

Regional Integrated Structural and Alteration Analysis of Magnetic and Infrared Remote Sensing Data from the Kerman Belt, Iran

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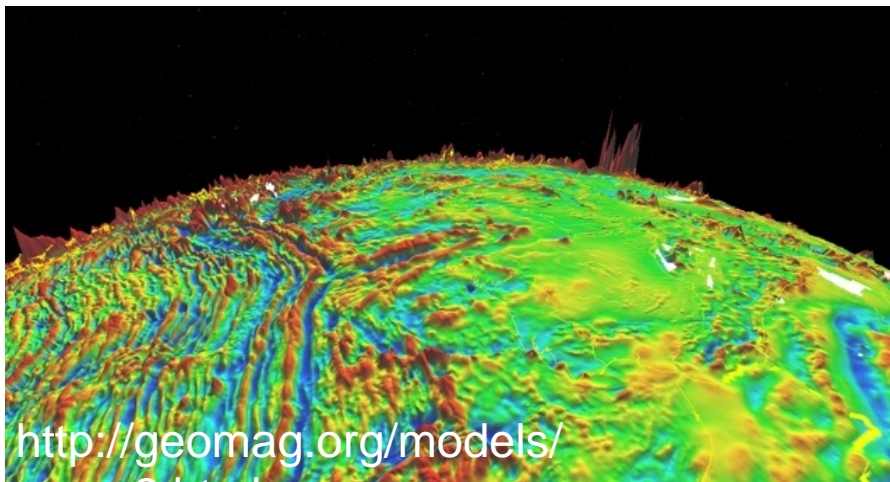
Integrated Analysis

Structural Interpretation

EMAG2: Earth Magnetic Anomaly Grid

(2-arc-minute resolution)

2.5 - 7.5 km depth



Alteration Interpretation

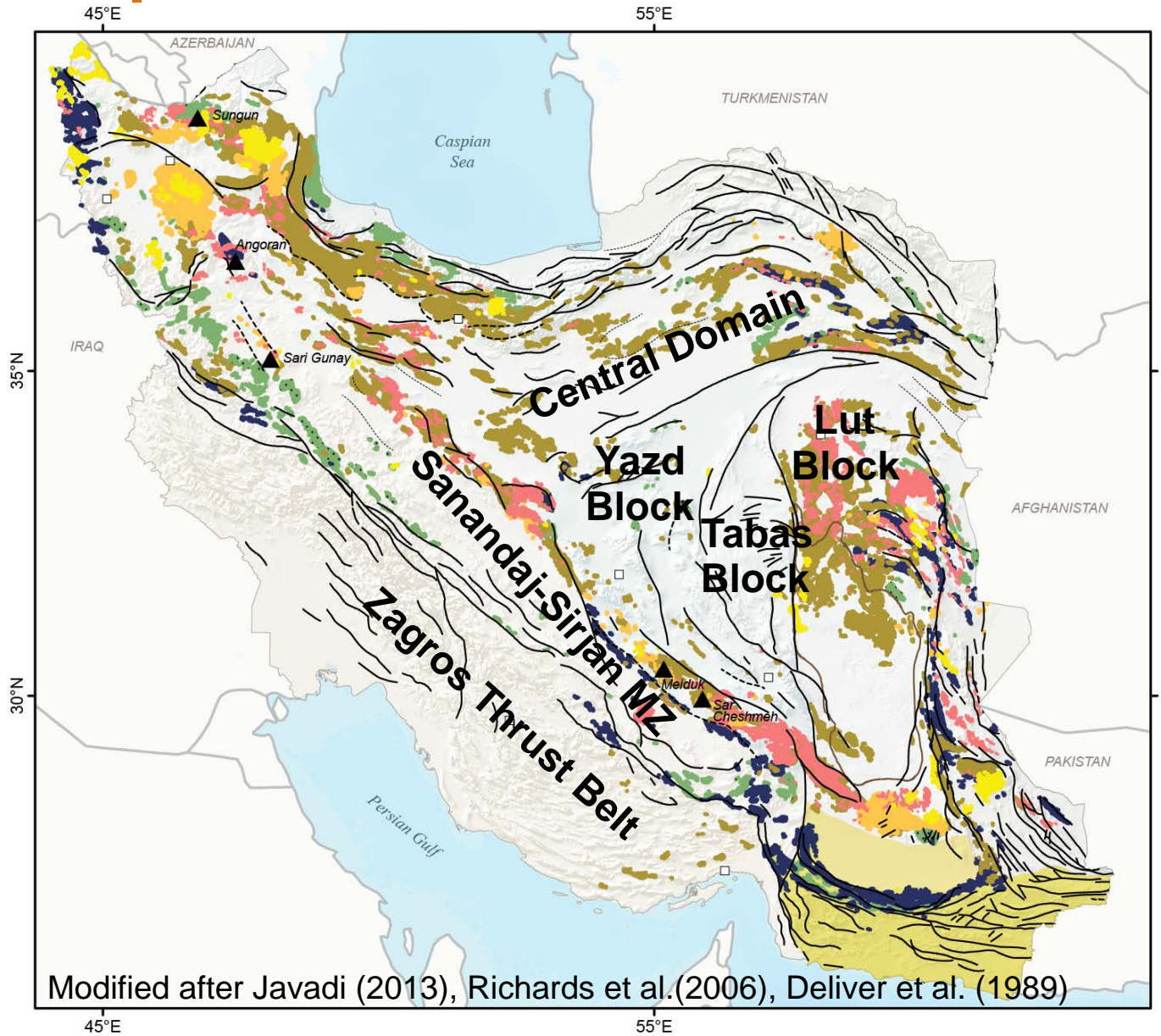
Landsat-8: Earth Magnetic Anomaly Grid

(30 m pixel resolution)

surface reflectance



Tectonic Setting of Iran



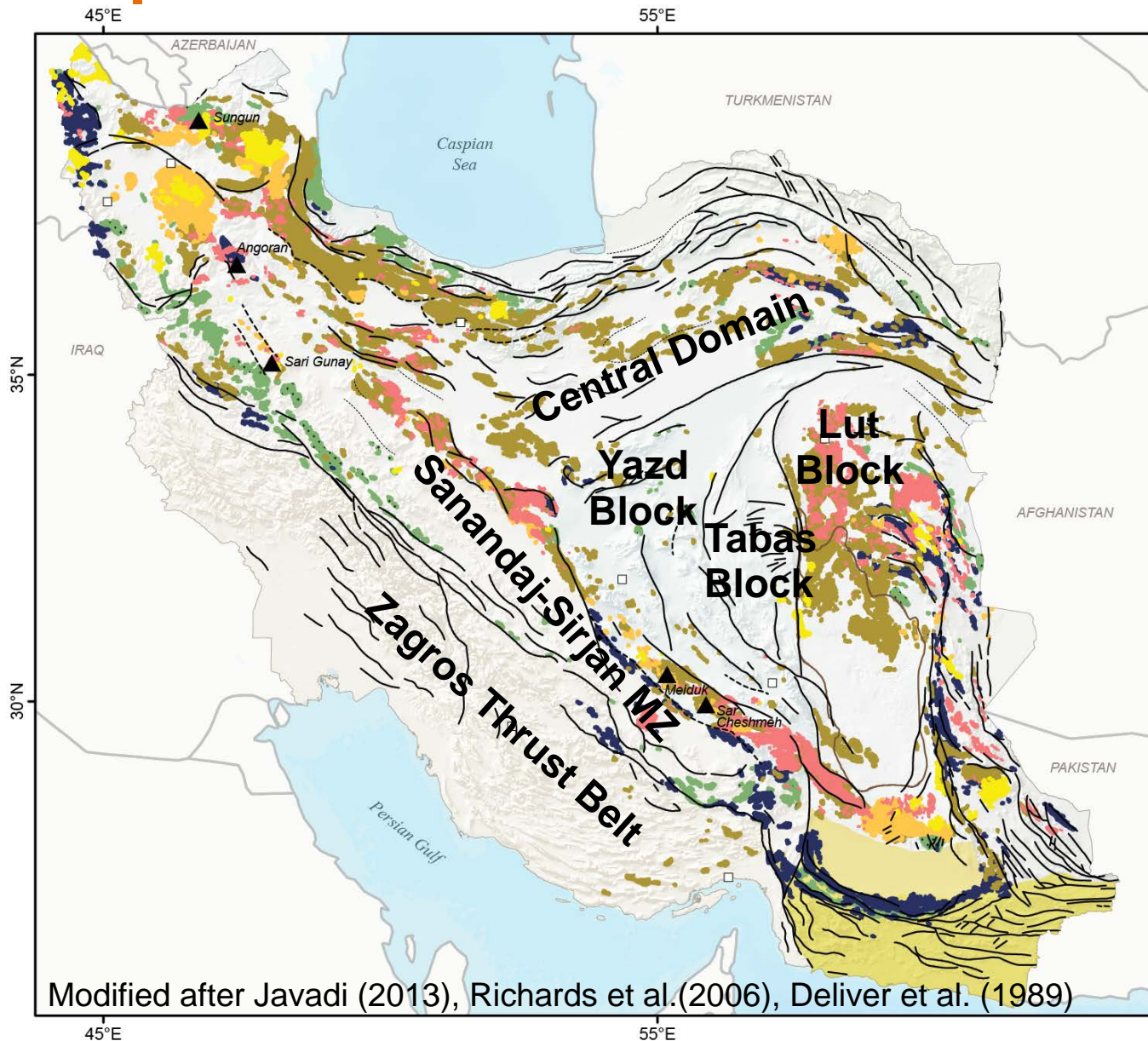
Sar Cheshmeh: 1.2 Gt at:
 0.69% Cu, 0.03% Mo, 0.06
 g/t Au, 1.22 g/t Ag
 (Shafiei and Shahabpour, 2011)

