Regional Geodynamic Network HIGHLANDS for Monitoring of Recent Crustal Movements of the Eastern Part of the Bohemian Massif

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Ongoing Research Projects

Project of the Ministry of Education, Youth and Sport of the Czech Republic, Centre of Basic research No. LC506 (2005-2009)

"RECENT GEODYNAMICS OF THE EARTH"

Project CEI of the Ministry of Education, Youth and Sport of the Czech Republic, No. 1P05ME781 (2005-2008)

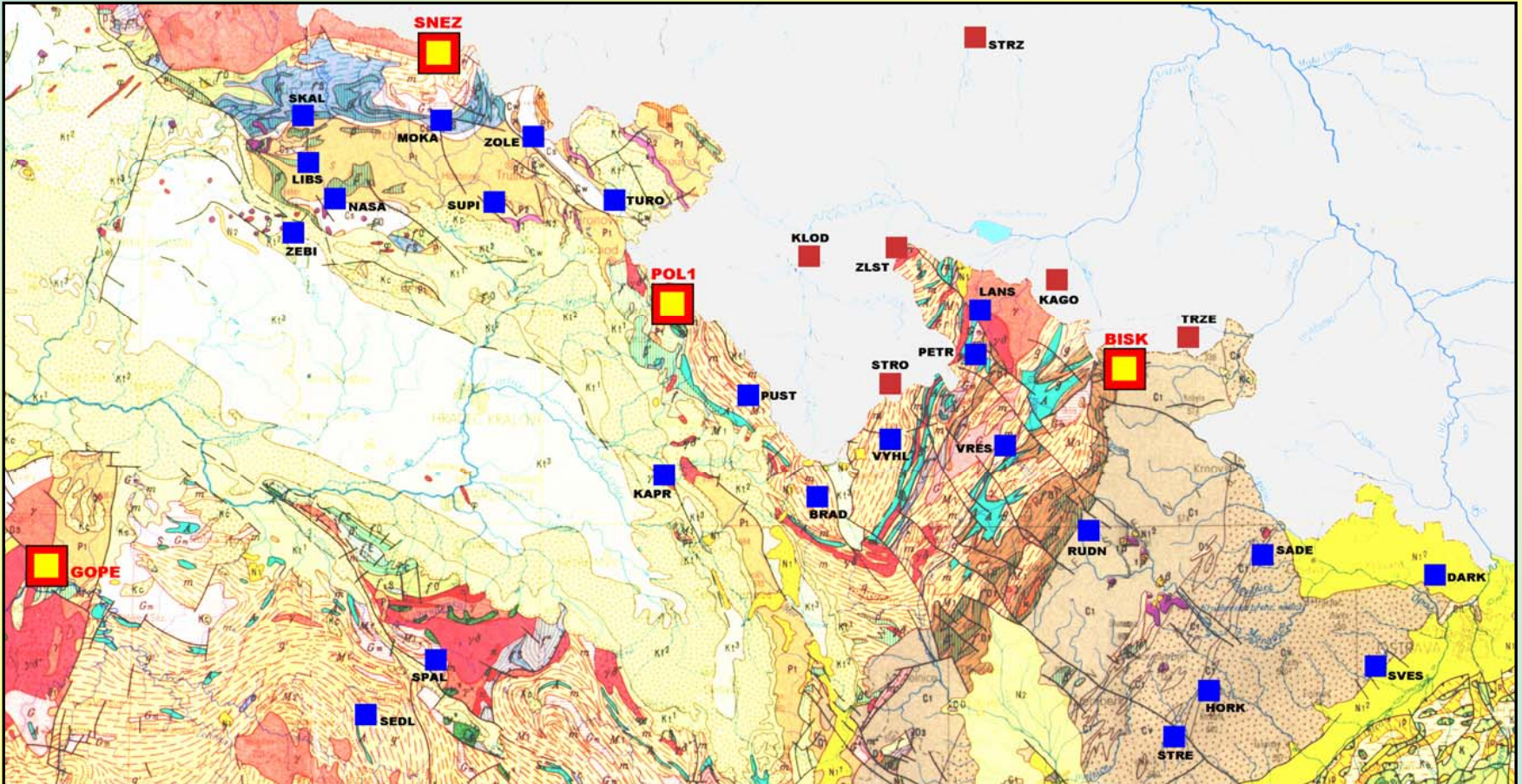"INFLUENCE OF GEODYNAMICS OF THE CENTRAL EUROPEAN REGION ON THE BOHEMIAN MASSIF "

Projects of the Grant Agency of the Academy of Sciences of the Czech Republic No. IAA300460507 (2005-2008)

