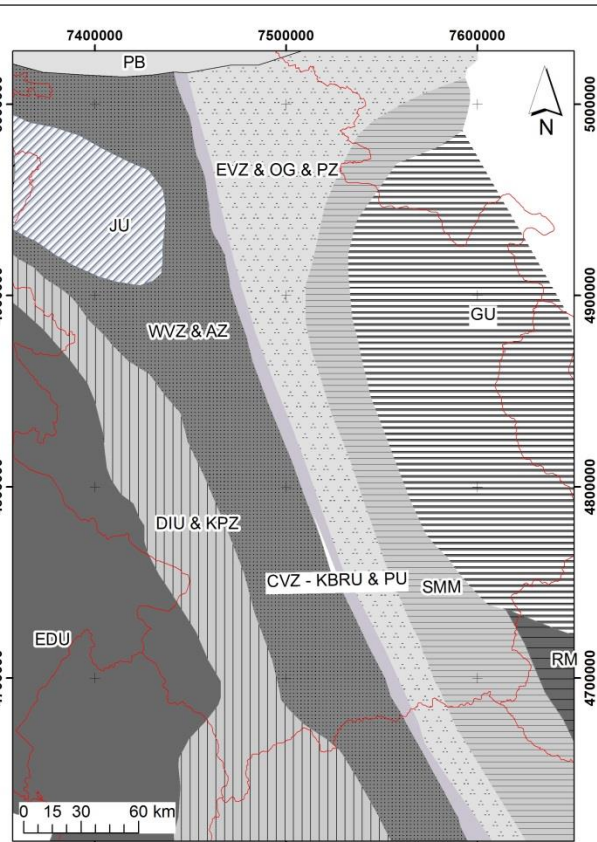


Mapping of the East Vardar Zone ophiolite using remote sensing and geophysical data

Dragana Đurić

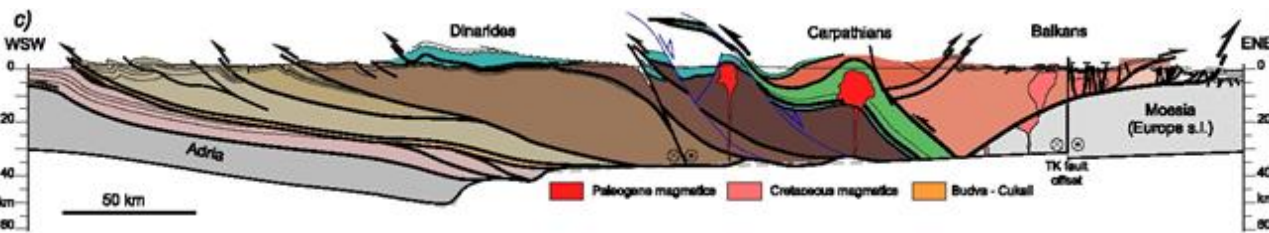
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Vardar Zone (VZ), as one of several, subparallel and NNW-SSE stretching belts that left behind Mesozoic convergence and subsequent collision, is settled between two continental units, Drina-Ivanjica Unit on the east and Serbo-macedonian Massif (SMM) on the west.