Meiduk: 125 Mt at:
 1.5% Cu
 (Samani, 1998)

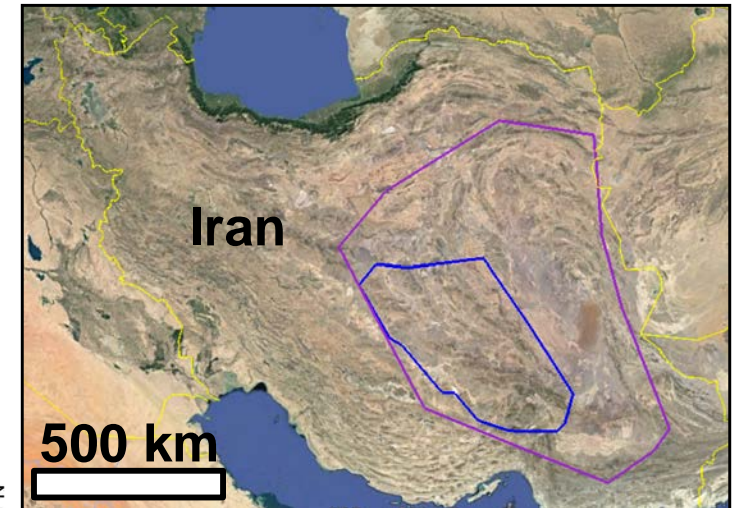
- ▲ Mineral Deposit
- fault
- Ophiolites
- Magmatic Rocks**
- Pleistocene
- Mid-Miocene to Early Pliocene
- Oligocene to Early Miocene
- Eocene
- Mesozoic volcanic/plutonic

Modified after Javadi (2013), Richards et al.(2006), Deliver et al. (1989)

Tectonic Setting of Iran



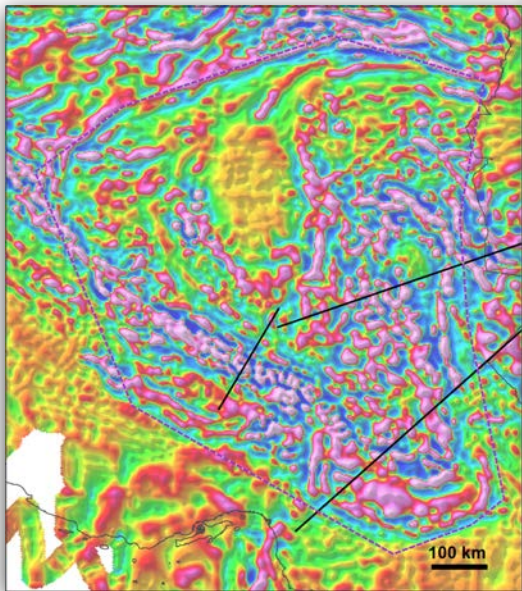
Modified after Javadi (2013), Richards et al.(2006), Deliver et al. (1989)



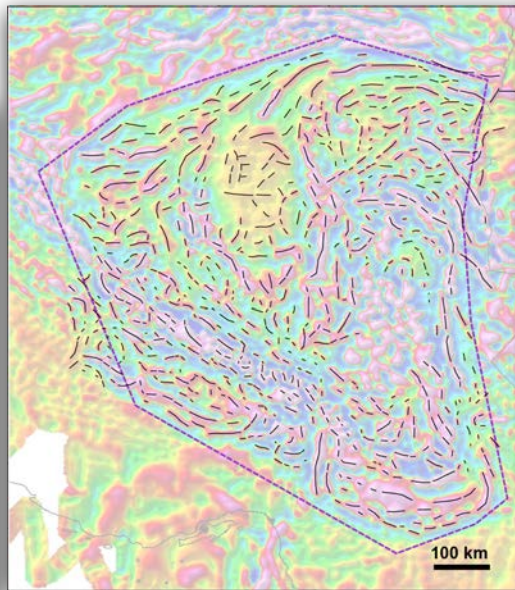
- ▲ Mineral Deposit
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Structural Interpretation of Magnetic Data

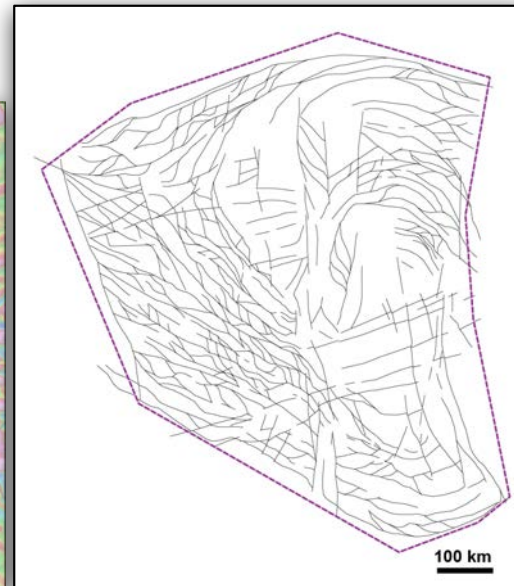
1VD



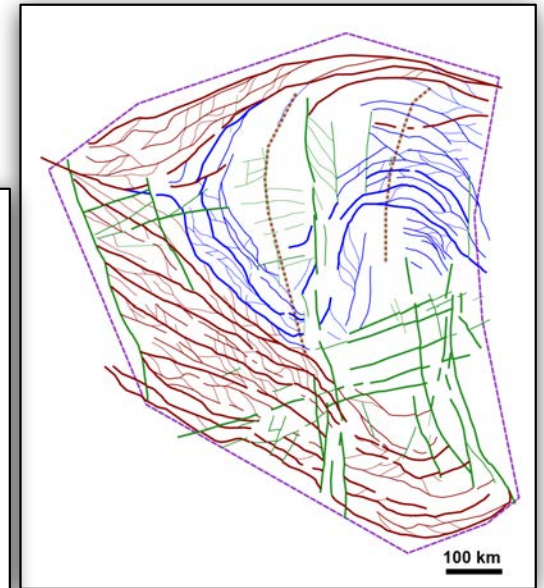
Form lines



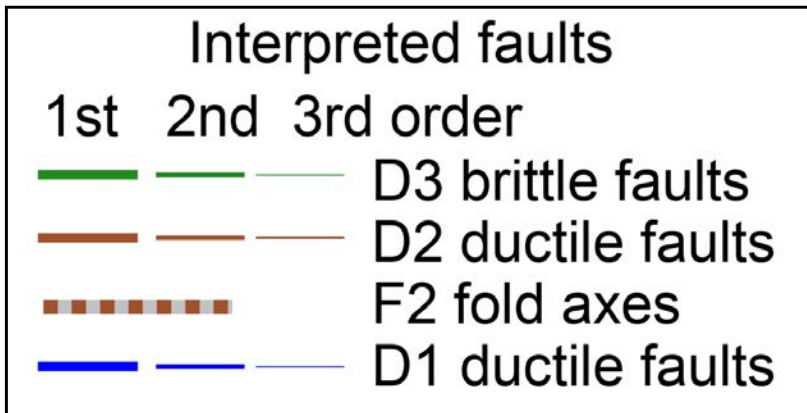
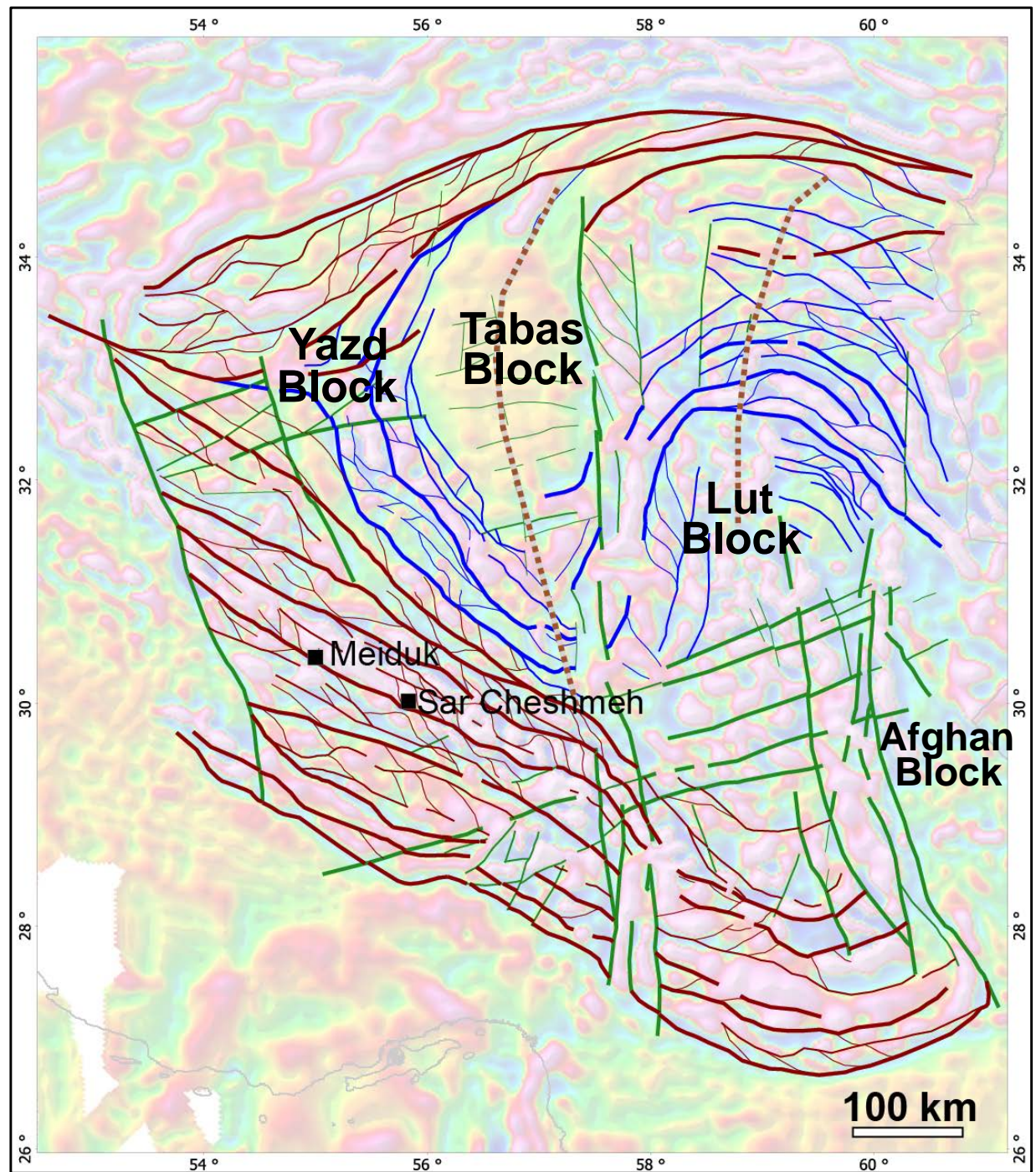
Fault network