"MONITORING OF RECENT CRUSTAL MOVEMENTS OF THE EASTERN PART OF THE BOHEMIAN MASSIF USING GPS"
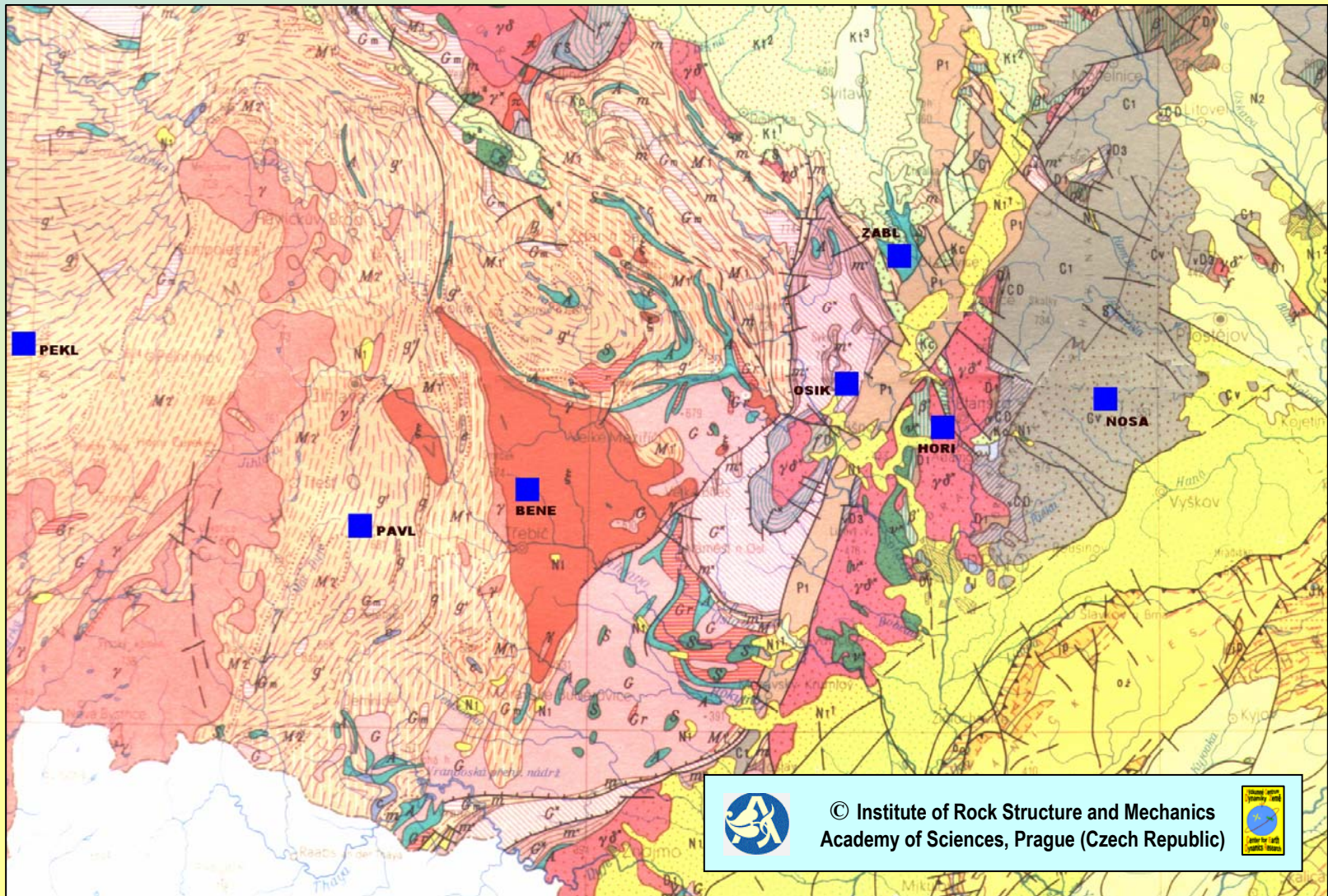
GPS Epoch Geodynamic Networks
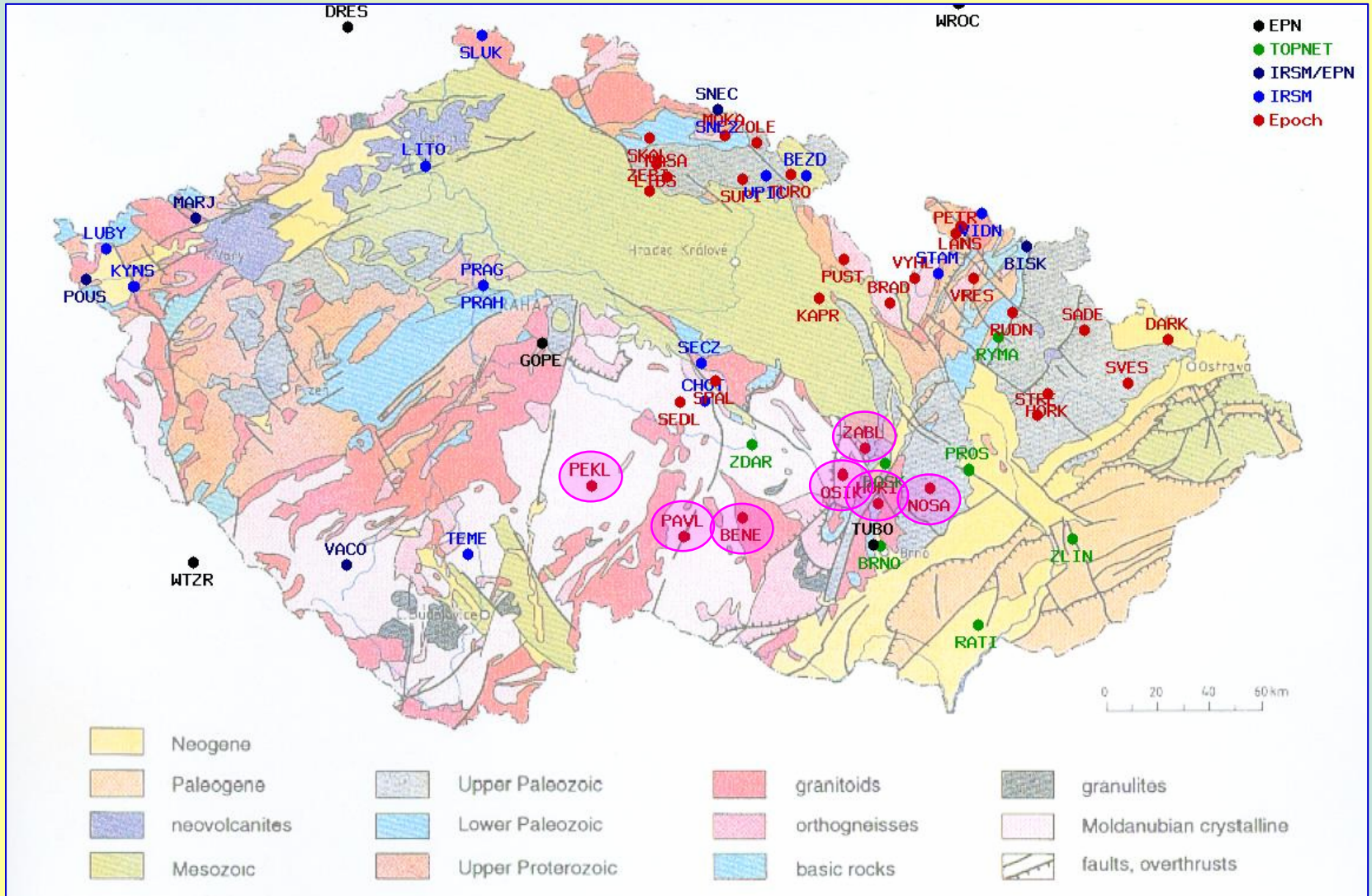## EAST SUDETEN (12 sites) and WEST SUDETEN (11 sites)

