiclient fracture datasets.
- » Proven capability of producing Zagros-wide geological maps, cross-sections and geodynamic interpretations.

Project Leaders

- » Dr. Richard Jones (Managing Director) richard@geospatial-research.co.uk
- » Dr. Jonathan Long (Senior Geoscientist) jon@geospatial-research.co.uk

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