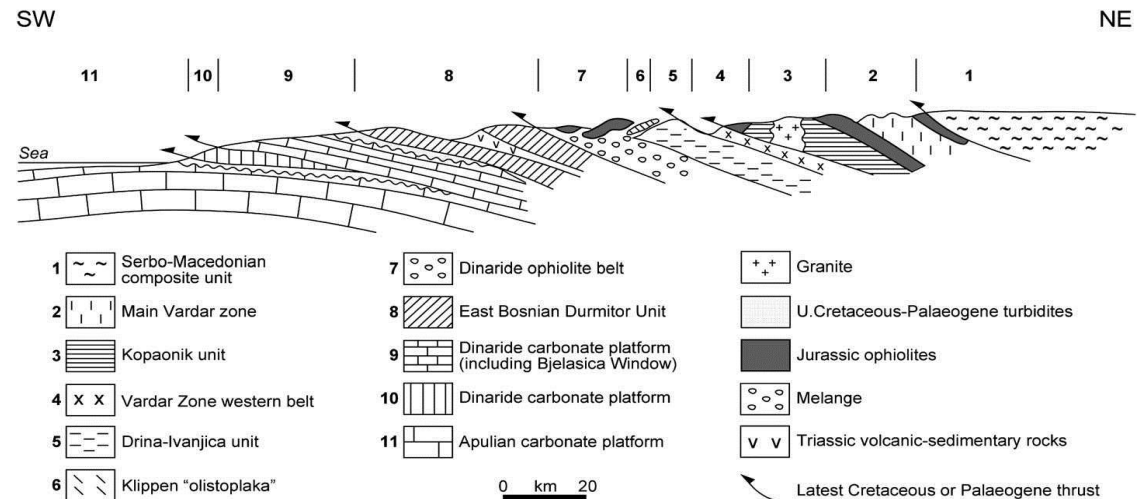


Legend:

EDU - External Dinaric Units
 DIU & KPZ - Drina - Ivanjica Unit & Korabi - Pelagonian Zone
 JU - Jadar Unit
 WVZ & AZ - West Vardar Zone & Altopias Zone
 CVZ - KBRU & PU - Central Vardar Zone - Kopaonik Block and Ridge Unit & Paikon Zone
 EVZ & GO & PZ - East Vardar Zone & Guevgueli Ophiolite & Peonias Zone
 SMM - Serbo - Macedonian Massif
 RM - Rhodope Massif
 GU - Getic Unit
 PB - Panonnian Basin



Schmid et al., 2008

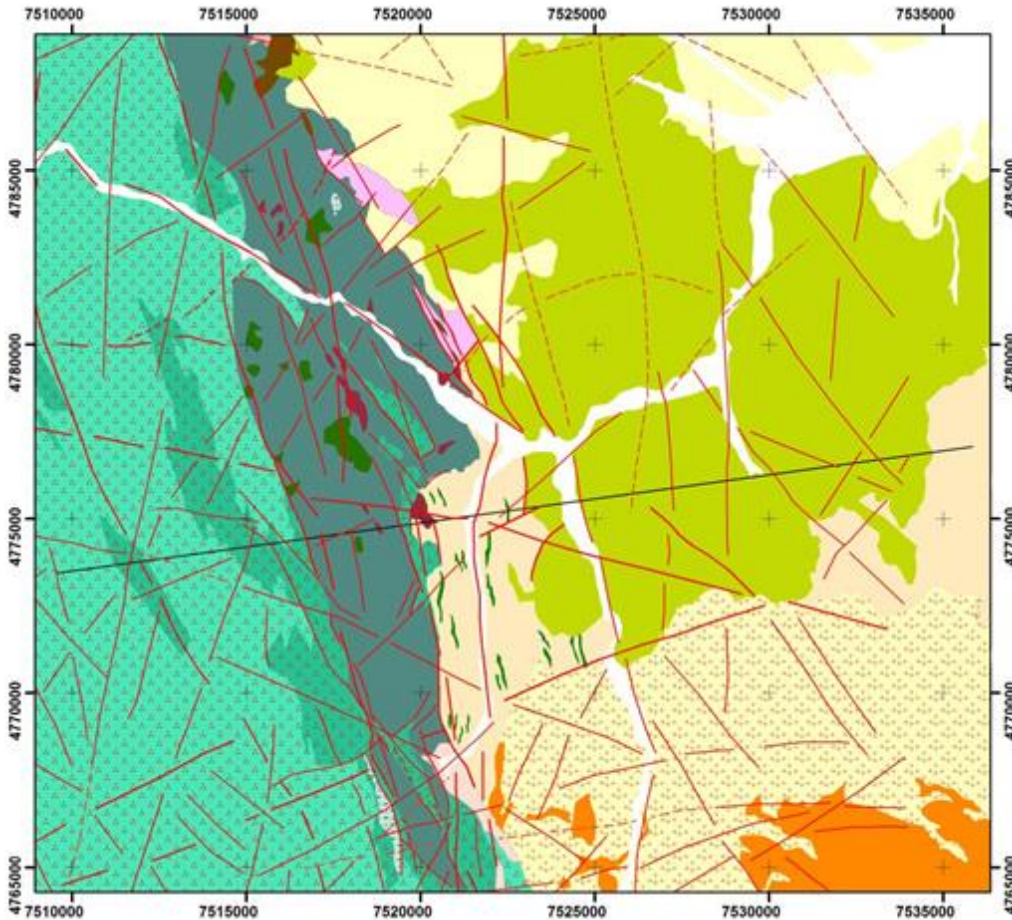


Robertson et al., 2009

Ophiolites

An ophiolite is a section of the Earth's oceanic crust and underlying upper mantle, uplifted and exposed.