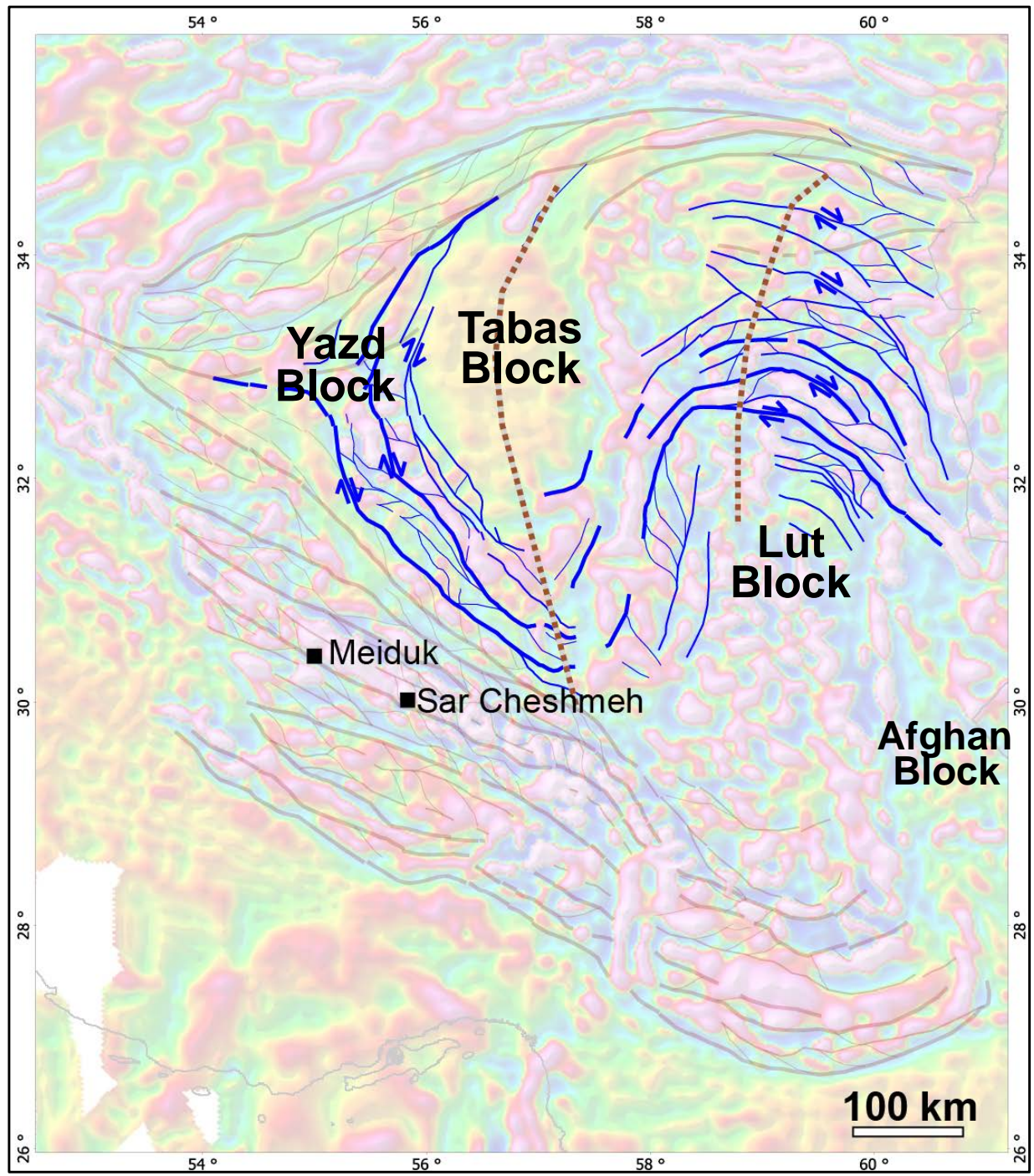
Interpreted Faults



Structural Interpretation Results

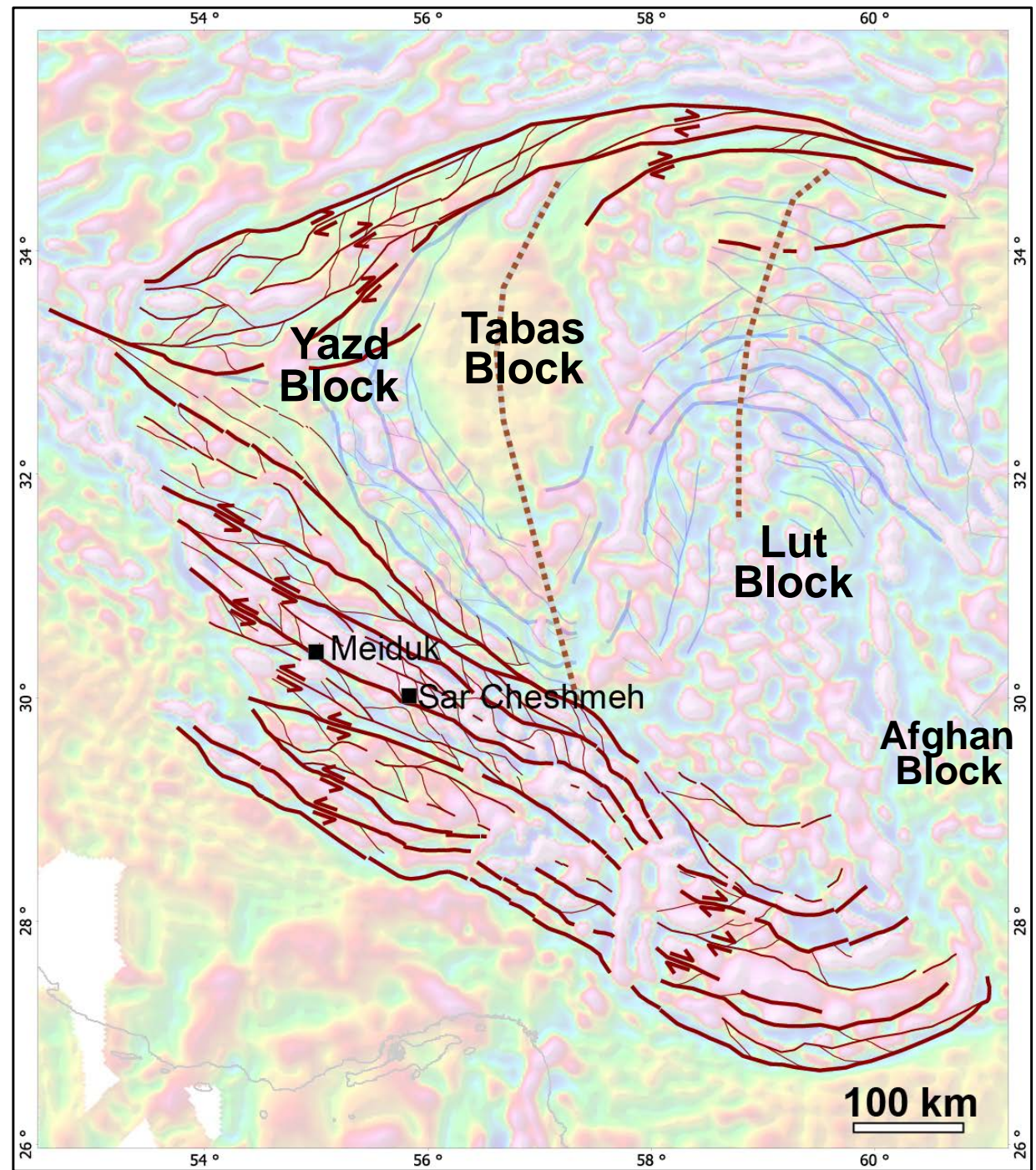


Structural Interpretation Results



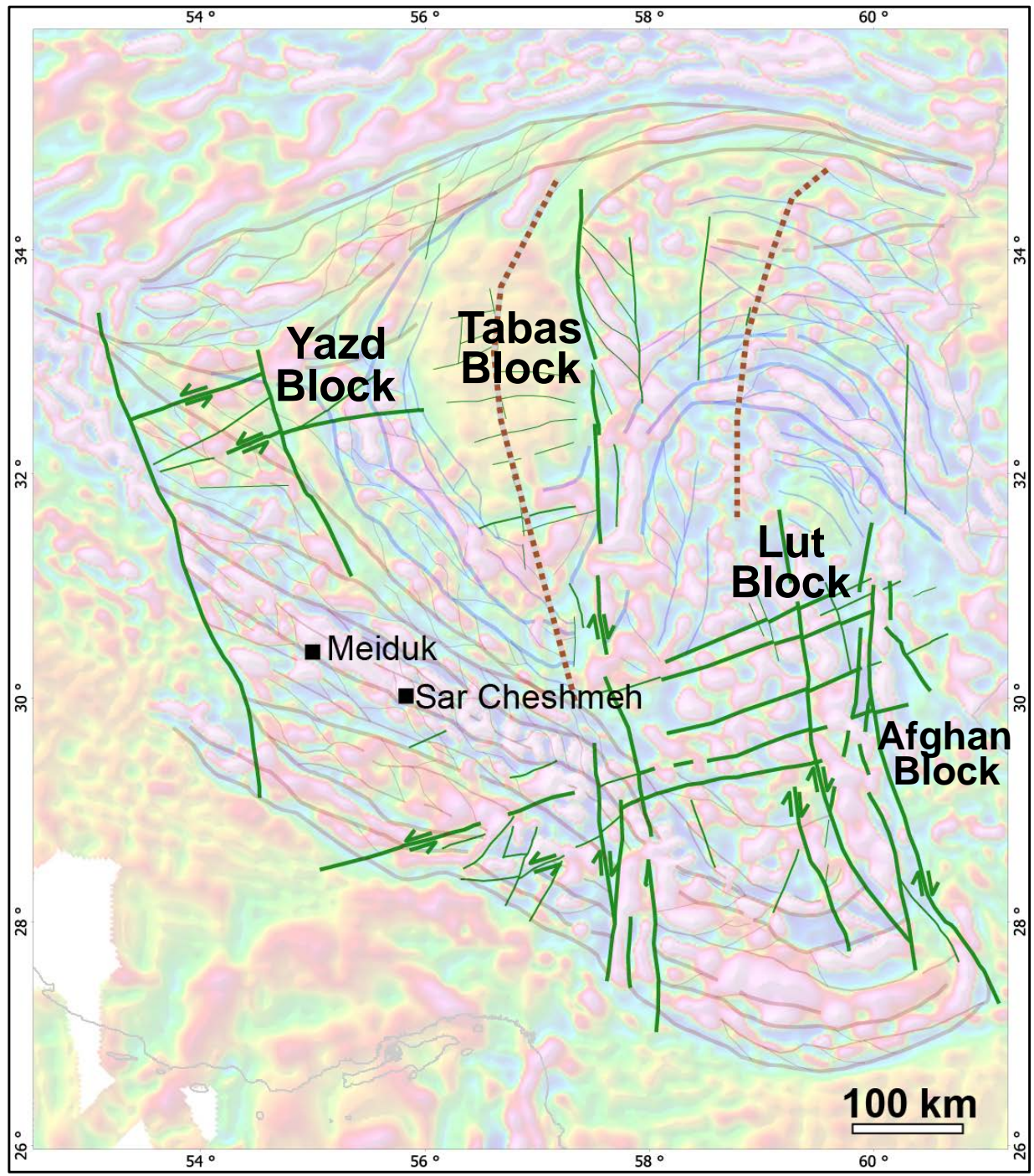
Interpreted faults			
1st order	2nd order	3rd order	
			D3 brittle faults
			D2 ductile faults
			F2 fold axes
			D1 ductile faults

