


 XXIV FIG International Congress 11-16 April 2010 Sydney, Australia

Modelling of Ground Surface Deformations with Finite Element Method in Fault Zones for the Purpose of Designing Geodetic Observations

(4283)

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RESEARCH AREA



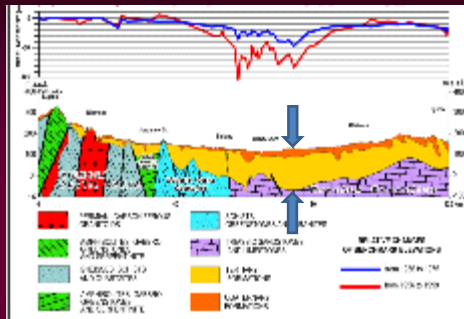
POLAND



Location of the research area and the European tectonic units in the background
(geological background Majdański et al., 2007 after Cymmerman)

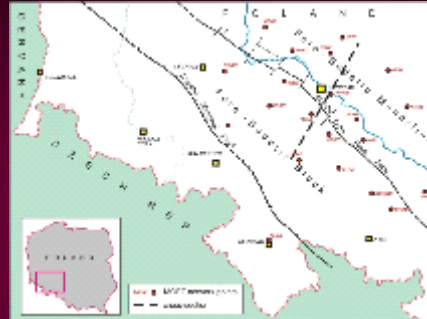
The Central-European Subsidence Zone
FSM - Fore-Sudetic Monocline
FSB - Fore-Sudetic Block

GEOLOGICAL CONDITIONS



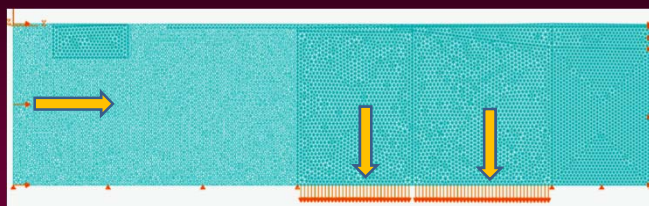
Grzempowski P., Badura J., Cacon S., Przybylski B., 2009, Acta Geodynamica et Geomaterialia, Vol. 6 No. 3 (155), pp. 339-349.

GPS NETWORK "THE MIDDLE ODRFA FAULTS ZONE"



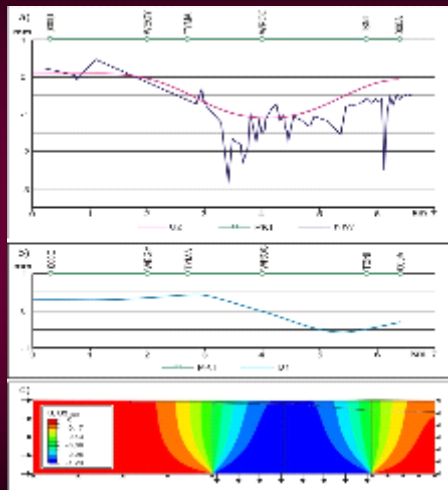
Location of the GPS points and the regional tectonic units in the background

FINITE ELEMENT METHOD GEOMETRICAL MODEL AND BOUNDARY CONDITIONS



- 65 km in length and 15 km depth geological cross-section ,
- three-node triangular elements (3-node linear plane strain triangle),
- plane strain state and a linear-elastic relationship between stress and strain,
- vertical displacements -1.2 mm/year,
- horizontal displacement 0.6 mm/year

FINITE ELEMENT METHOD PREDICTION OF THE GROUND SURFACE DISPLACEMENTS



GPS point (PKT)

vertical displacement (U2) from FEM model,

velocities of vertical displacements in precise levelling lines (NIV)

horizontal displacements (U1)

boundary conditions and vertical displacements from FEM model (U2)

CONCLUSION

The presented study related to the problem of reliable monitoring of the lithosphere's surface in the Middle Odra Fault Zone in Poland is a preliminary stage of research on the subject.

In 2008 GPS network covering an area of 6000 sq km has been established. Locations of points have been correlated with the regional geology, tectonic structure and results of FEM analyses.

Reliable results of GPS measurements and their comparison with FEM model will be realized after third campaign in this year.