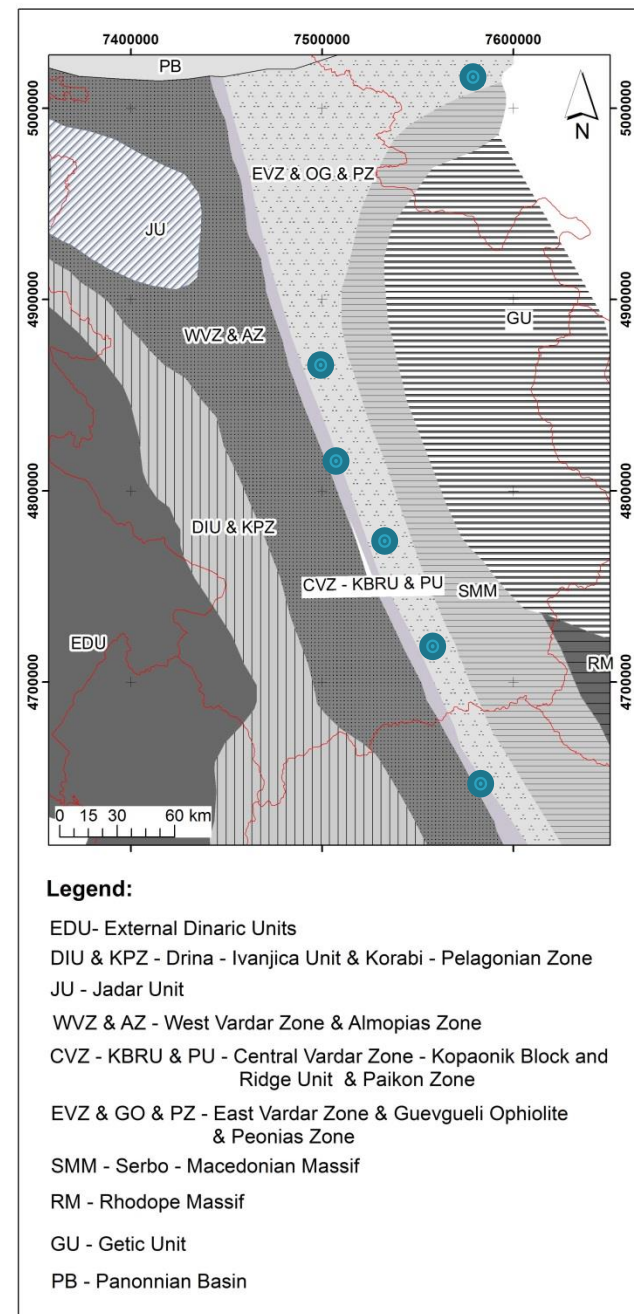
Tectonic setting and the emplacement style of ophiolites bear important constraints for understanding the geological and geotectonic evolution of any region.



Main part of East Vardar zone ophiolites is built up of gabbro-dolerites, dolerites, dolerite dykes and rare basaltic pillow lavas, serpentinitised harzburgites.

All ophiolitic rocks are associated with intermediate and acid calcalkaline granitic rocks.

Problem?