Structural Interpretation Results



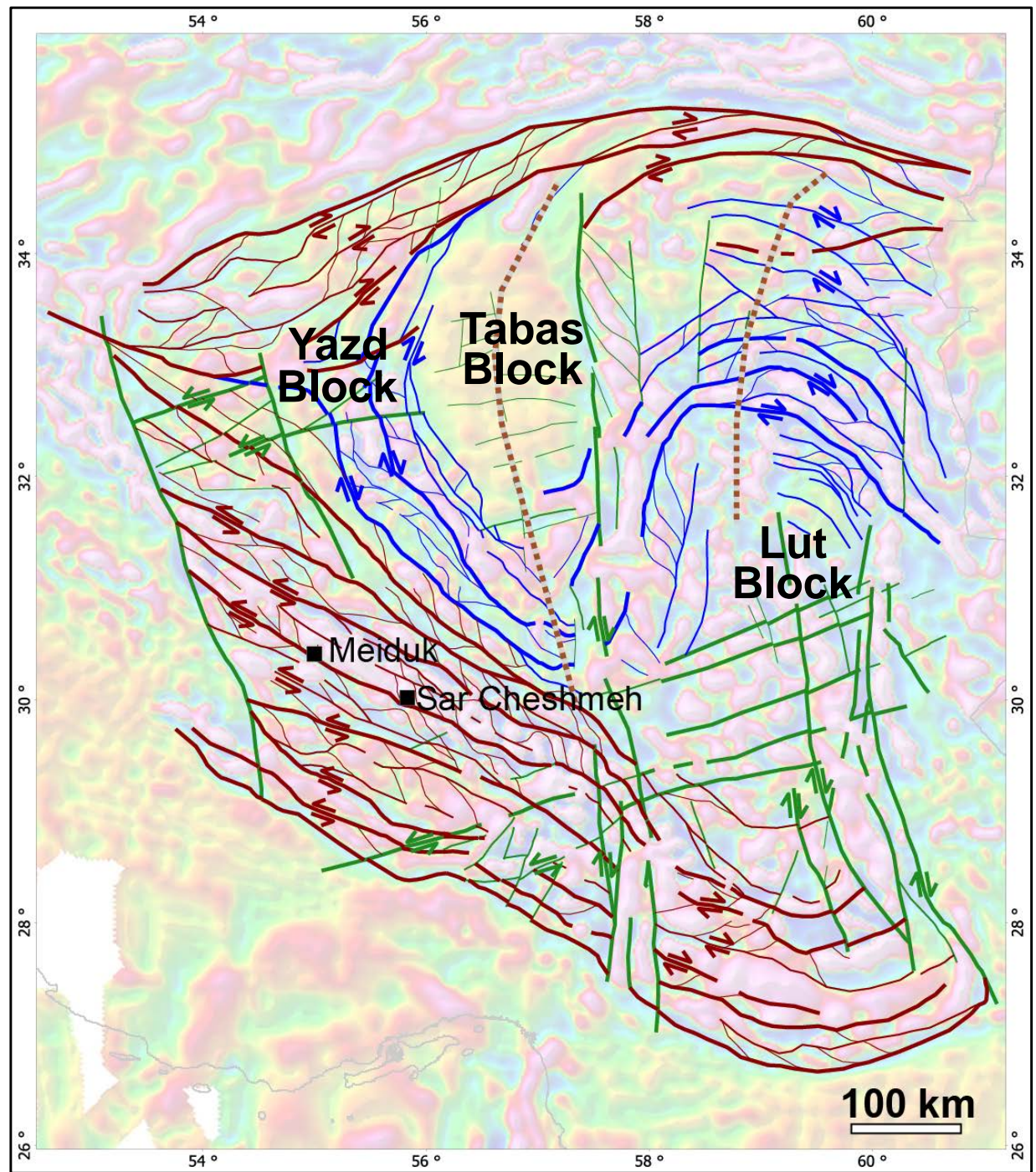
Interpreted faults			
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Structural Interpretation Results



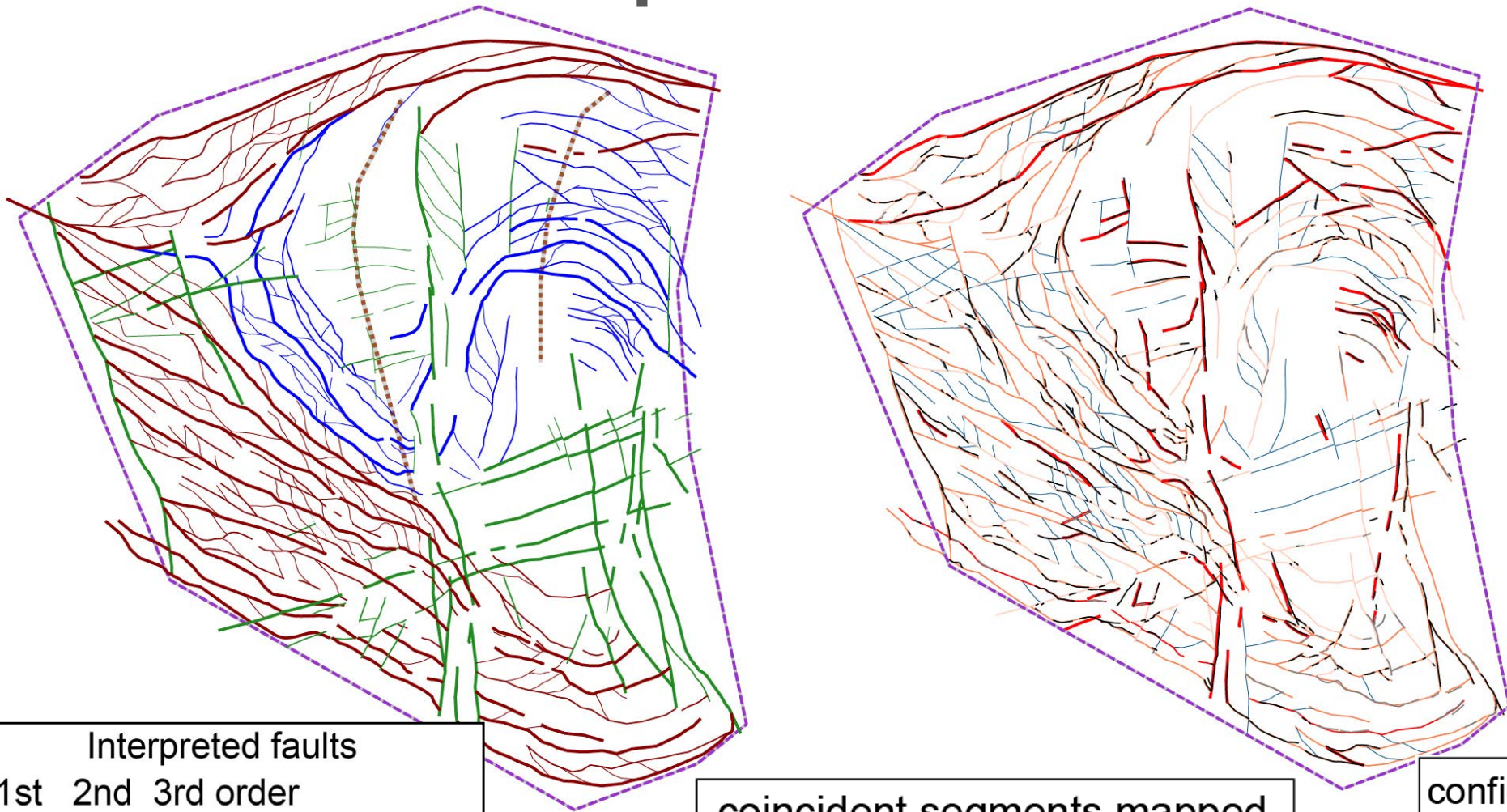
Interpreted faults			
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Structural Interpretation Results



