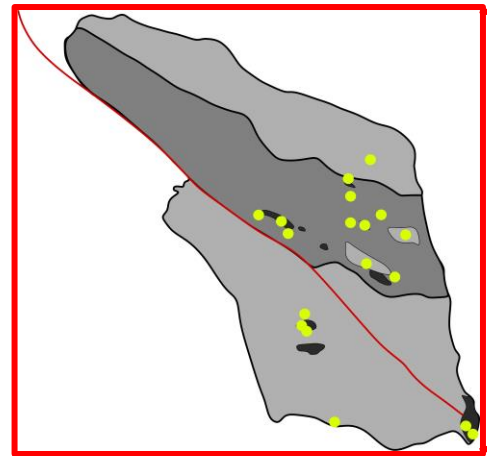


# Granitic batholith emplacement mechanism in a transtensional setting: petromagnetic evidence from the Southern Urals

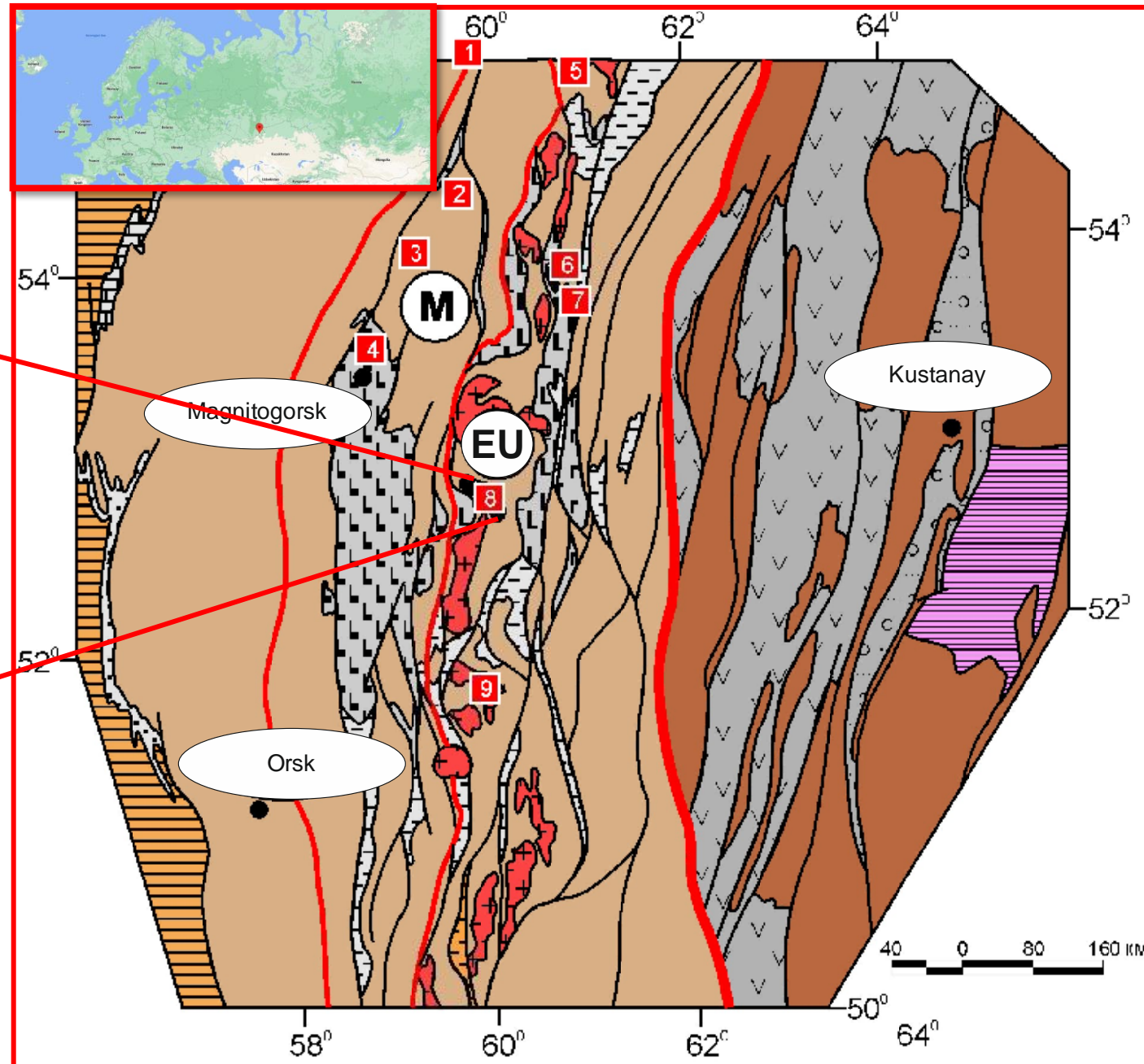
**Egor Koptev**, Alexey Kazansky, Alexander Tevelev, Alexandra Borisenko,  
Natalia Pravikova and Jirí Zák