- *Preprocessing of satellite images*

- Eliminate the noise
- Pan-sharpening

- *Processing of satellite images*

- NDVI
- PCA, band ratio, FCC
- Semiautomatic classification

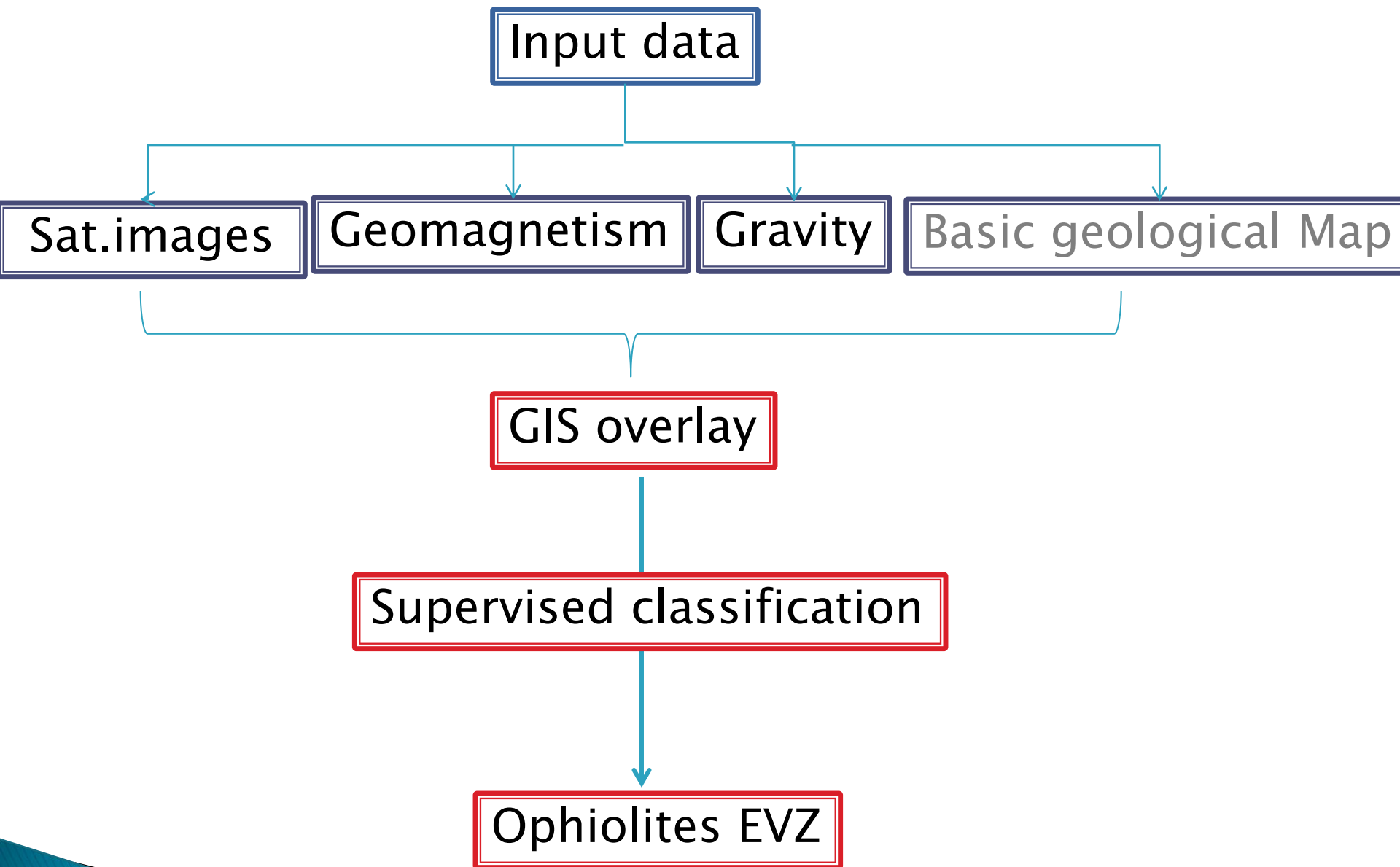
- *Analysis of geophysical data*

Gravity
data

Geomagnetic
data

Hanning filter,
Vertical derivation of gravitational acceleration,
Normalized standard deviation