Interpreted faults			
1st order	2nd order	3rd order	
			D3 brittle faults
			D2 ductile faults
			F2 fold axes
			D1 ductile faults

Structural Interpretation Confidence



Interpreted faults

1st order	2nd order	3rd order	Description
			D3 brittle faults
			D2 ductile faults
			F2 fold axes
			D1 ductile faults

coincident segments mapped at 1:250,000 scale

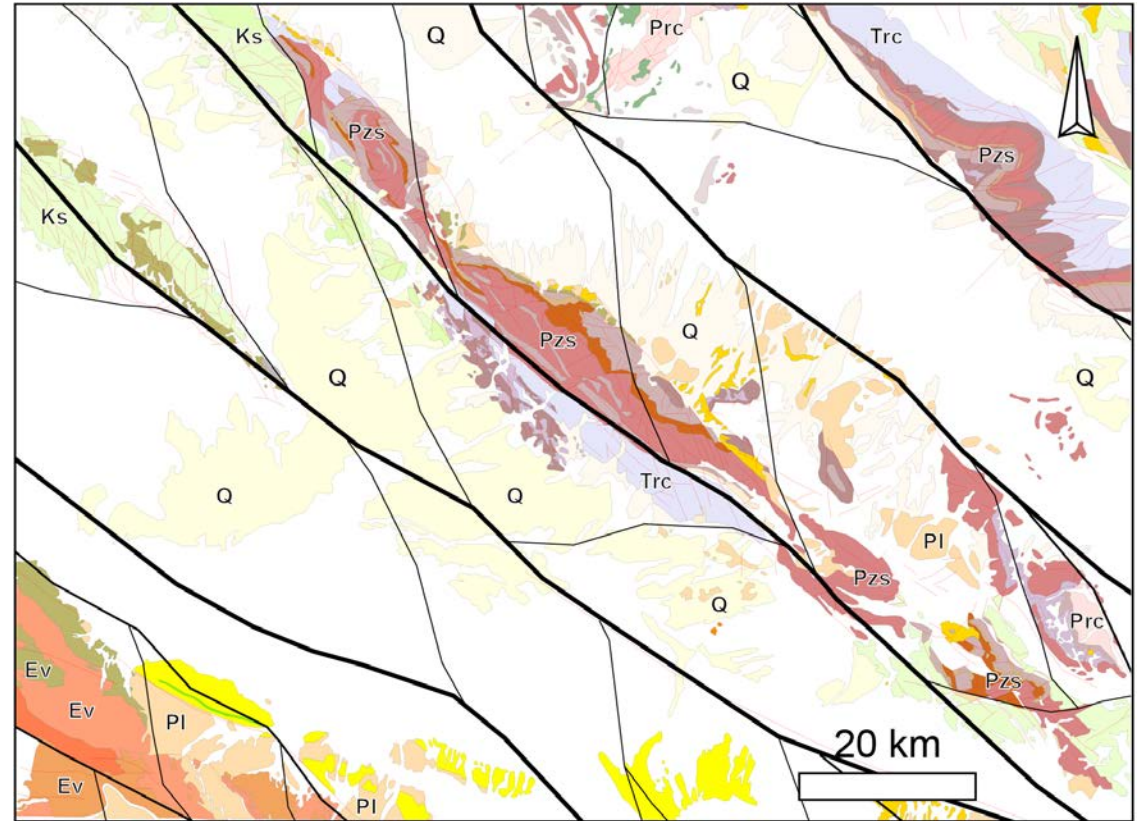
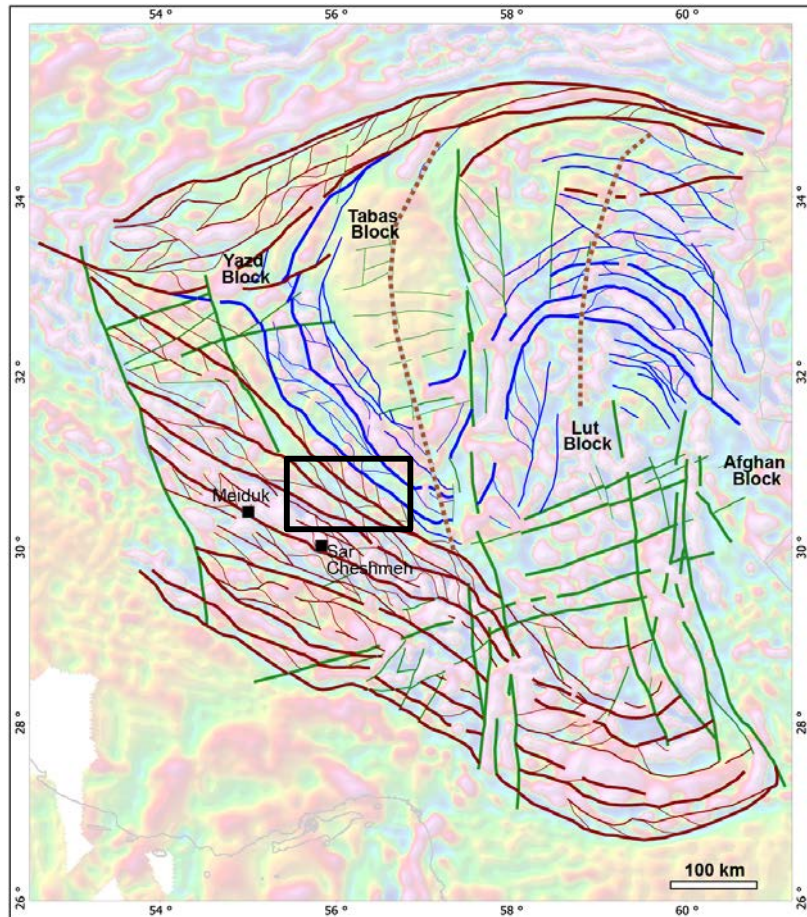
	fault segment
	physiographic feature