# Study Area



Nepluyevka granitic batholith  
Yellow dots are observation sites



 Early Carboniferous Plutons:

## Magnitogorsk zone (M):

1 - Syrostansky, Turgoyaksky;  
2 - Petropavlovsk;  
3 - Kasselsky, Zamatokhinsky;  
4 – Magnitogorsk group (Kuibasovskiy, Mosovskiy, Magnitogorskiy);  
10 - Karagaikulsky and Starobalbukovsky;

## East Ural zone (EU):

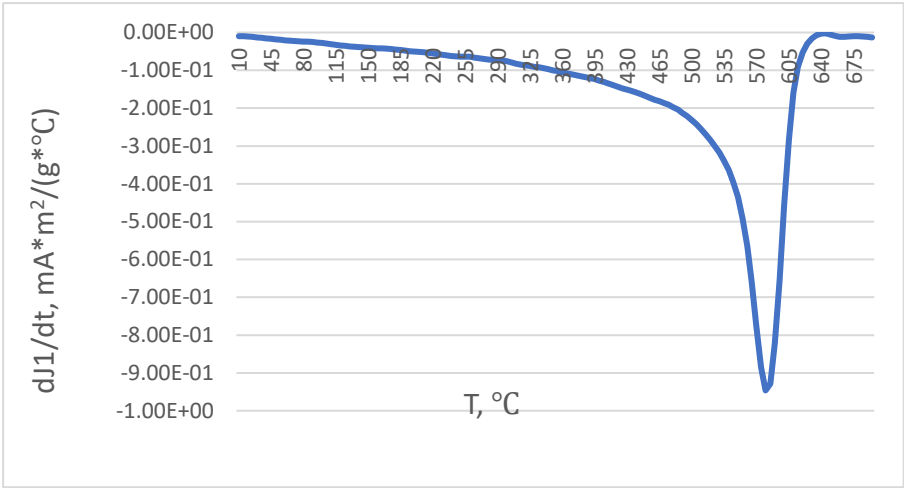
5 - Chelyabinsk;  
6 - Chernorechensky;  
7 - Kamensky;

## 8 - Nepluyevka;

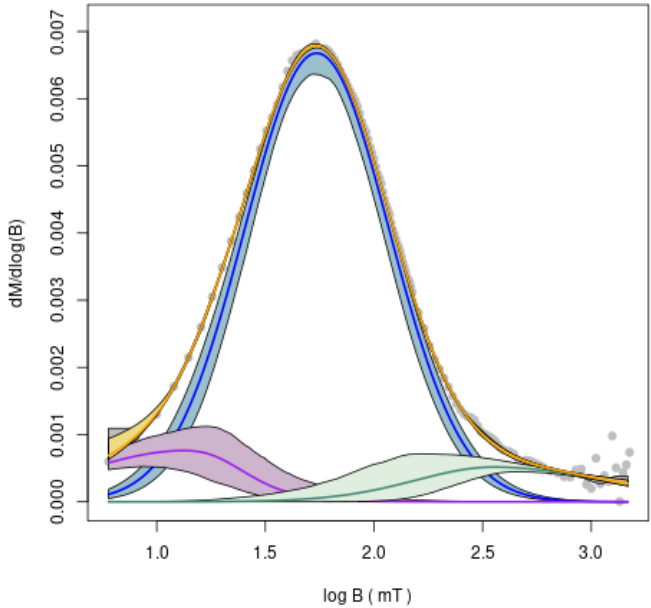
9 – Kaindinskiy, North Kaindinskiy;  
11 - Klyuchevsko-Kurtmasky

