DETERMINATION OF THE NOW-A-DAYS STRESS FIELD PARAMETERS BASED ON EXTENZOMETRIC DATA RECORDED BY EU TECNET NETWORK. CASE STUDY FROM DĚDIČNÁ ŠTOLA GALLERY IN RYCHLEBSKÉ HORY MTS.

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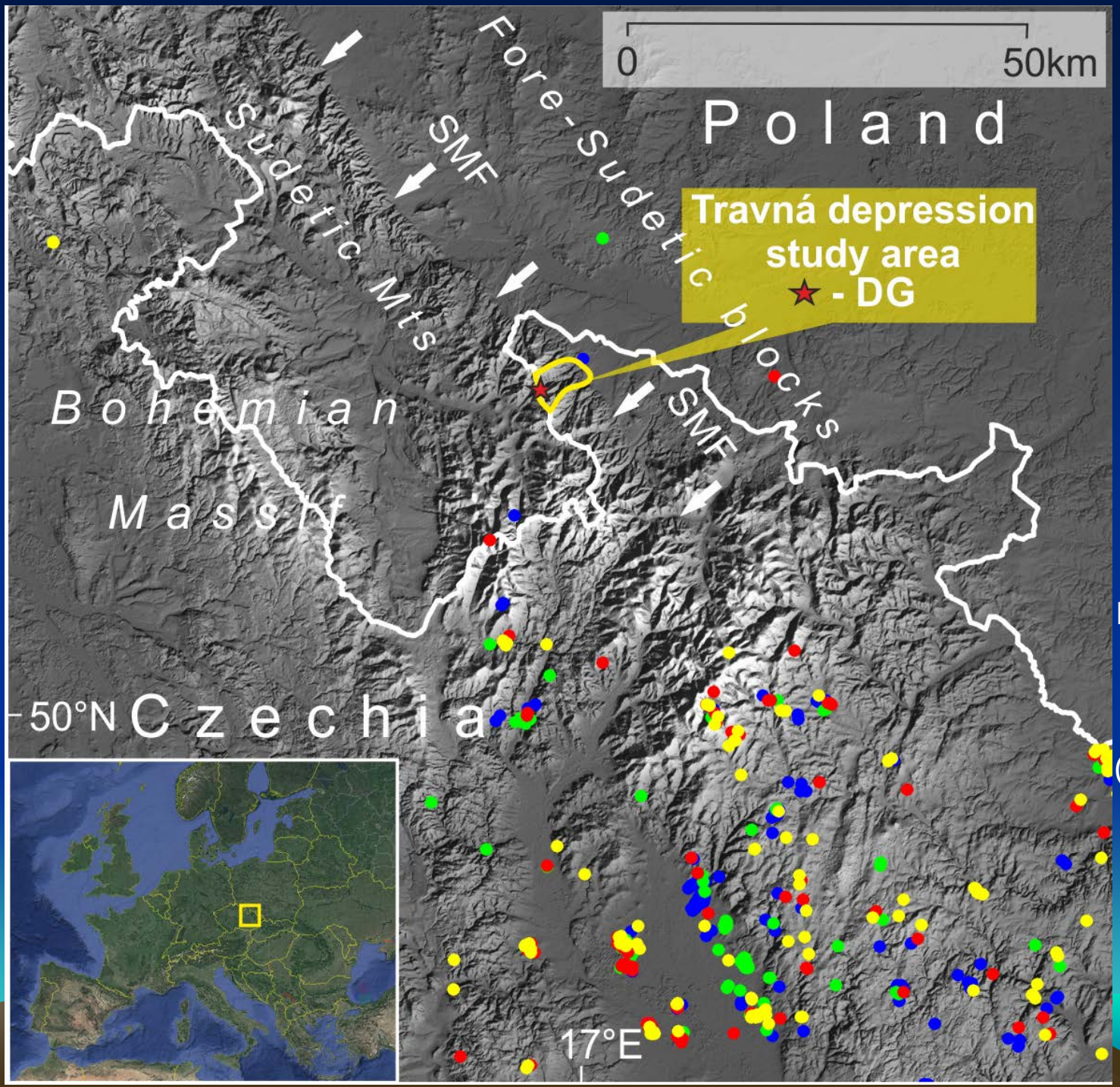
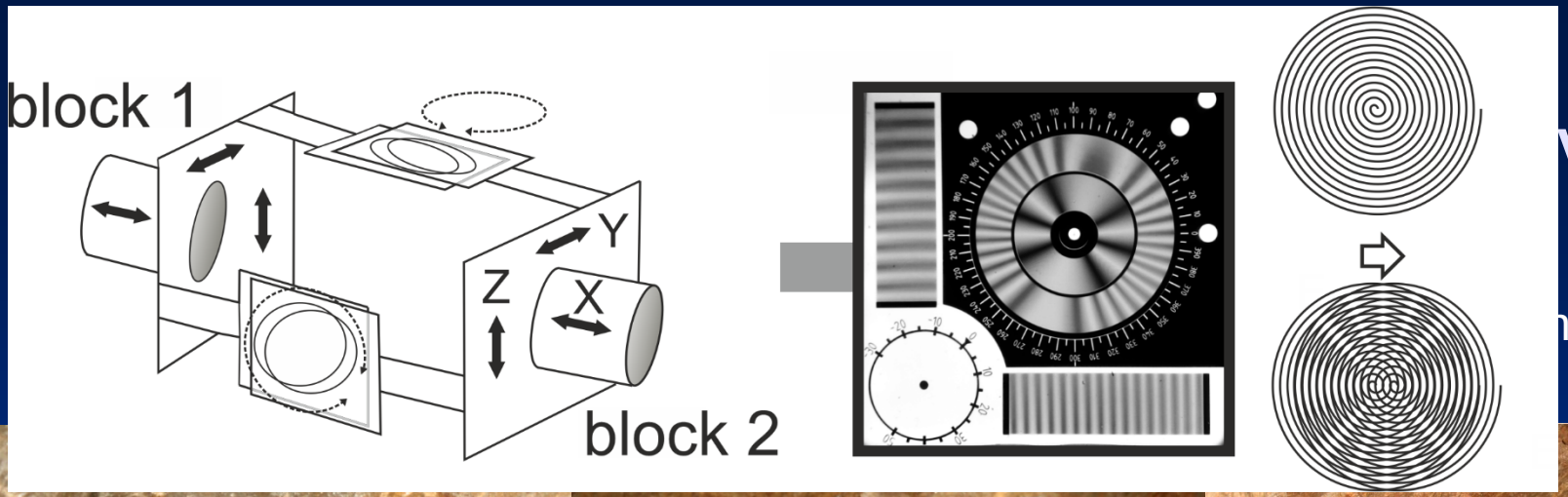
Study area