confidence value

	3
	2
	1
	0

Structural Interpretation Results

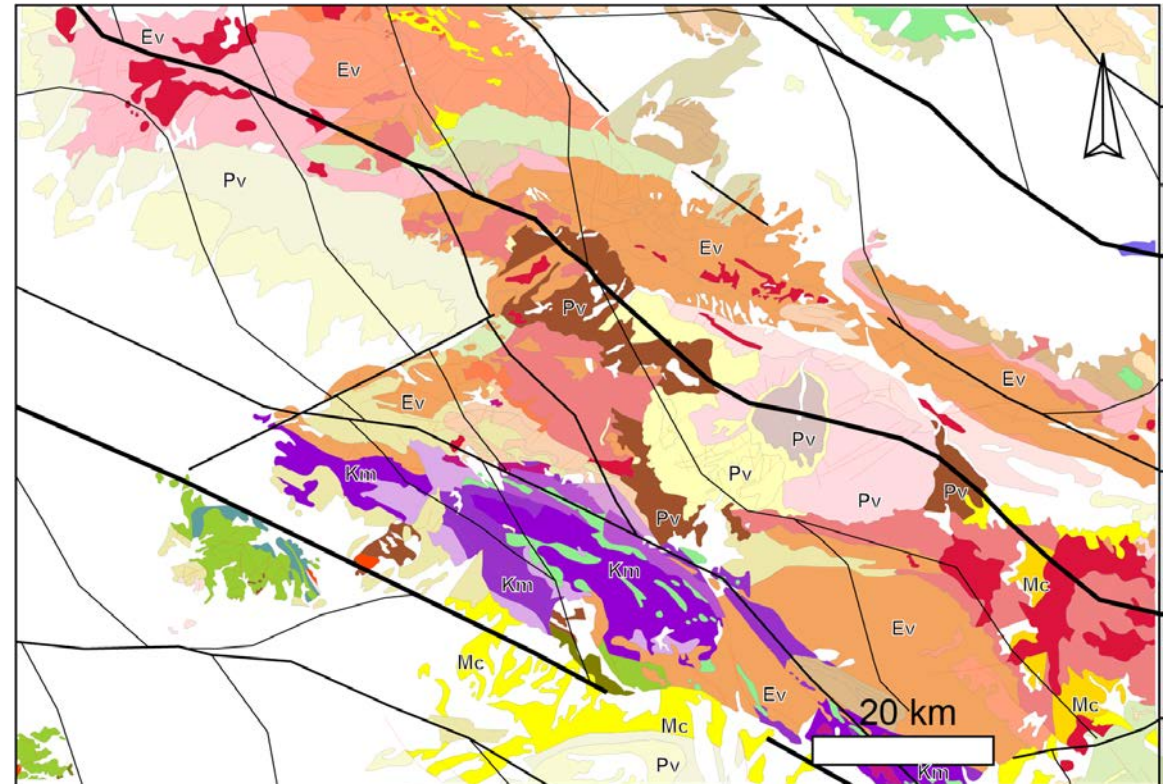
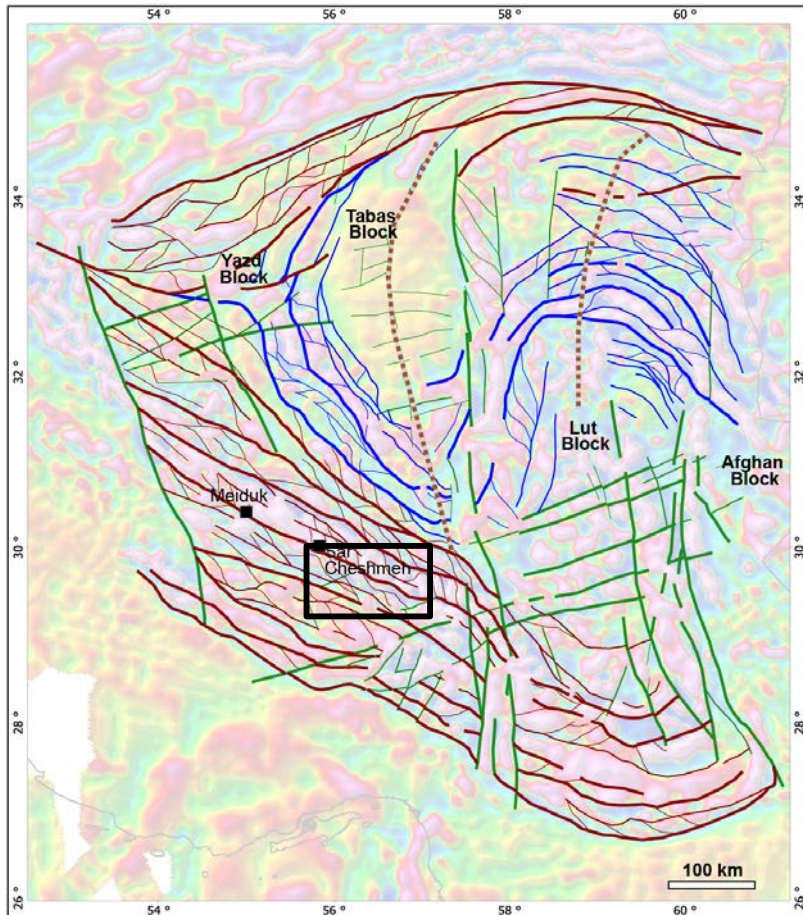
GSI – Rafsanjan Map



- Q Quaternary unconsolidated
- PI Pliocene sedimentary rocks
- Mv Miocene volcanic rocks
- Ev Eocene volcano-sedimentary rocks
- Ks Trc Mesozoic sedimentary rocks
- Pzs Palaeozoic sedimentary rocks
- Prc Upper Precambrian evaporites

Structural Interpretation Results

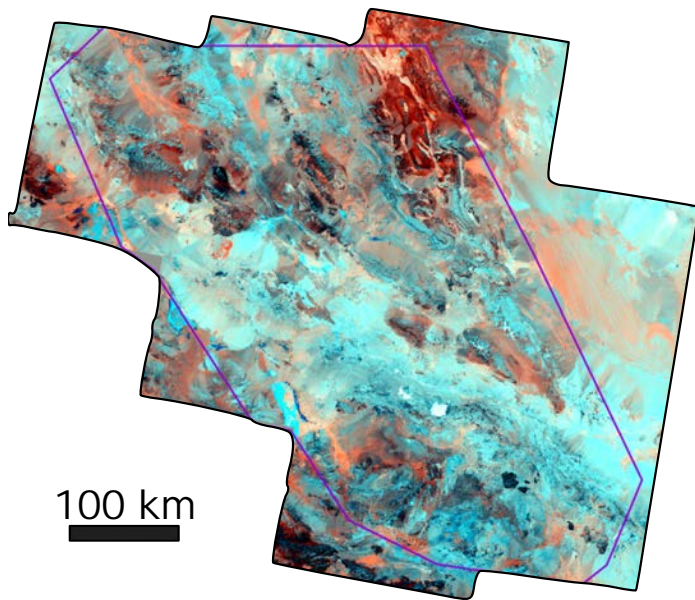
GSI – Sirjan Geological Map



- Intrusive rocks
- Pv Pliocene volcanic rocks
- Mc Miocene volcano-sedimentary rocks
- Ev Eocene volcanic rocks
- Km Cretaceous (?) melange complex

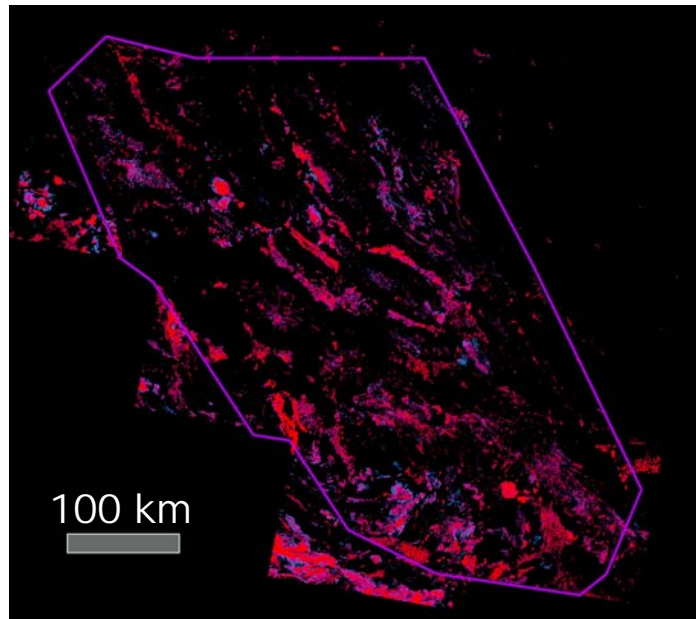
Alteration Interpretation of Spectral Data