[After Pravikova et al., 2022]

# Magnetic mineralogy

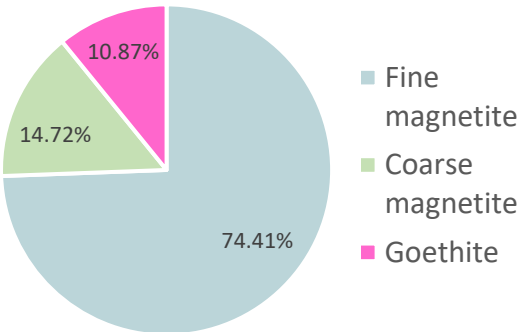


Example of the 1<sup>st</sup> derivative of a thermal demagnetization curve

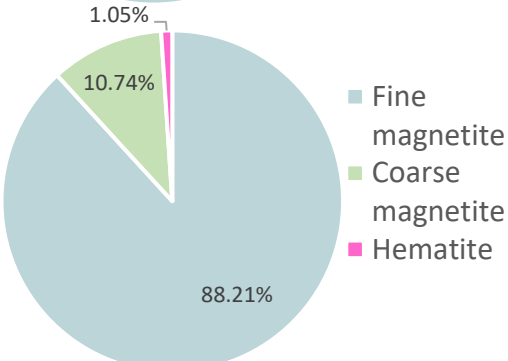


Example result of a coercive spectrum decomposition [executed in “MaxUnMix”, Maxbauer et al., 2016]

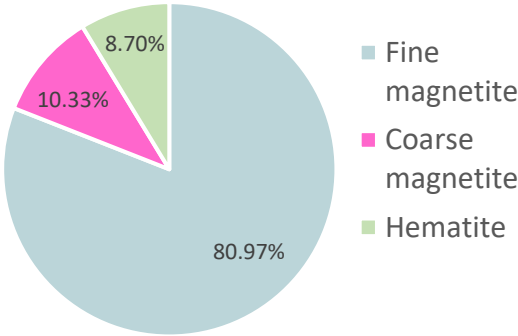
Gabbro  
(1<sup>st</sup> phase)



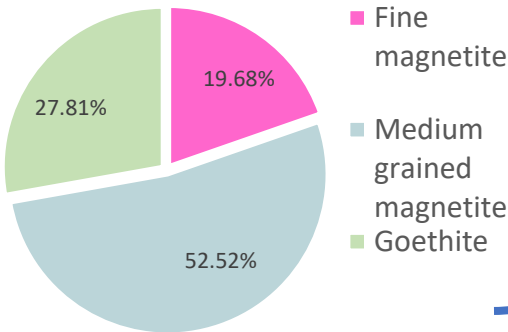
Granodiorite  
(2<sup>nd</sup> phase)



Adamellite  
(3<sup>rd</sup> phase)

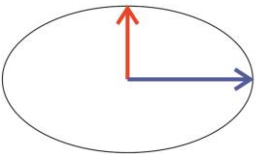


Leucogranite  
(4<sup>th</sup> phase)



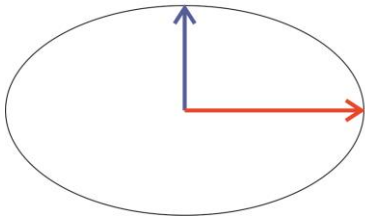
Contributions to the saturation remanent magnetizations of the rocks