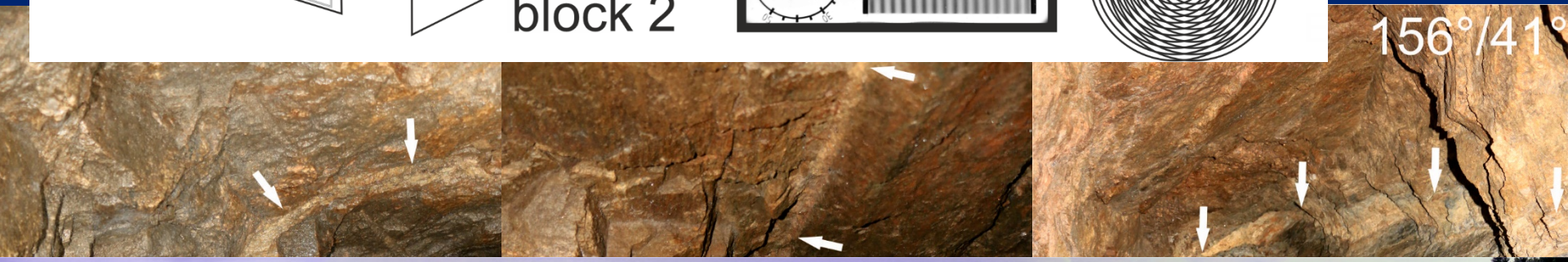


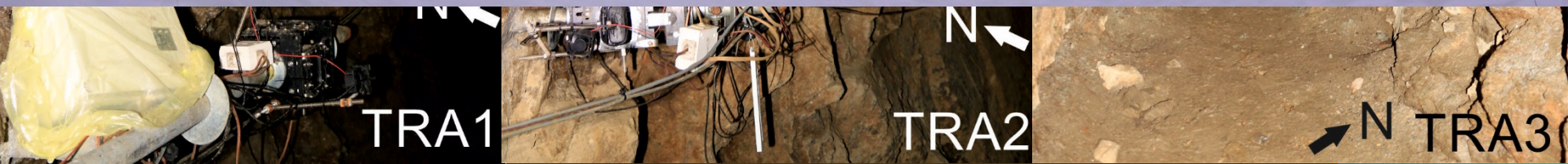
Dots show earthquake epicenters registered by EPI-MONET seismic network (Sýkorová et al., 2018)