© Institute of Rock Structure and Mechanics
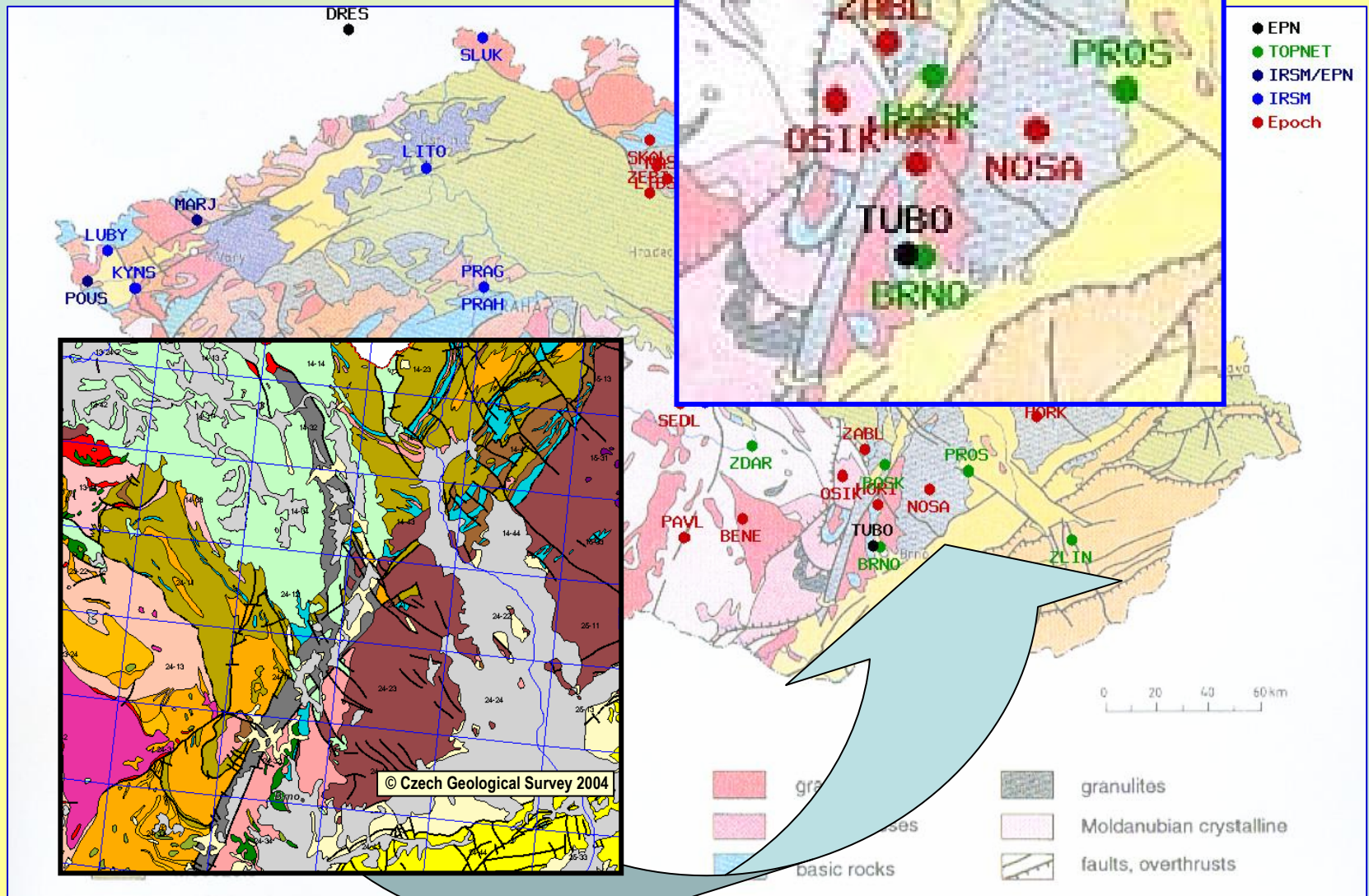Academy of Sciences, Prague (Czech Republic)