Single-Domain Magnetite



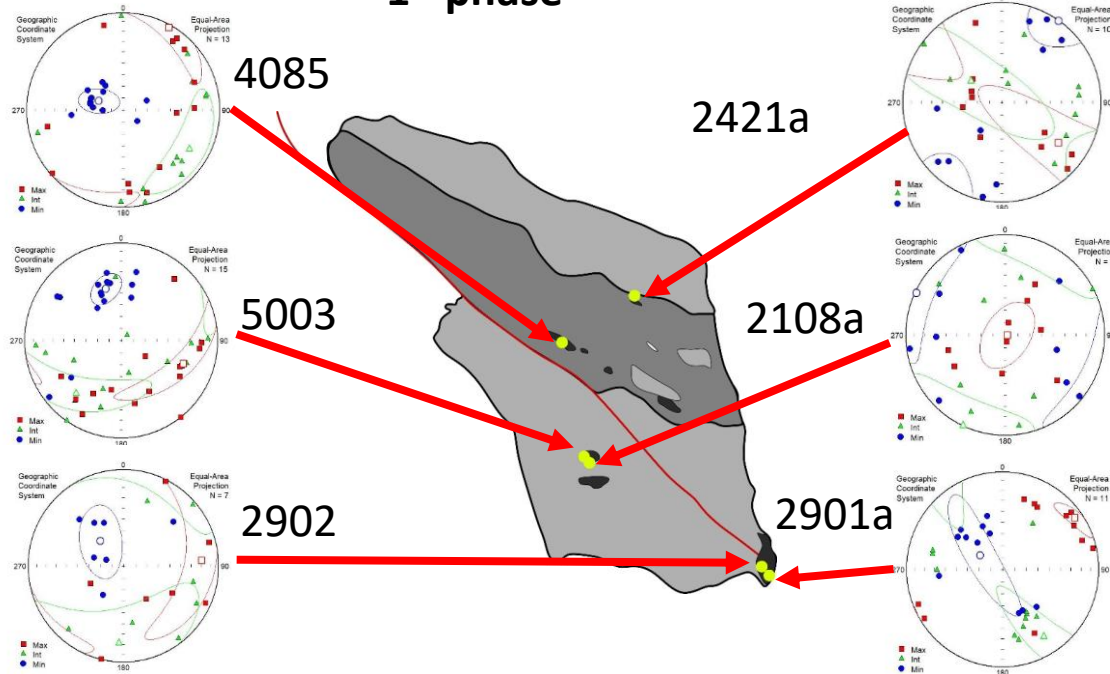
K<sub>max</sub> axes  
K<sub>min</sub> axes