- 2014
- 2015
- 2016
- 2017

vice



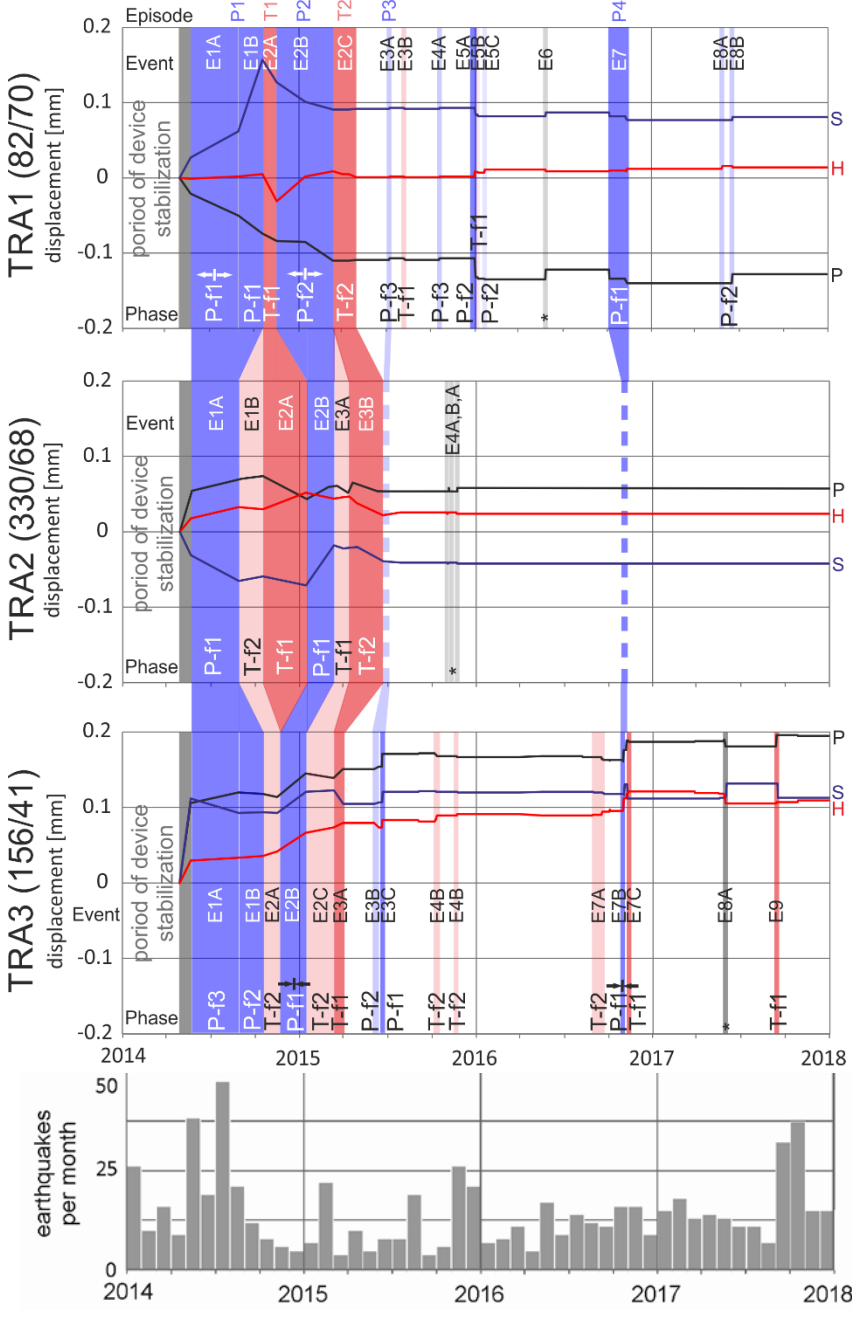




Aims of the research

Evaluation of now-a-days tectonic activity within the study area and wider area in Poland and in Czech Republic in relation to the Sudetic Marginal Fault (SMF), Bělský fault (BF) and other faults.

- Are there some slips on 3 observed faults within DG?
- Are the slips observed on all faults simultaneously within DG?
- Could we find out some stress phase(s), which caused registered slips on faults?
- What are the parameters of this/these stress fields?
- What about other known / unknown faults (if any?) in region and their activity?
- In future – comparison with other slips registered by EU TecNet network (see http://www.tecnet.cz for more details about network)