GPS Geodynamic Network HIGHLANDS (7 sites)

GEONAS = GEOdynamic Network of the Academy of Sciences of the CR (17 observatories)

Boskovice Furrow region

© Czech Geological Survey 2004

Legend:
- ● EPN
- ● TOPNET
- ● IRSM/EPN
- ● IRSM
- ● Epoch

granulites

Moldanubian crystalline

basic rocks

faults, overthrusts

0   20   40   60 km

Construction of the GPS Site Monument

GPS sites:

BENETICE

HOŘICE

OSIKY

PEKLŮVKO

UPPER BENCH MARK

400

CENTERING HEAD

400 – 1200

GROUND FREEZING LEVEL

PARENT ROCK
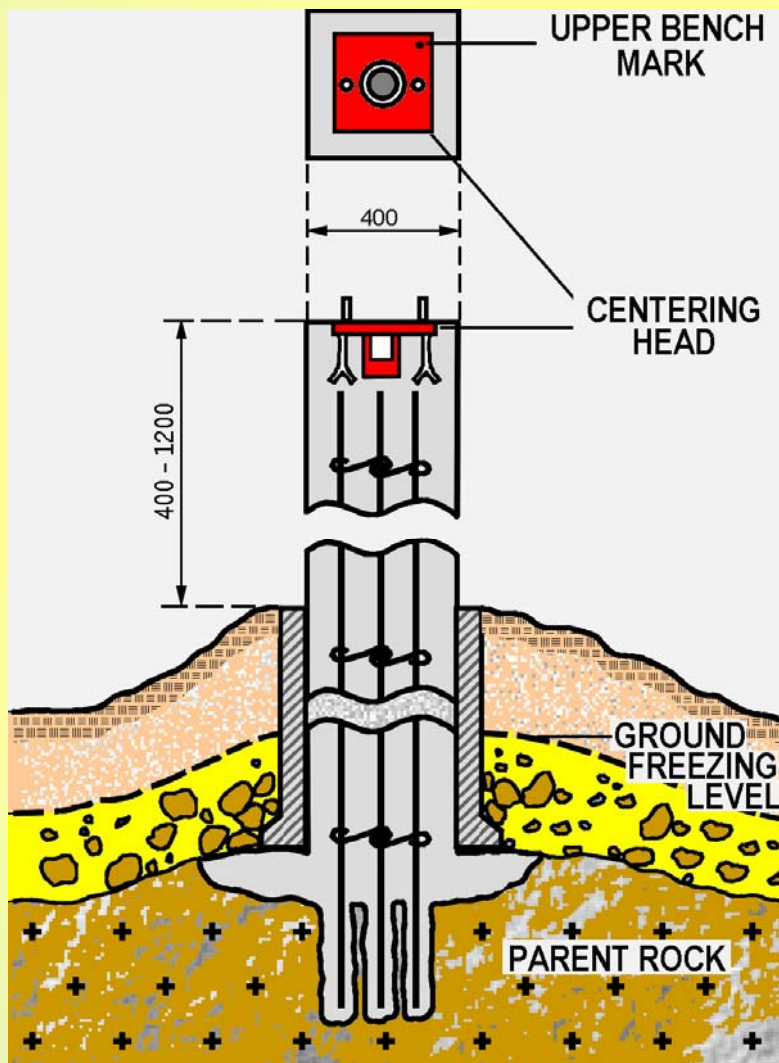
Epoch GPS Measurements on the Network
HIGHLANDS