Reduction to pol,
TDR



PCA and Semi-automatic classification

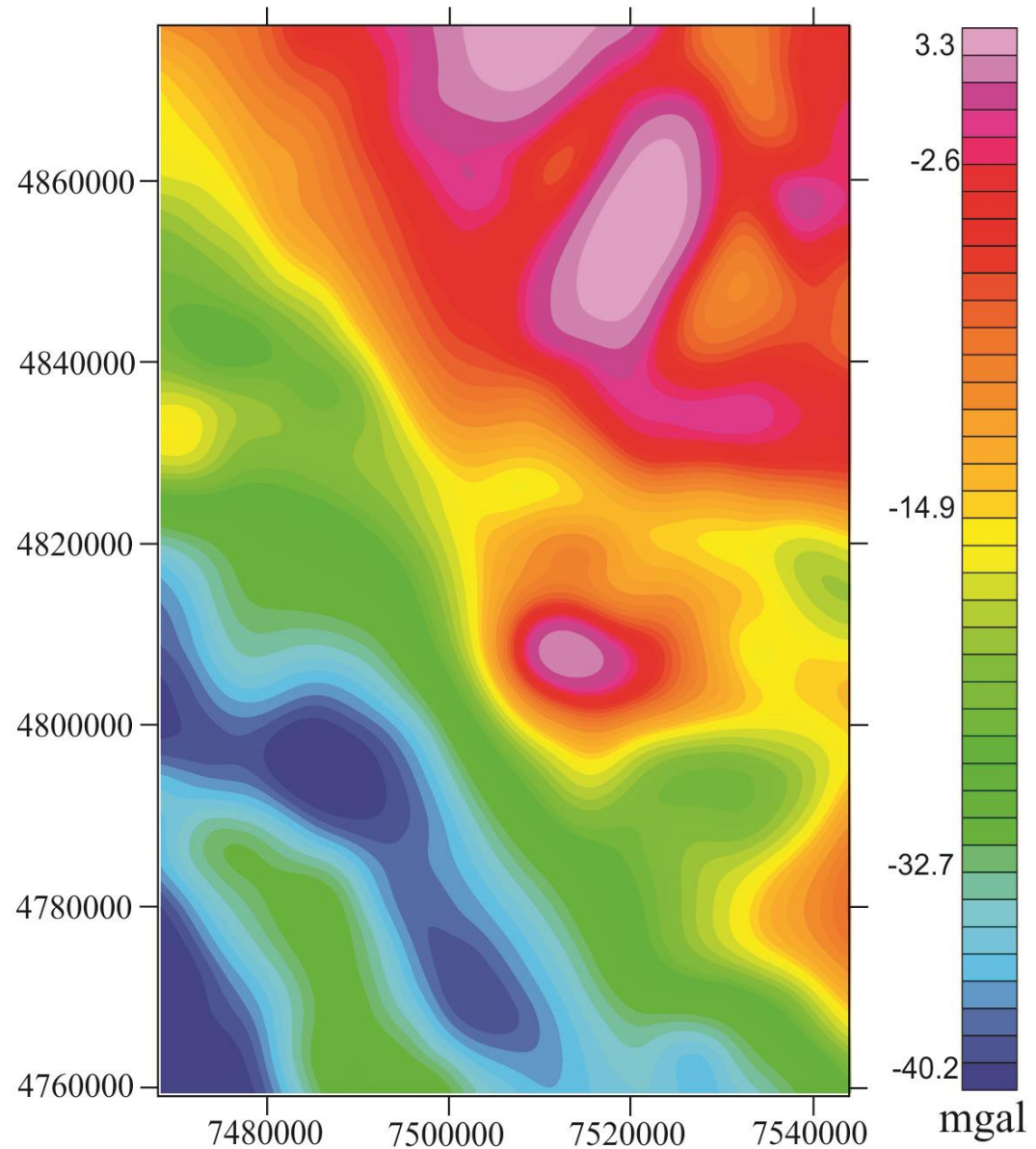
- ▶ Ophiolites are clearly visible and separated from other units.
- ▶ The results are in agreement with Basic Geological Map, but boundaries are more precisely located.

RGB (7, 4, 2) FCC was converted to HSV (Hue, Saturation Value) and from that, back to RGB.