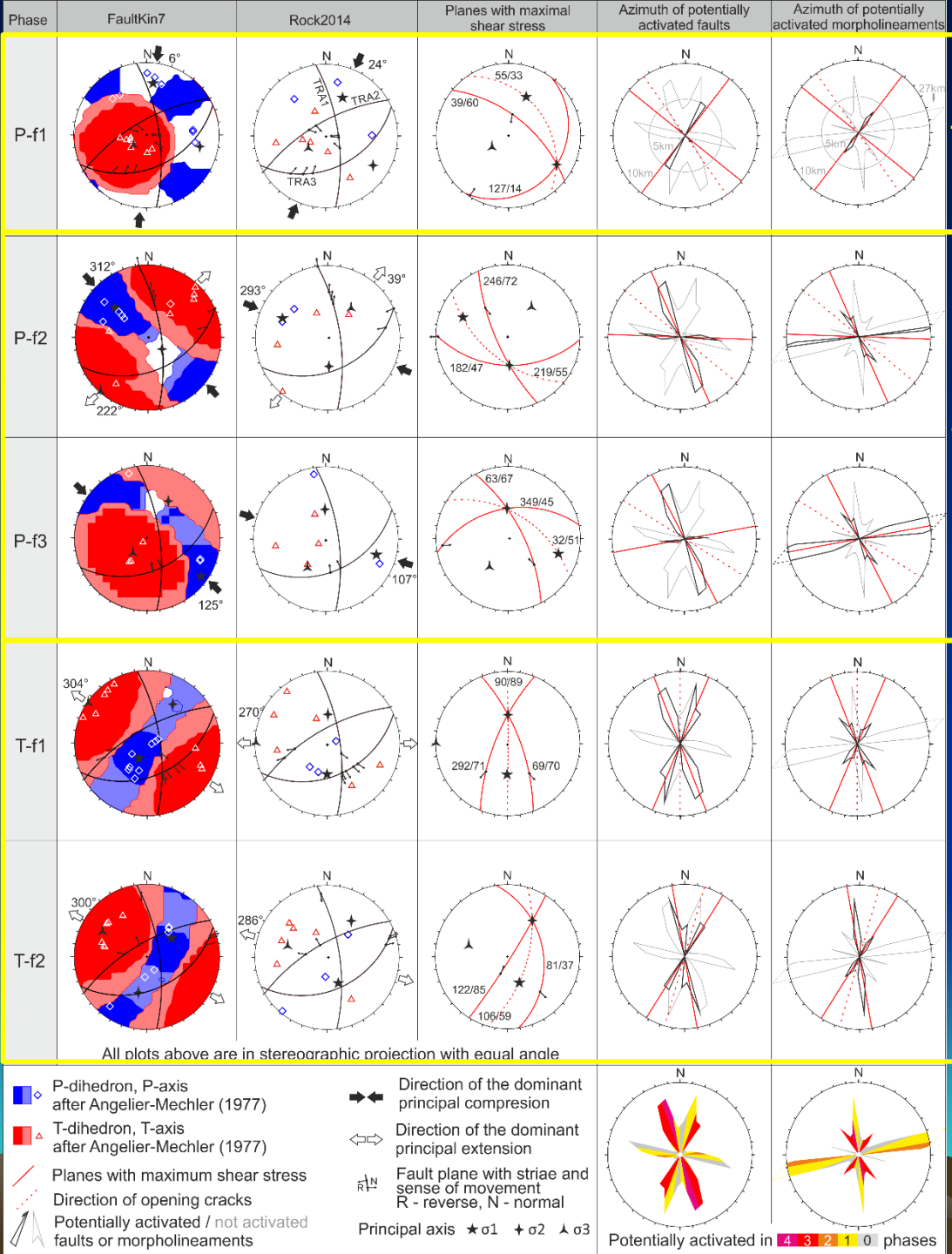


Results

- TRA1 – normal slip until ~10/2015 then reverse slip; slow sinestral slip; fault extension
- TRA2 – normal slip until ~1/2015, then reverse slip, slow sinestral slip
- TRA3 – normal slip; sinestral slip; fault compression

Fault	TRA1	TRA2	TRA3
Observed movements	until 10/2015 N since 11/2015 R	since 1/2015 R 68 N until 1/2015	41 N

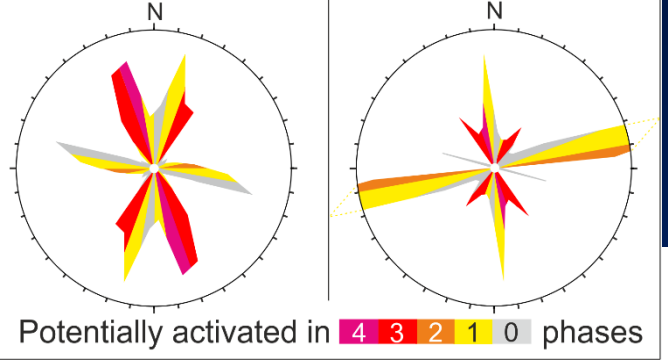
- Movement amplitude ~0.05mm/year
- Defined ~40 individual time-events (with unified movement tendency)
- Based on similar time-events, several time-episodes with dominant compression (P1-P4) and extension (T1-T2) regime were found out