Receivers: Ashtech Z-12, Ashtech Z-12 surveyor, Ashtech Xtreme

Antennas: Ashtech geodetic, marine, choke-ring

Registration intervals: 30 second

Epoch measurement duration: 48 hours (2 GPS days)

Elevation mask: 10 degree

NAVSTAR satellite systems

Data storage: CD-ROMs, external hard disk

Epoch GPS measurements:

2005, Sep 10-12   incl. BRAD and RUDN

2006, Sep 16-18   incl. BRAD and RUDN

GPS Data Processing

The **network solutions** for each GPS day **constrained** to three EPN stations BOR1, PENC and ZIMM were computed.

The **Bernese GPS software version 5.0** was used under the following assumptions:

➢ Precise satellite orbits and satellite clock data, precession of the Earth´s rotation parameters were used from **Centre for Orbit Determination in Europe** (CODE), Bern.

➢ Geocentric and geographic coordinates were computed in **ITRF2000** reference frame.

➢ The stochastic ionosphere model GLOBAL (**CODgpswd.ION**) was applied for ionosphere correction estimation.

➢ **Baselines** were fixed for each GPS day.

➢ Linear combinations of observations L3 (**ionosphere free**) were used.

➢ The QIF (**Quasi Ionosphere Free**) strategy for ambiguity resolution was applied.

➢ The **atmosphere model DRY NIELL** was used for troposphere correction estimation.

The daily solutions were combined altogether by the **ADDNEQ2** program.

Baselines Scheme
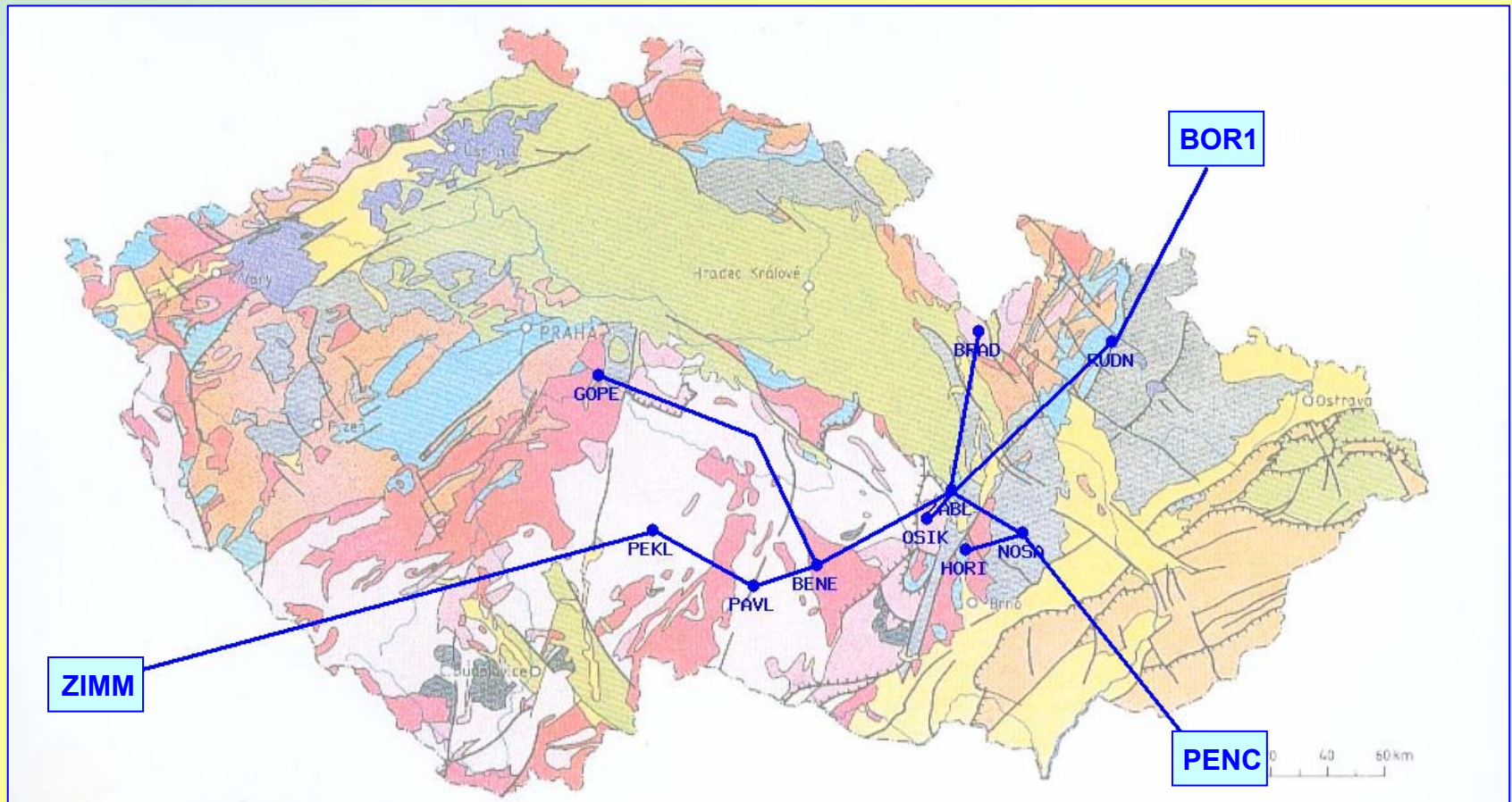
GPS Site Geocentric Coordinations