Crosta Analysis

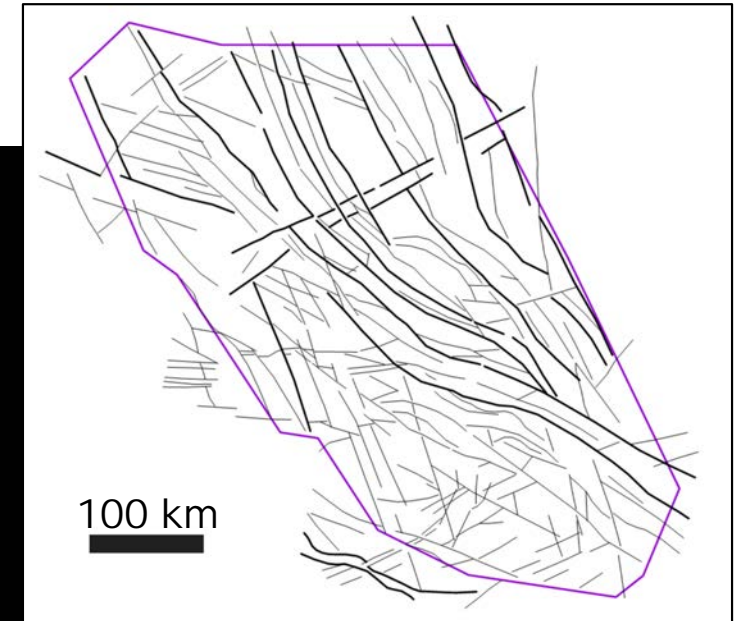


hydroxyl > Fe-oxyhydroxide
Fe-oxyhydroxide > hydroxyl

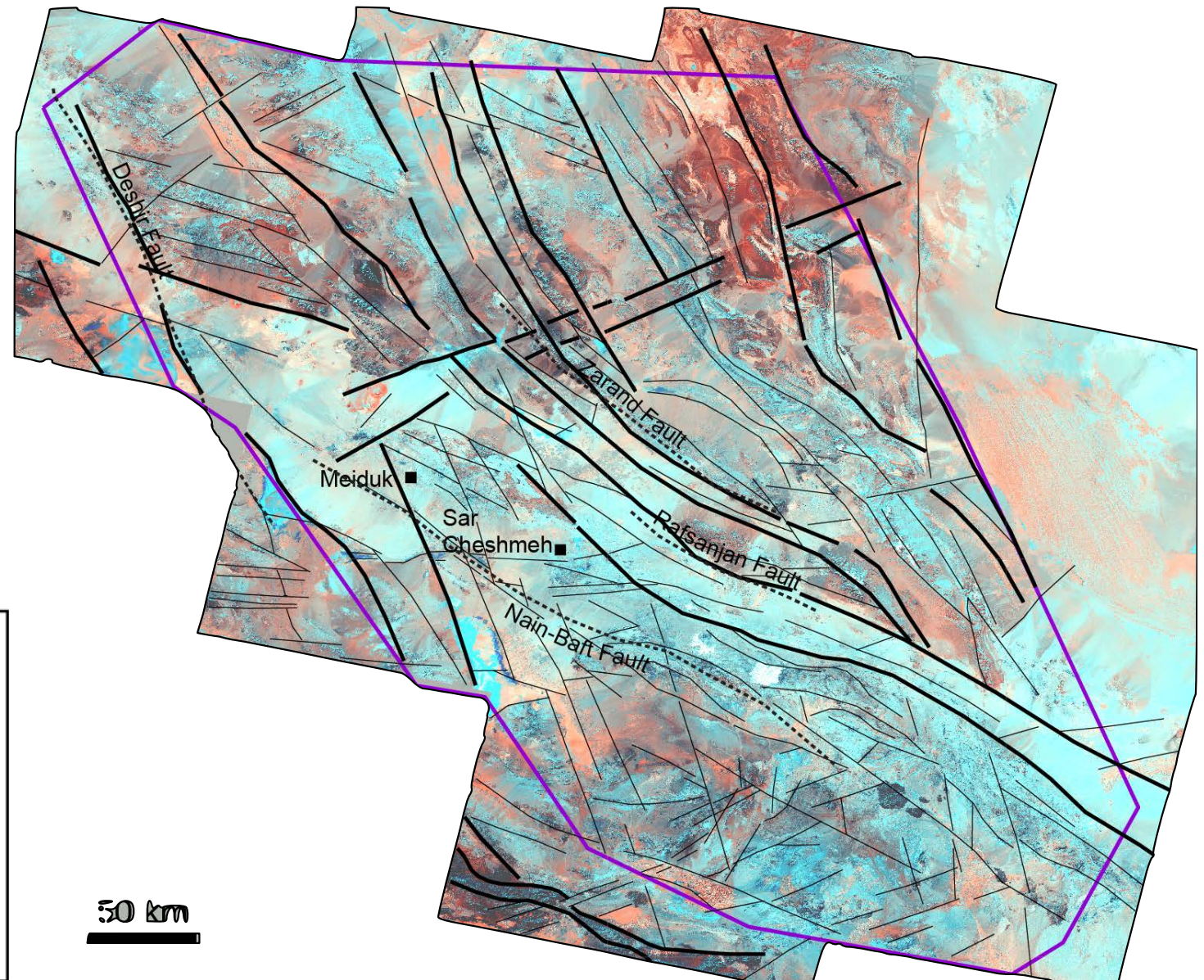
Band Ratios 3:7, 6:7



Alteration Lineaments

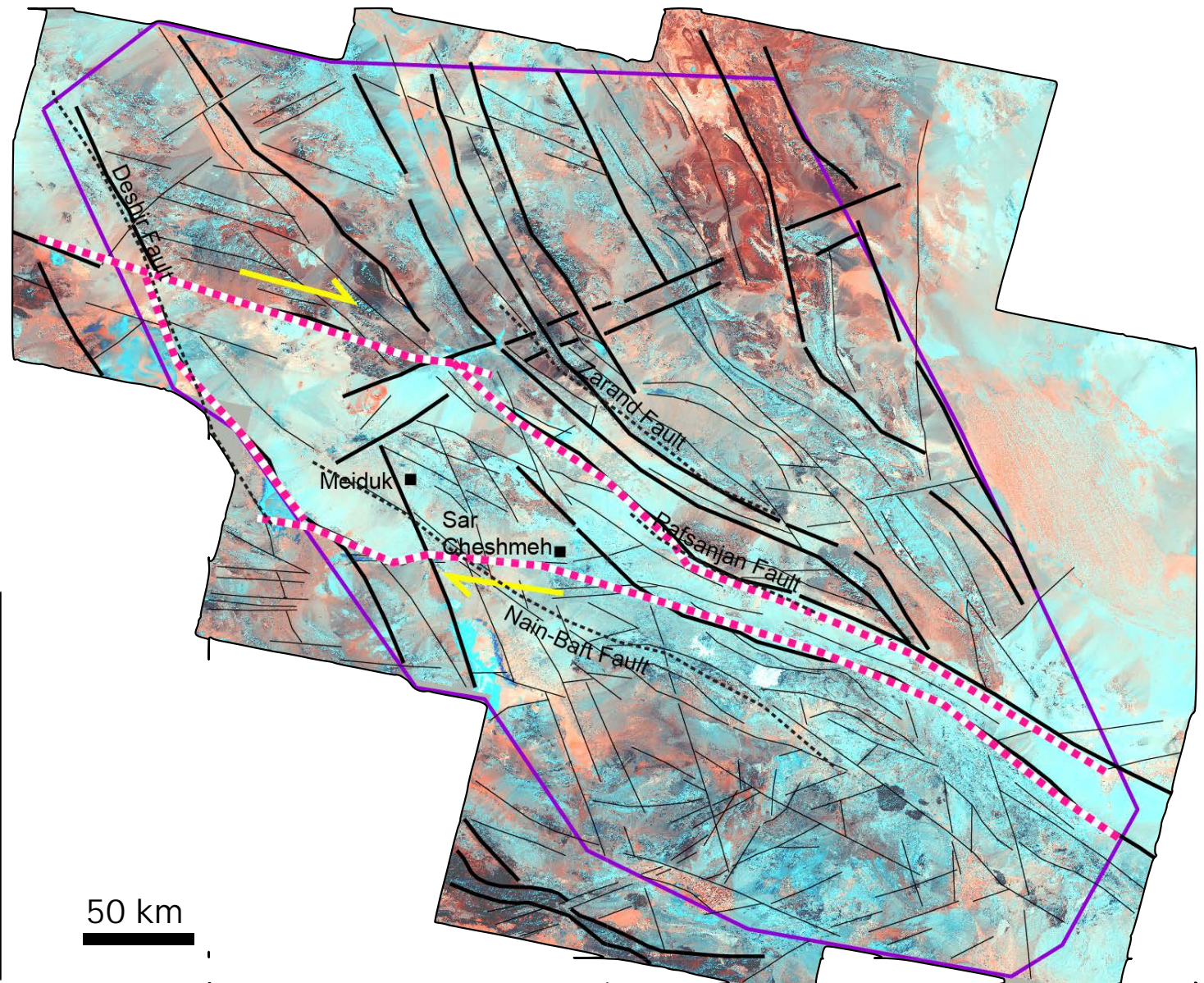


Alteration Interpretation of Spectral Data



- mapped fault
- alteration interpretation area
- Crosta analysis
- hydroxyl > Fe-oxyhydroxide
- Fe-oxyhydroxide > hydroxyl
- interpreted alteration lineaments
- first order
- second order

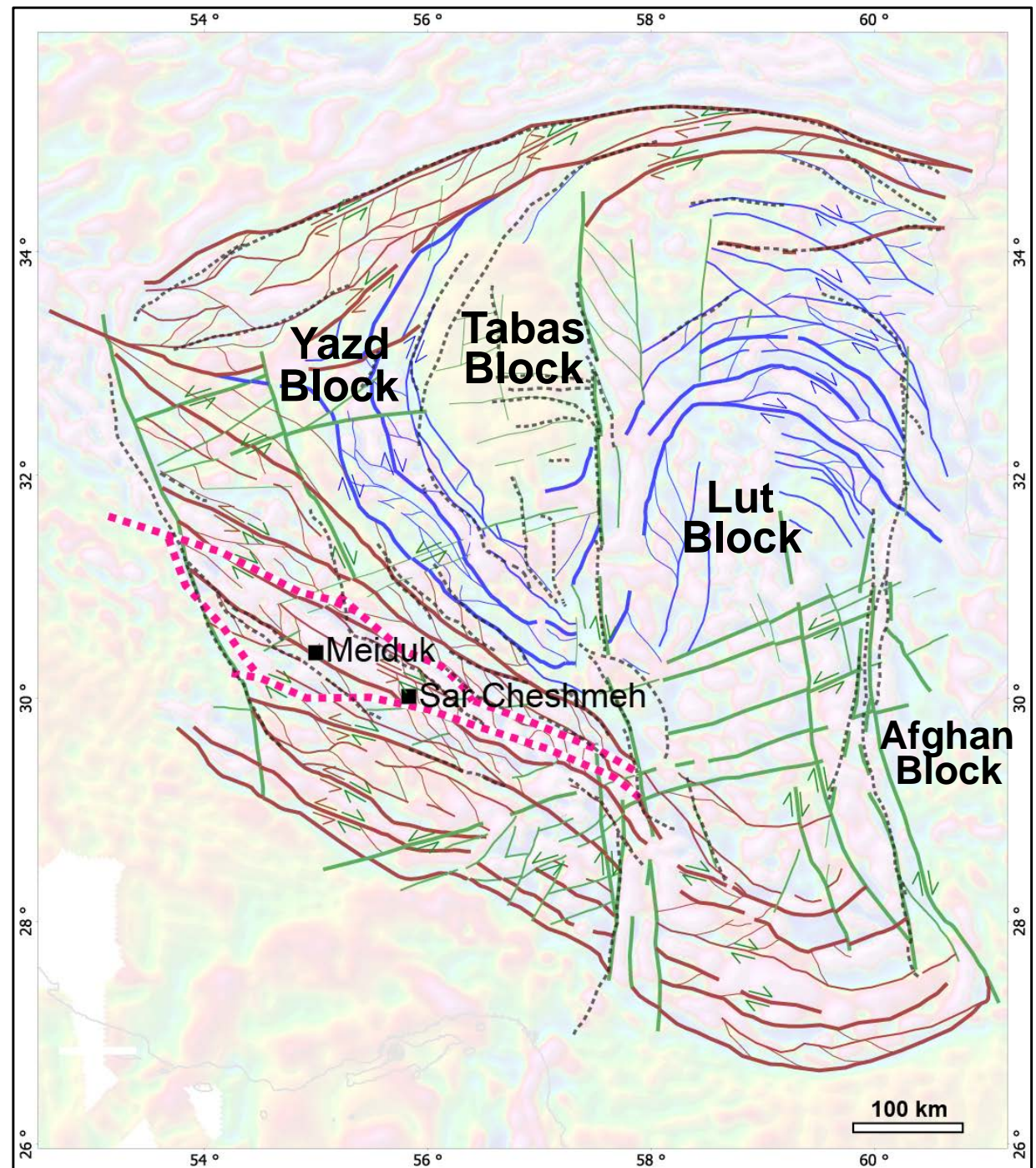
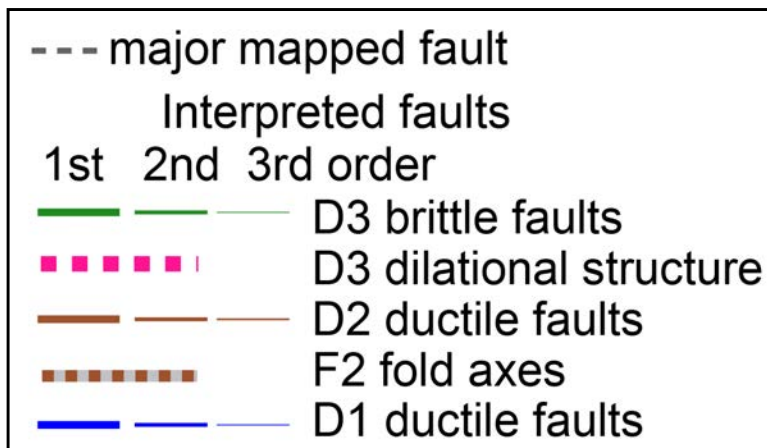
Alteration Interpretation of Spectral Data