Results of geophysical data analysis

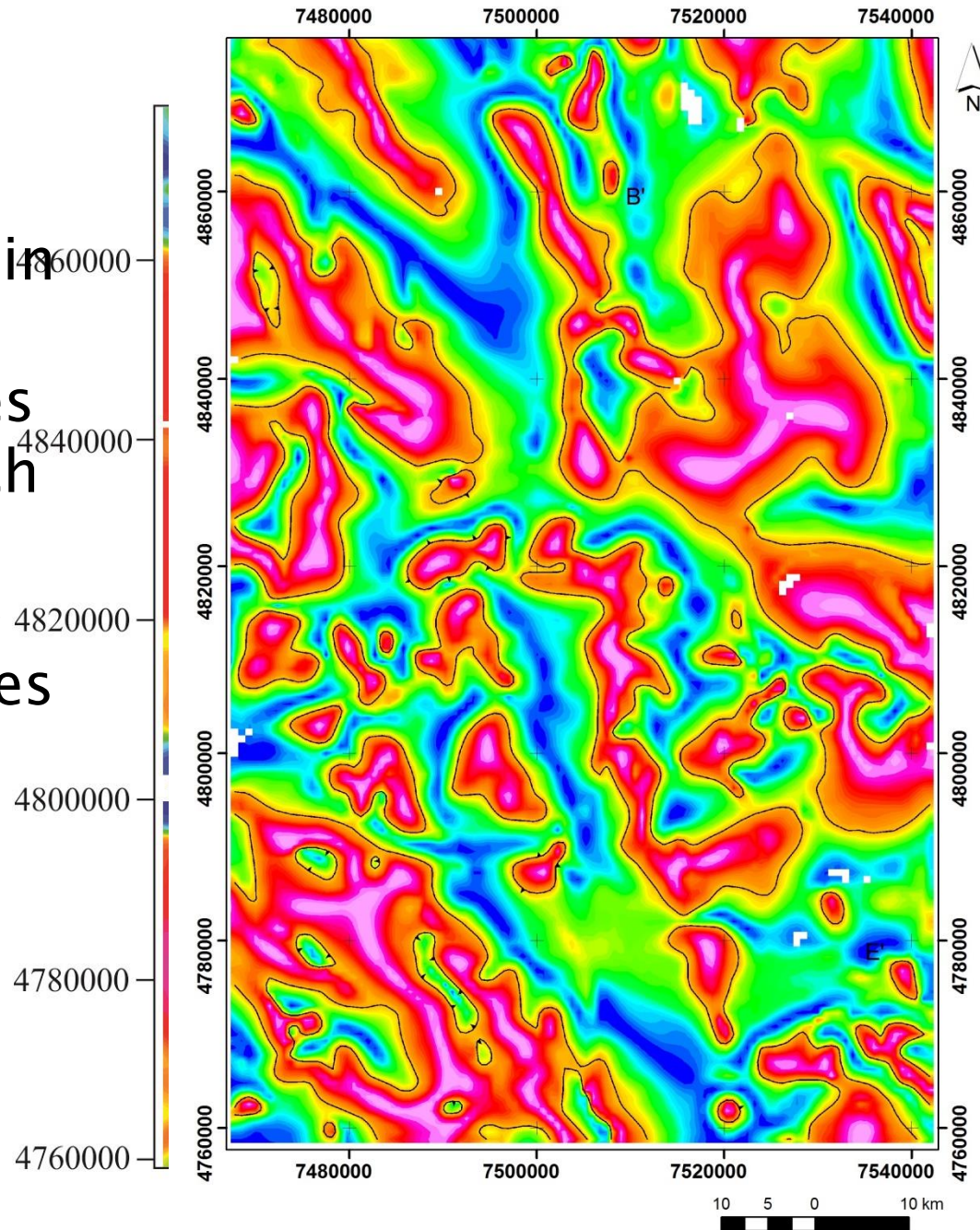
Bouguer anomaly map

- ▶ Anomalies are oriented... indicate the presence... which generally follow... restrict it from both... anomaly values suggest... adjacent units is vertical
- ▶ EVZ is characterized... while the neighboring... separated by abrupt... area of Greece the... anomaly was used... elongated in the direction