| Site	X(m)	Y(m)	Z(m)
BENE – Benetice	4008450.918	1140132.100	4813059.850
BOR1 12205M002	3738358.570	1148173.636	5021815.765
BRAD – Bradlo	3930977.856	1178331.790	4867549.301
GOPE 11502M002	3979316.152	1050312.387	4857066.930
HORI – Hořice	3989074.613	1190835.348	4816710.131
NOSA – Nové Sady	3978999.385	1209124.565	4820556.198
OSIK – Osiky	3985078.389	1174932.349	4823989.615
PAVL – Pavlov	4020193.873	1119684.642	4808161.150
PEKL – Peklůvko	4015060.874	1080106.362	4821345.916
PENC 11206M006	4052449.544	1417681.027	4701407.040
RUDN – Rudná	3919698.040	1224556.047	4864931.828
ZABL - Zabludov	3975019.162	1181461.131	4830446.442
ZIMM 14001M004	4331297.145	567555.796	4633133.855

Relative Site Movement Velocities [mm/year]
GOPE fixed
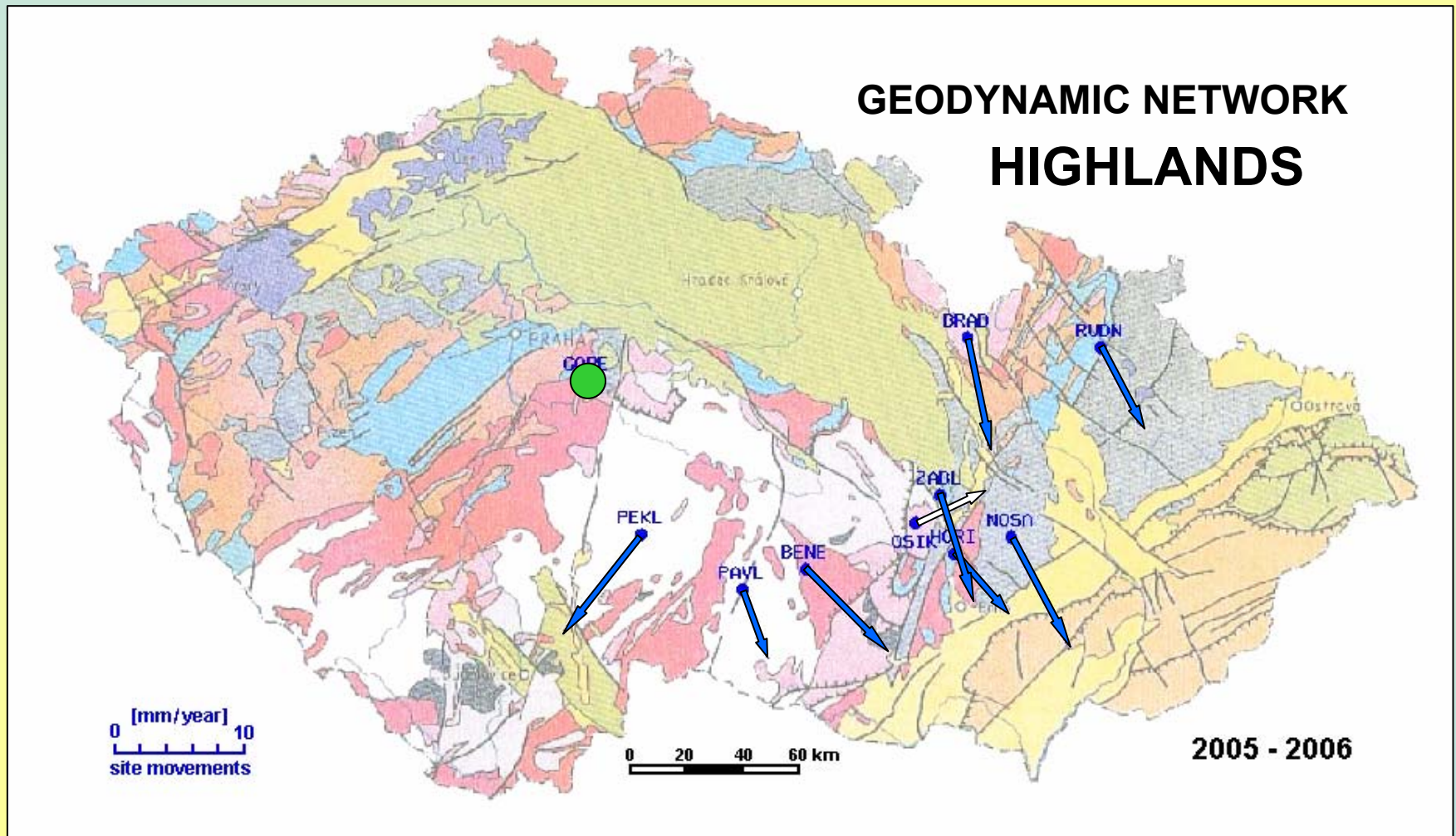
Relative Site Movement Velocities [mm/year]