Multi-Domain Magnetite

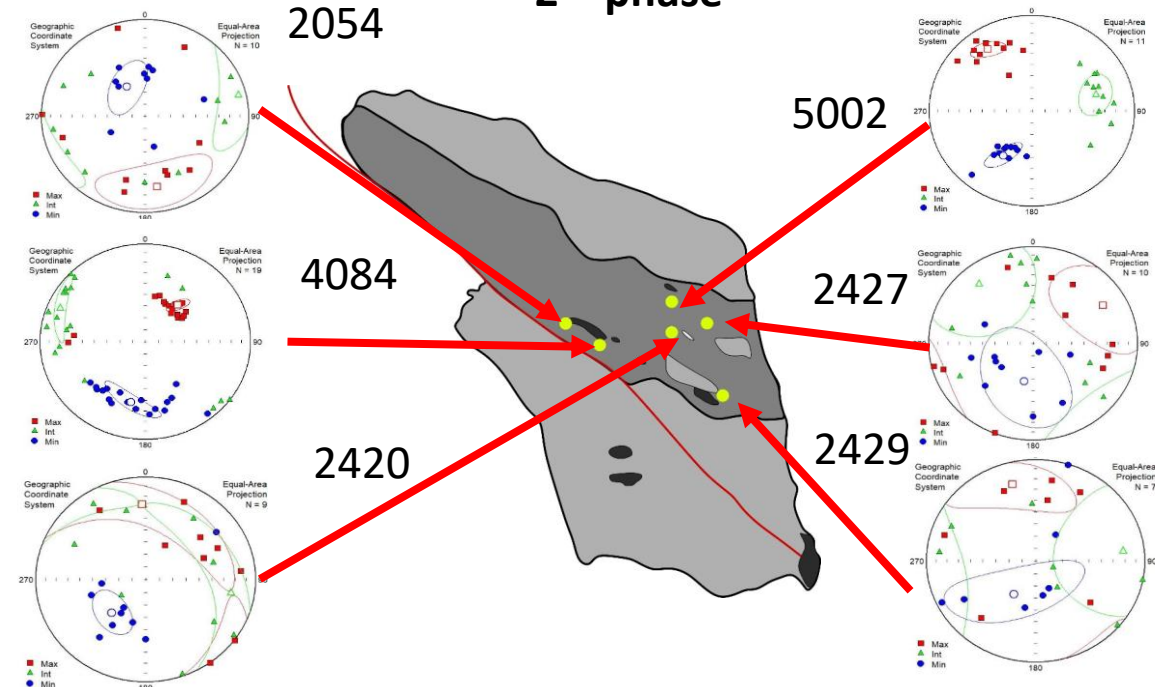


Magnetite grain size factor determines the configuration of an AMS ellipsoid

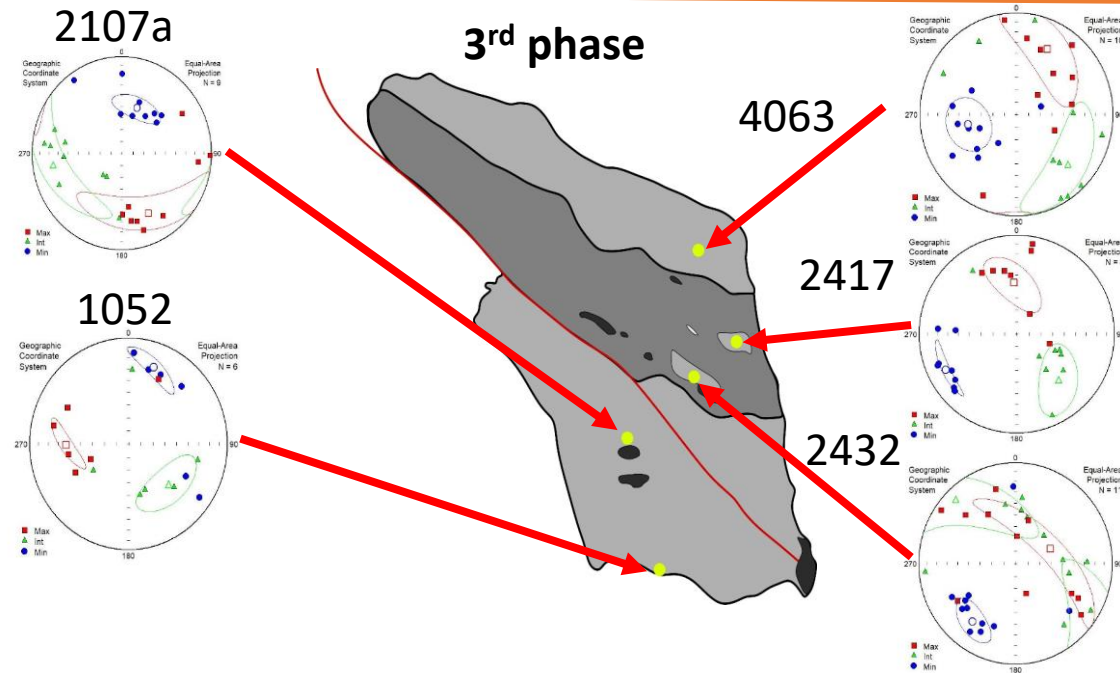
## 1<sup>st</sup> phase



## 2<sup>nd</sup> phase

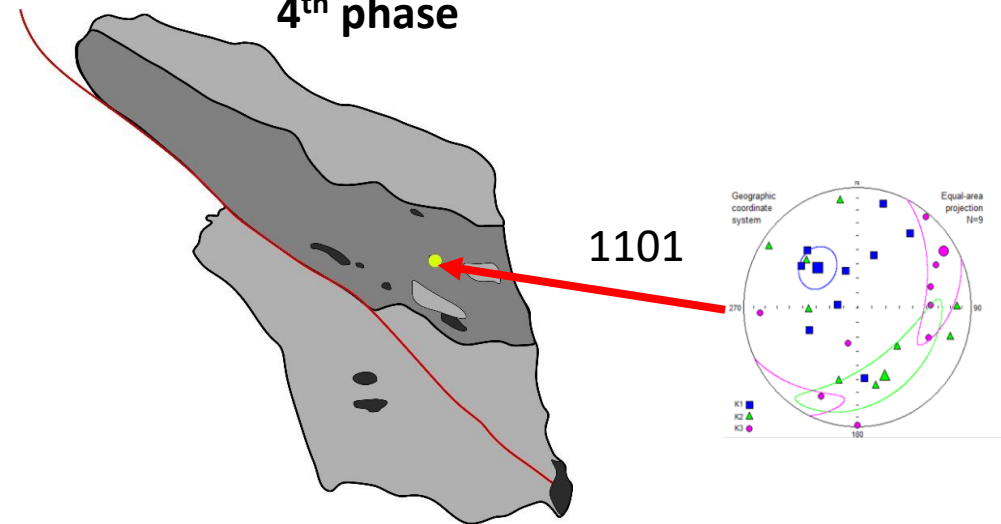


## 3<sup>rd</sup> phase



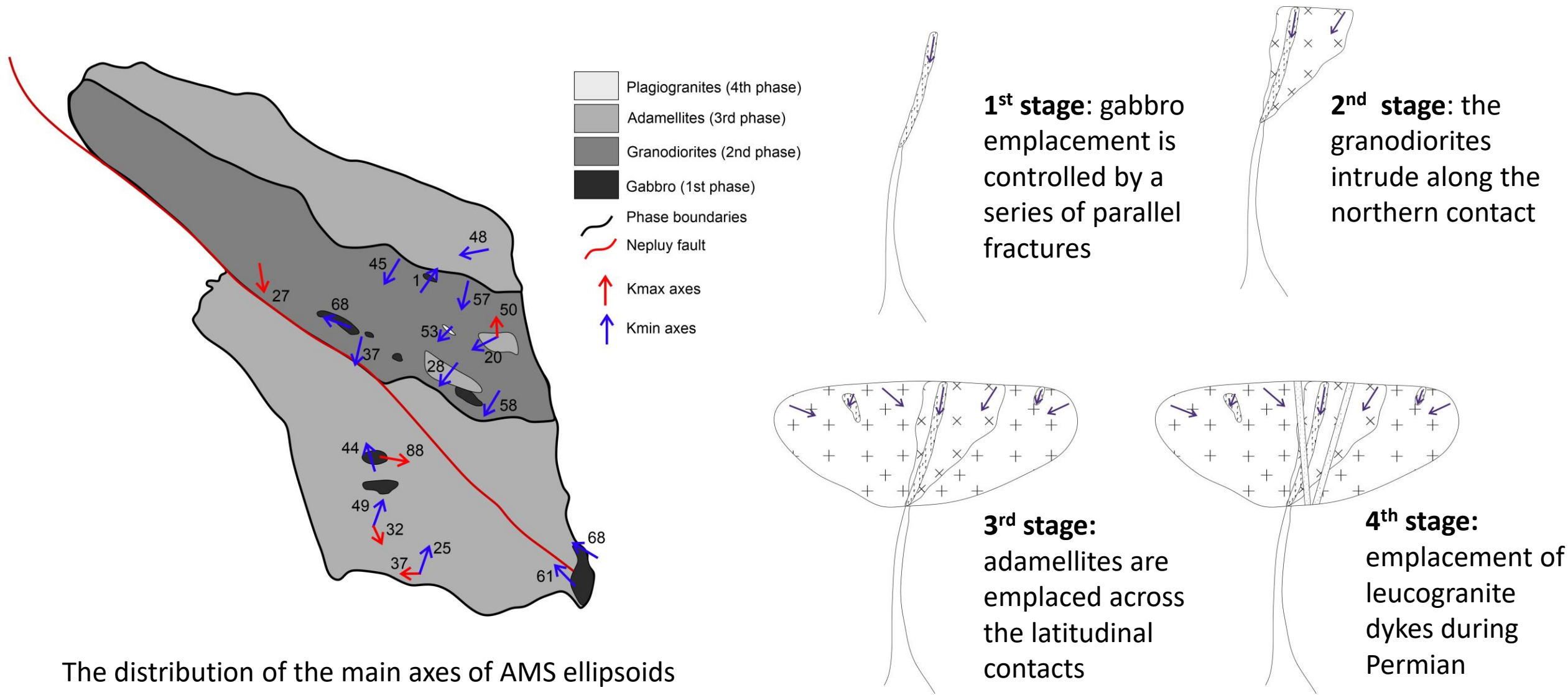
## 4<sup>th</sup> phase

Insufficient data