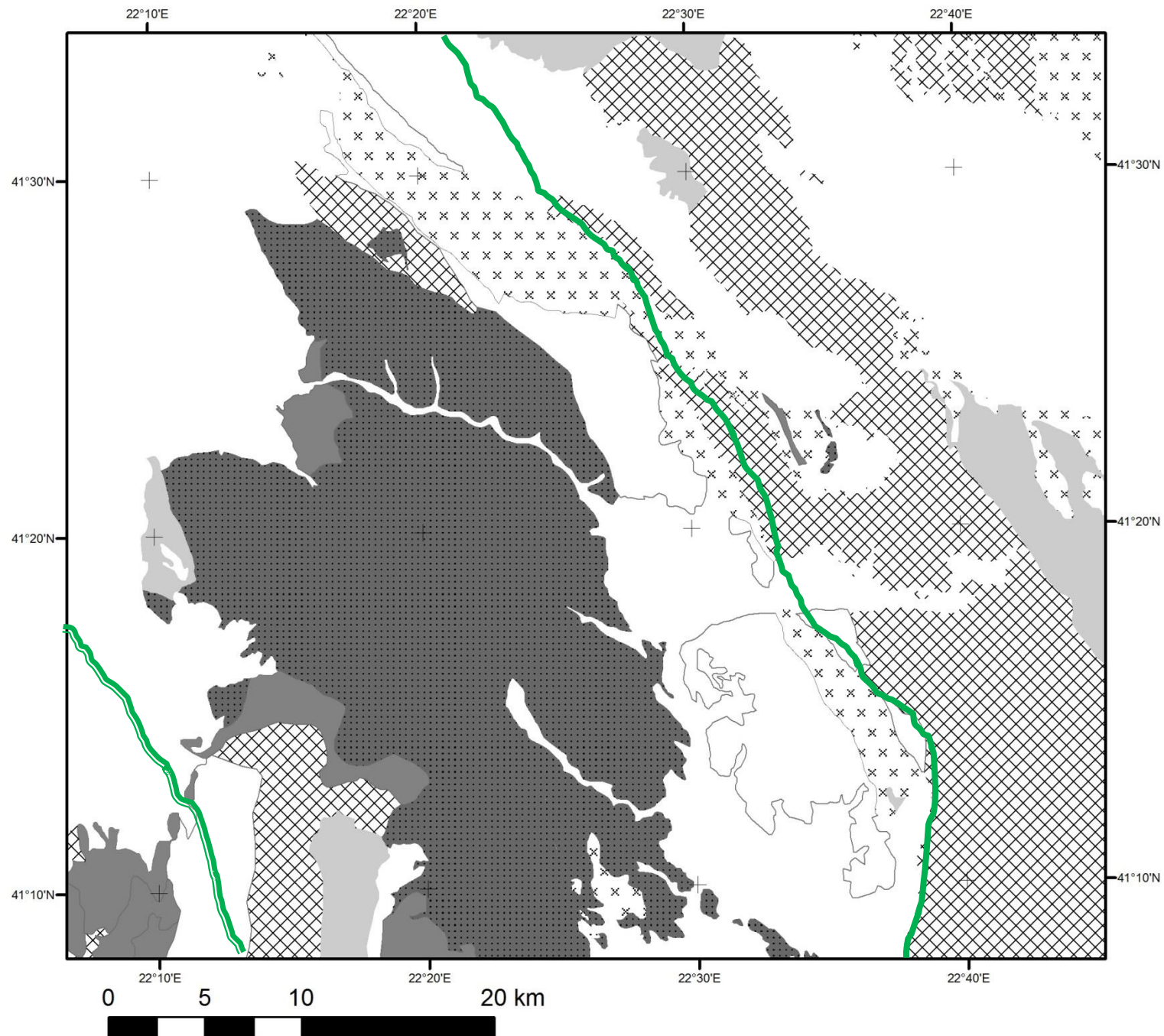


Geomagnetic maps

On the map position of the positive values of anomalies in the area of EVZ was determined, which agrees with the position of anomalies and can be seen on maps as Bouguer anomalies.. The position of the boundaries of causes of anomaly corresponds to the provision of isoline with the value zero.