RUDN fixed
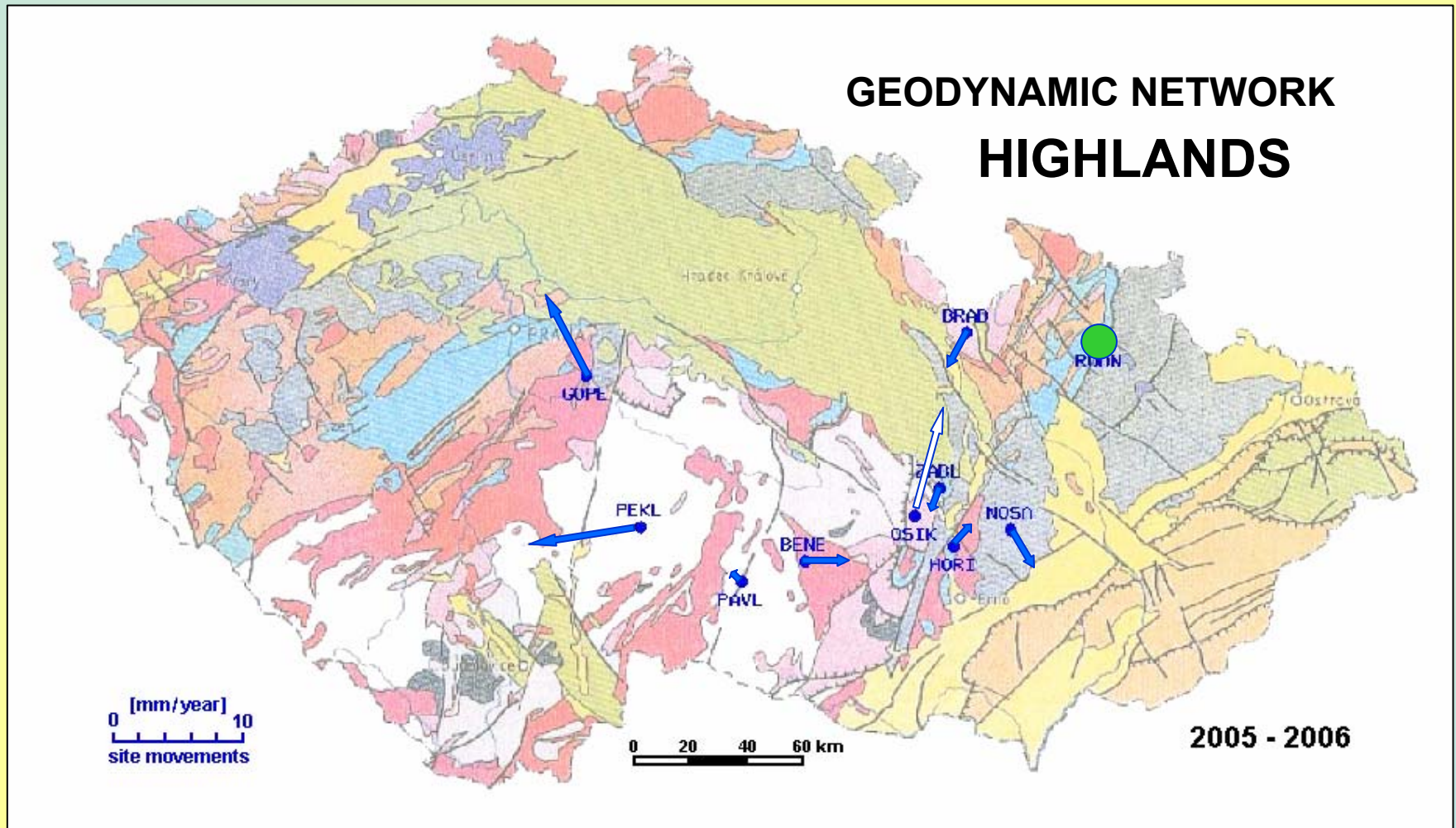
Relative Site Movement Velocities [mm/year]
PAVL fixed