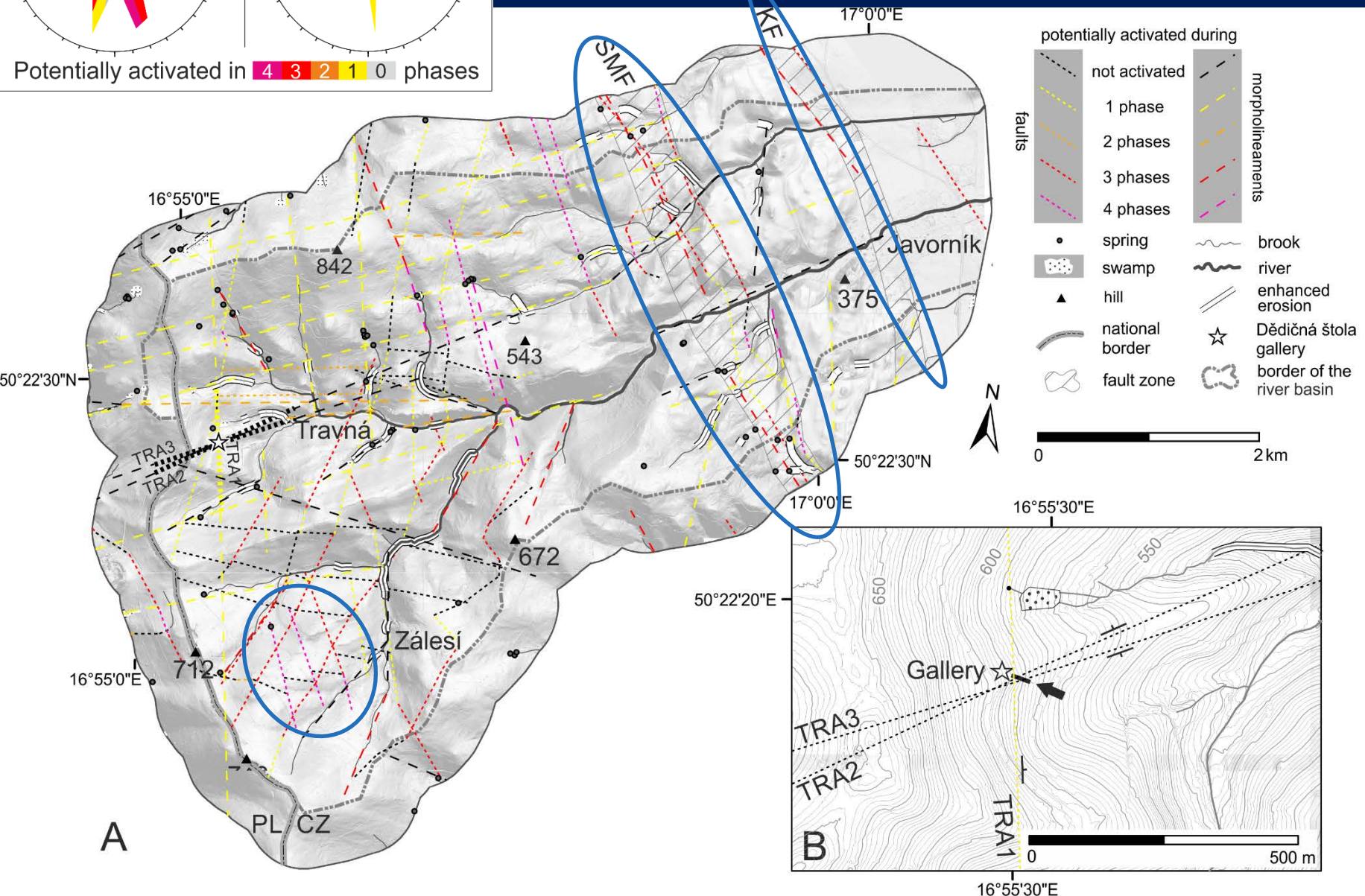


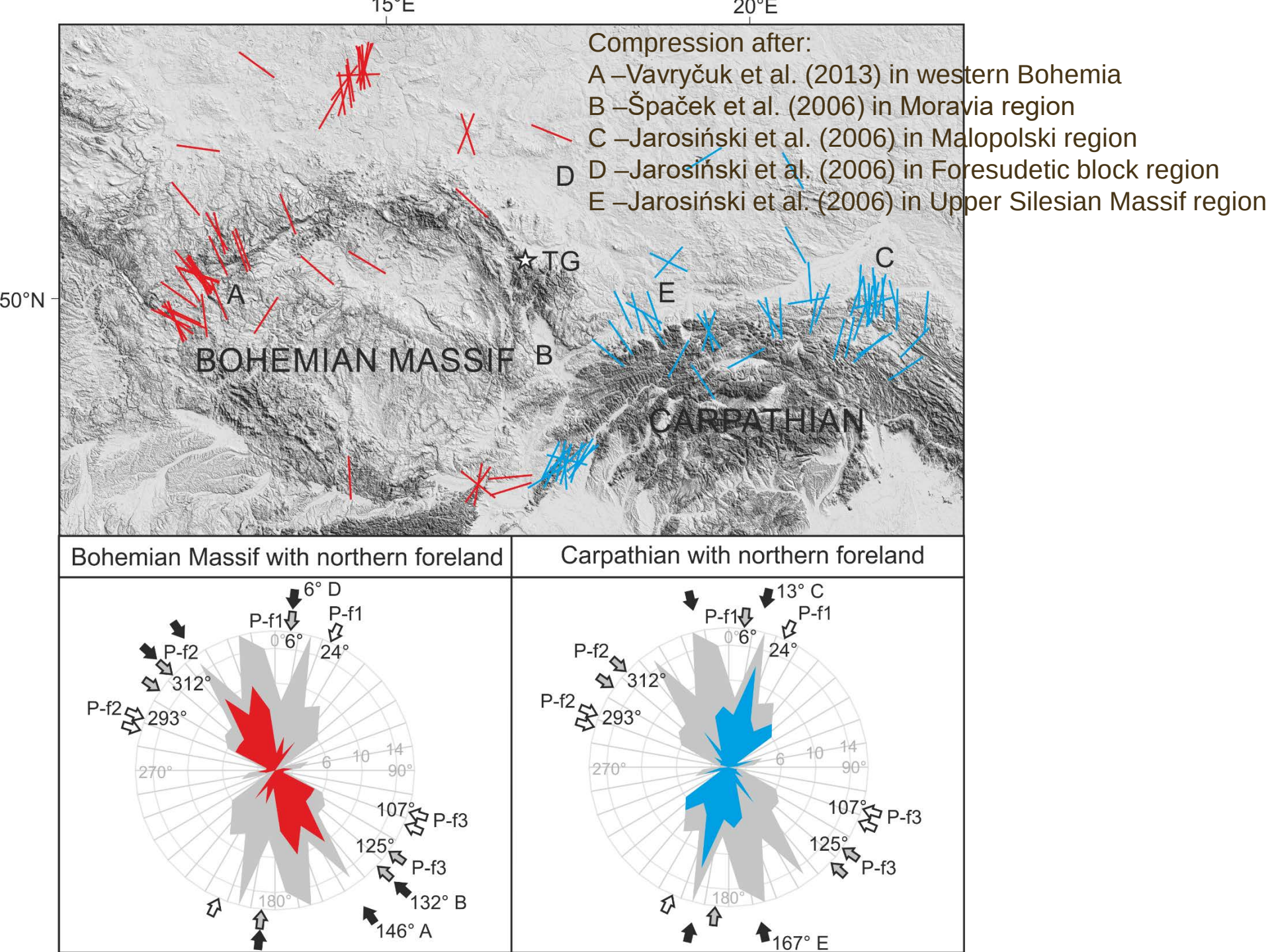
Results

- The paleostress method (*Angelier 1994, Málek 1991*) was applied on kinematic characteristics of all individual time-events and they were statistically grouped to 5 tectonic phases (5 events were not assigned)
- For each tectonic phase, the orientation of main principal axis (σ1, σ2, σ3) and theoretical fault planes with maximal shear stress and plane with tendency to dilate were calculated
- The fault planes with maximal shear stress were compared with orientation of known faults and suggested morpholineaments in adjacent area

Results


N
N
Potentially activated in 4 3 2 1 0 phases


17°0'0"E
SMF
KF
16°55'0"E
842
Javorník
375
543
50°22'30"N
Travná
TRA3
TRA2
TRA1
672
Zálesí
712
16°55'0"E
PL
CZ
A
potentially activated during
faults
not activated
1 phase
2 phases
3 phases
4 phases
morpholineaments
spring
brook
swamp
river
hill
enhanced erosion
national border
Dědičná štola gallery
fault zone
border of the river basin
N
0
2 km
16°55'30"E
50°22'20"E
650