# Emplacement model for the Nepluyevka intrusion



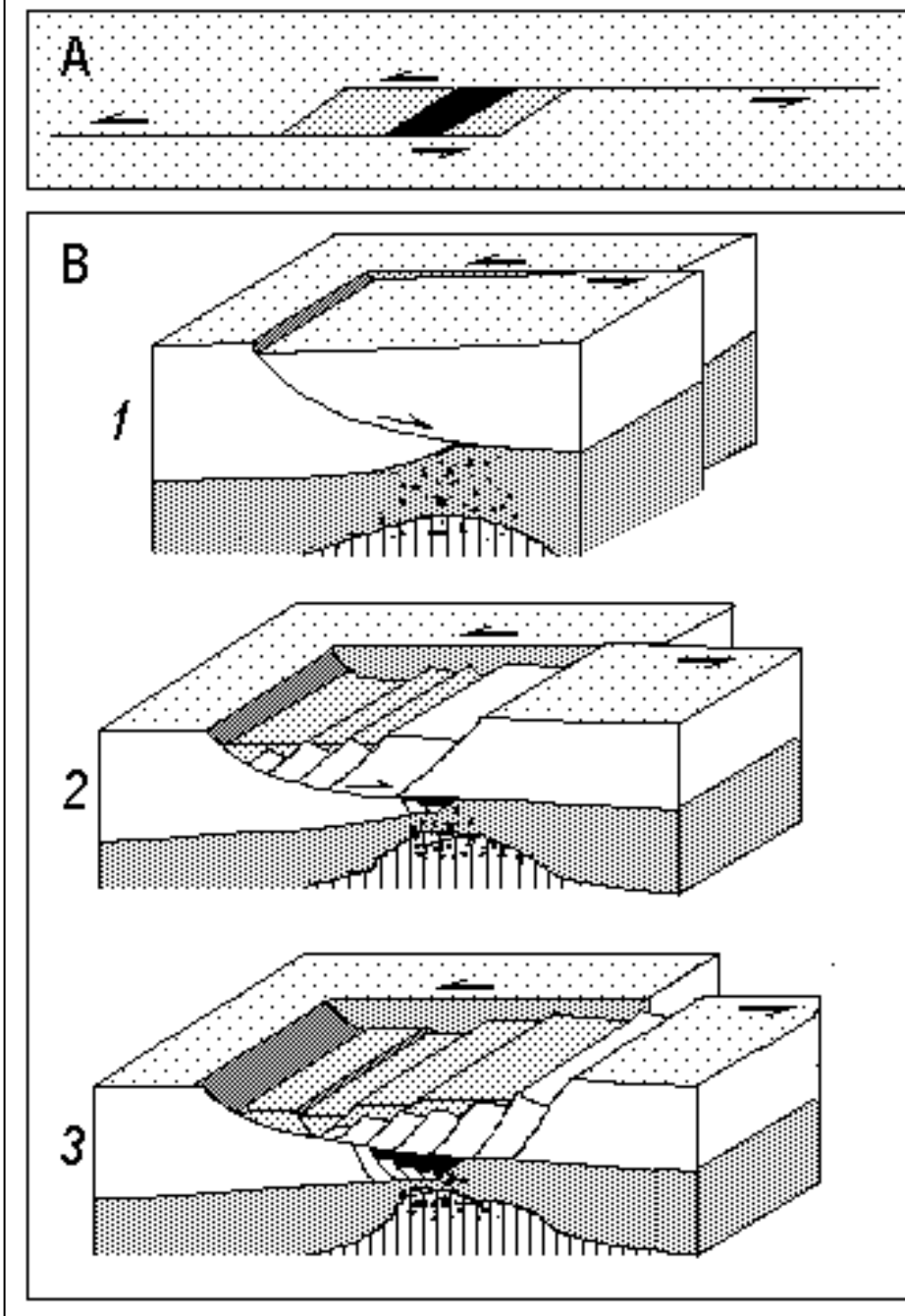
The distribution of the main axes of AMS ellipsoids over the Nepluyevka intrusion

# Conclusions

1. The emplacement of the first 3 phases of the Nepluyevka batholith was controlled by a single feeder associated with the main Nepluy fault
2. The infracrustal magma chamber was supplying increasingly felsic melt to the supracrustal transtensional structure
3. The later phases were emplaced in the weakened latitudinal zones trending sub-normally to the main extension direction

**Acknowledgements:** The reported study was funded by RFBR and Czech Science Foundation (research project № 19-55-26009). Centre of collective usage 'Geoportal', Lomonosov Moscow State University (MSU), provided access to remote sensing data.

A “magmatic extensional duplex” development model, after [Ark. Tevelev, 2005]



# Thank you for your attention!