GEODYNAMIC NETWORK
HIGHLANDS

2005 - 2006

[mm/year]
0   10
site movements

0   20   40   60 km
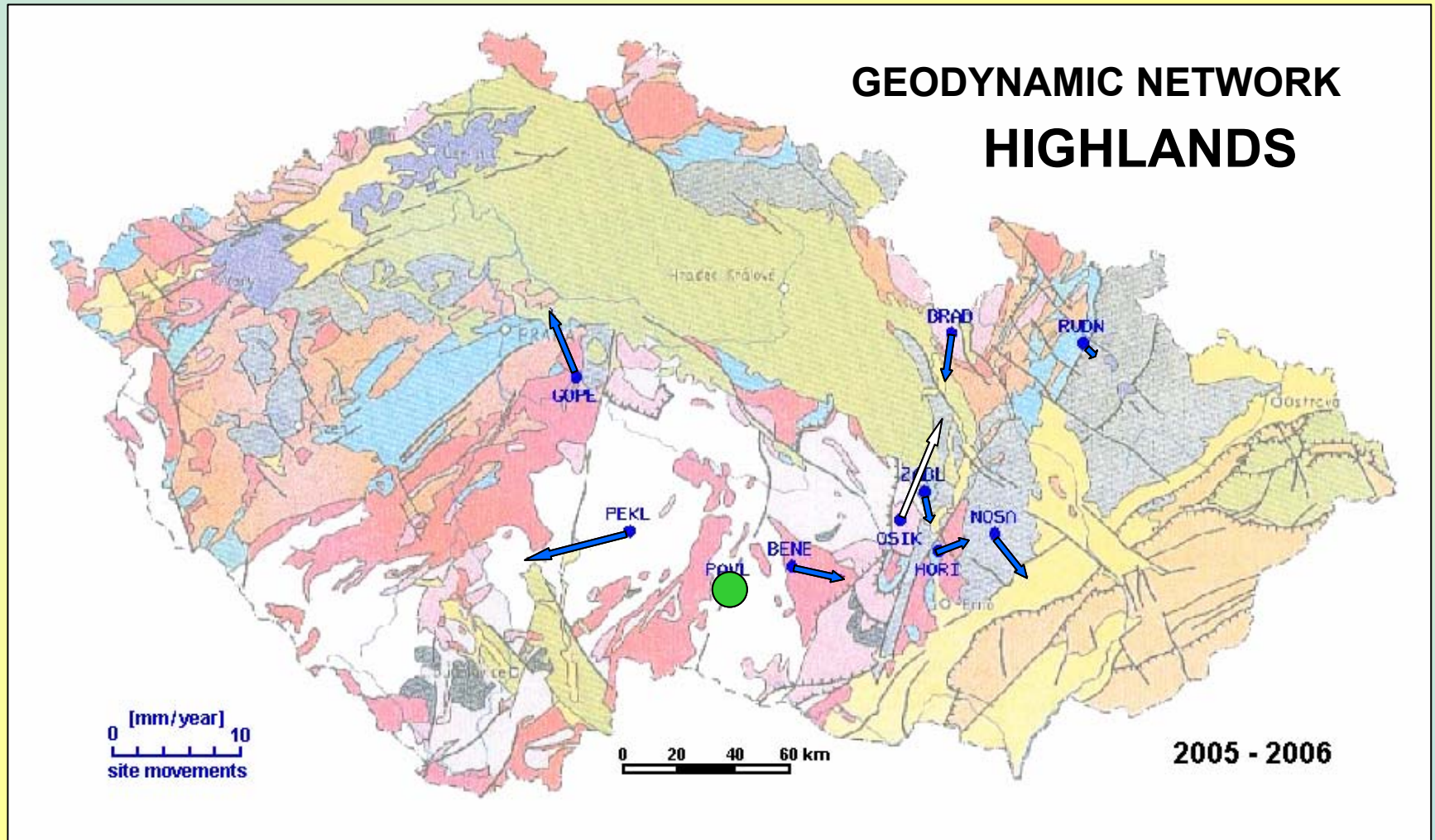
8th Czech-Polish Workshop on
RECENT GEODYNAMICS OF THE SUDETEN AND ADJACENT AREAS
Kłodzko (Poland), March 29-31, 2007

THE END
Thank you for your attention