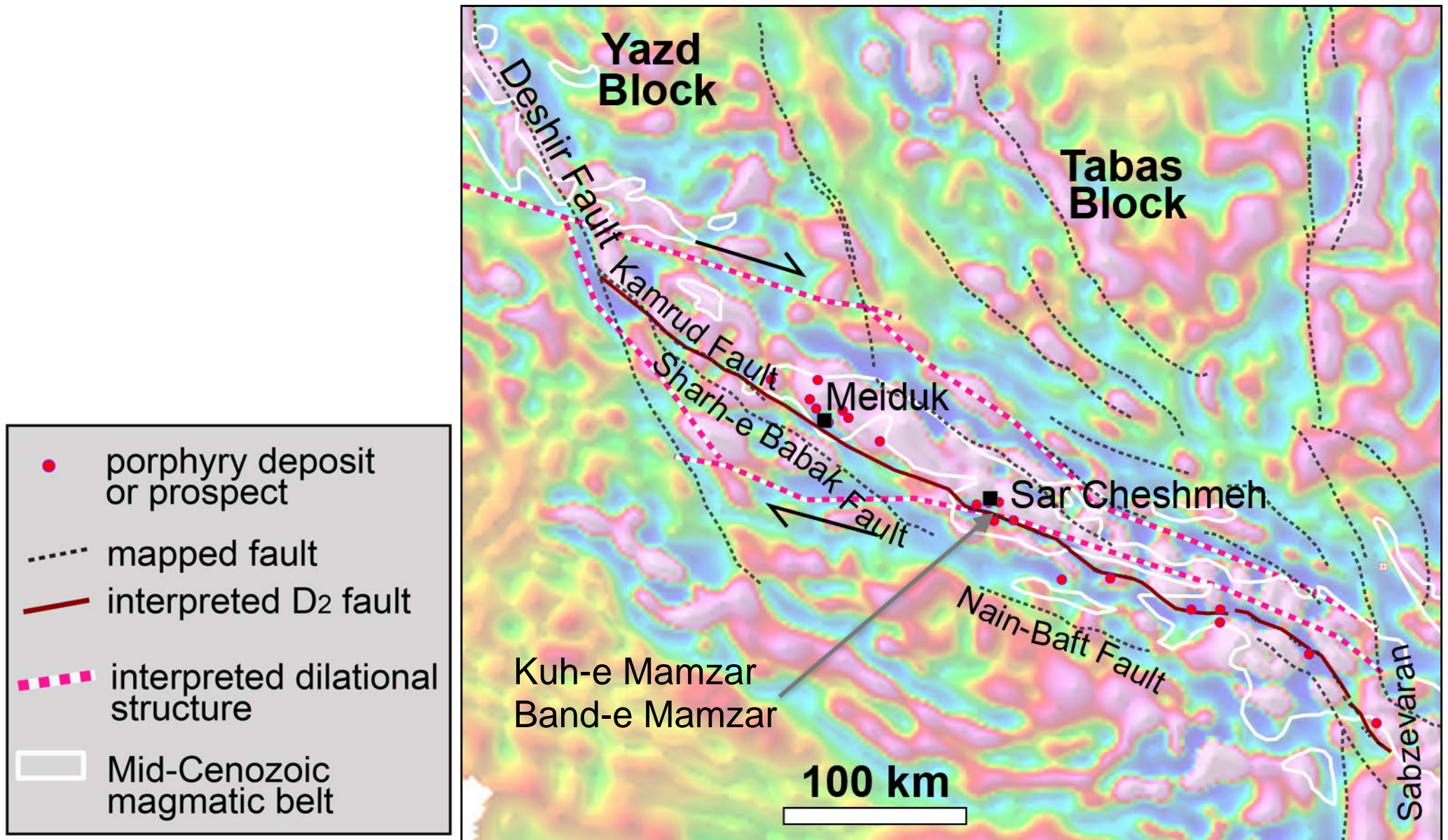
- ■ ■ ■ interpreted dilational feature
- mapped fault
- alteration interpretation area
- Crosta analysis
- hydroxyl > Fe-oxyhydroxide
- Fe-oxyhydroxide > hydroxyl
- interpreted alteration lineaments
- first order
- second order

50 km

Integrated Interpretation

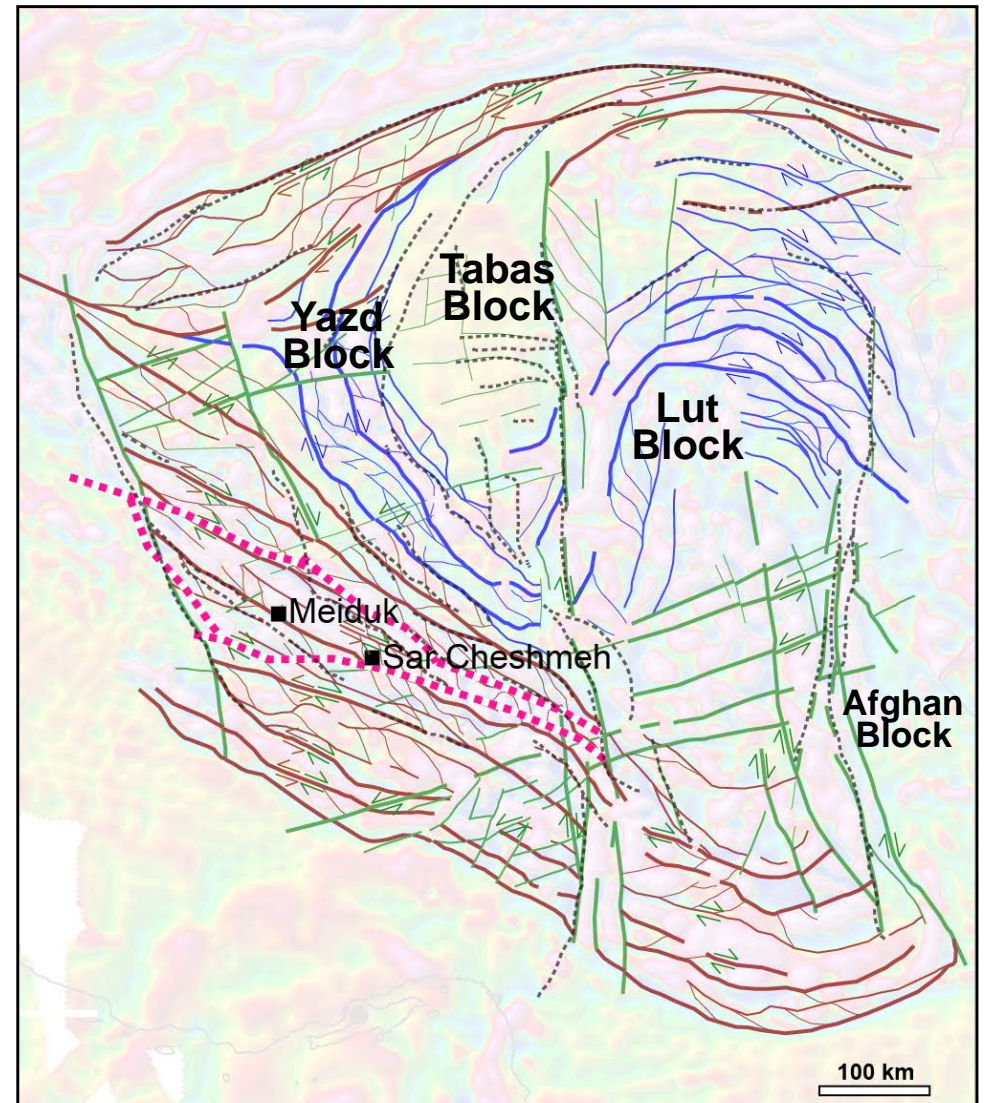


Integrated Interpretation



Conclusions

- Alteration interpretations refining regional structural interpretations - requires an understanding of the depths imaged by each data set
- Integrated analysis of the Kerman district imaged
 - pre-inversion kinematics
 - a regional dextral dilational jog
 - a >500 km fault straddled by porphyry prospects and deposits
- Raised more questions than answers



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