Example: Macedonia– Demir Kapija ophiolites



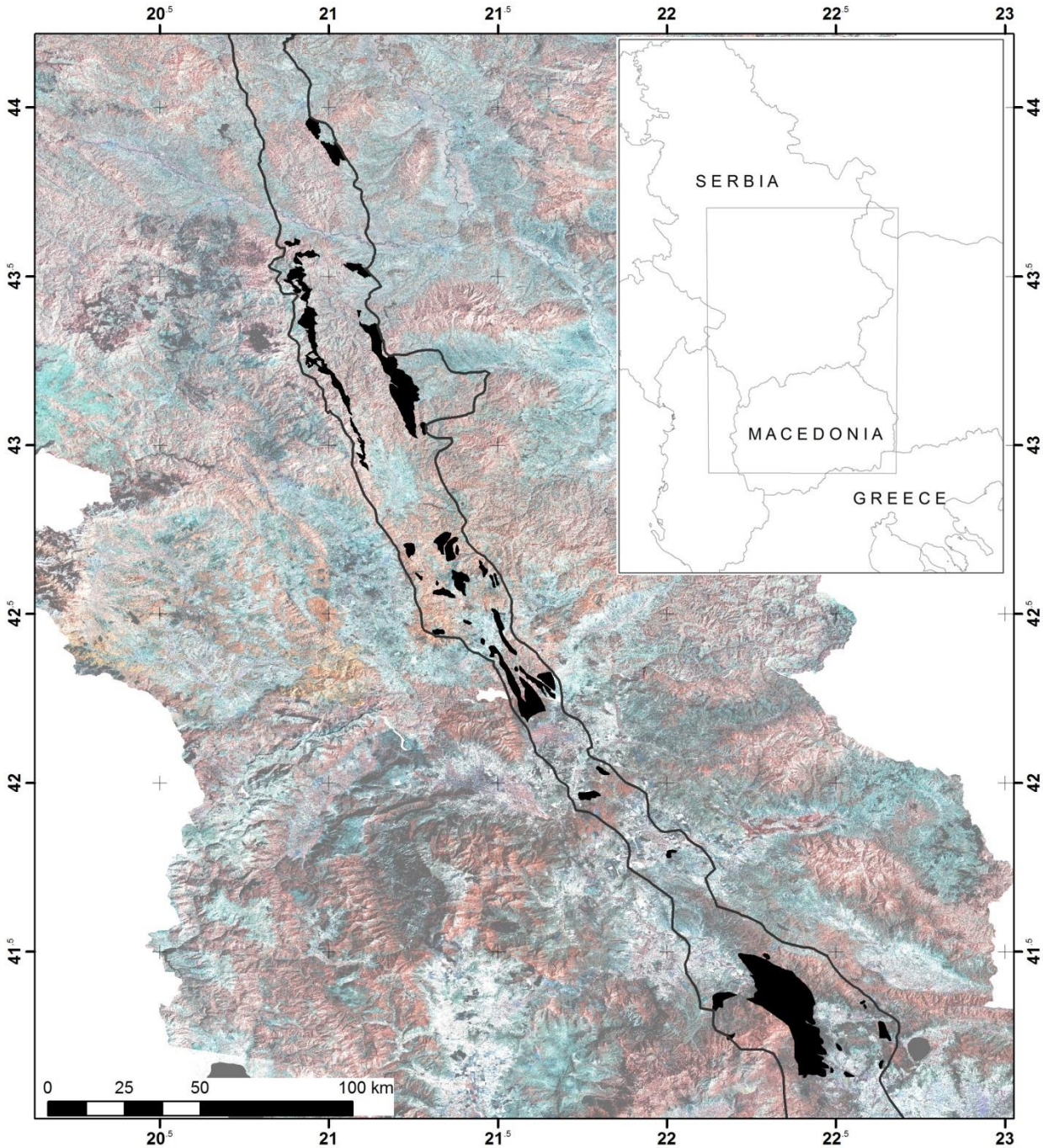
INTRODUCTION

METHODOLOGY

RESULTS

DISCUSSION

CONCLUSION



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- ▶ Mapped EVZ ophiolite covers area of about 920 km².
- ▶ Area of the central part of EVZ determined by remote sensing and geophysical data was estimated to about 9100 km²

Problem?

To be continued...

THANK YOU FOR YOUR ATTENTION!

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