600
550
Gallery
TRA3
TRA2
TRA1
B
0
500 m
16°55'30"E


15°E
20°E
50°N
Compression after:
A –Vavryčuk et al. (2013) in western Bohemia
B –Špaček et al. (2006) in Moravia region
C –Jarosiński et al. (2006) in Malopolski region
D –Jarosiński et al. (2006) in Foresudetic block region
E –Jarosiński et al. (2006) in Upper Silesian Massif region
TG
A
B
C
D
E
BOHEMIAN MASSIF
CARPATHIAN
Bohemian Massif with northern foreland
Carpathian with northern foreland
6° D
P-f1
P-f1
0°
6°
24°
P-f2
312°
P-f2
293°
270°
6
10
14
90°
107°
P-f3
125°
P-f3
132° B
180°
146° A
13° C
P-f1
P-f1
0°
6°
24°
P-f2
312°
P-f2
293°
270°
6
10
14
90°
107°
P-f3
125°
P-f3
180°
167° E

Thank you for attention

View from Borůvková hora Mt. to the valley of the Biala Lądecka river

More in:

Stemberk, J. jr., Coubal, M., Stemberk, J., Štěpančíková, P.:
Stress analysis of fault slips data recorded within Dědičná štola Gallery in the Rychlebské hory Mts., NE part of the Bohemian massif.
Acta Geodyn. Geomater., 16, No. 3, (195), 315–330, 2019.
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