Geophysical Research Abstracts
Vol. 17, EGU2015-9495, 2015
EGU General Assembly 2015

Application of the Deformation Information System for automated analysis and mapping of mining terrain deformations – case study from SW Poland

Jan Blachowski, Piotr Grzempowski, Wojciech Milczarek, and Anna Nowacka

Faculty of Geoengineering, Mining and Geology, Wroclaw University of Technology, Wrocław, Poland (jan.blachowski@pwr.edu.pl)

Monitoring, mapping and modelling of mining induced terrain deformations are important tasks for quantifying and minimising threats that arise from underground extraction of useful minerals and affect surface infrastructure, human safety, the environment and security of the mining operation itself.
The number of methods and techniques used for monitoring and analysis of mining terrain deformations is wide and expanding with the progress in geographical information technologies. These include for example: terrestrial geodetic measurements, Global Navigation Satellite Systems, remote sensing, GIS based modelling and spatial statistics, finite element method modelling, geological modelling, empirical modelling using e.g. the Knothe theory, artificial neural networks, fuzzy logic calculations and other.
The presentation shows the results of numerical modelling and mapping of mining terrain deformations for two cases of underground mining sites in SW Poland, hard coal one (abandoned) and copper ore (active) using the functionalities of the Deformation Information System (DIS) (Blachowski et al, 2014 @ http://meetingorganizer.copernicus.org/EGU2014/EGU2014-7949.pdf).
The functionalities of the spatial data modelling module of DIS have been presented and its applications in modelling, mapping and visualising mining terrain deformations based on processing of measurement data (geodetic and GNSS) for these two cases have been characterised and compared. These include, self-developed and implemented in DIS, automation procedures for calculating mining terrain subsidence with different interpolation techniques, calculation of other mining deformation parameters (i.e. tilt, horizontal displacement, horizontal strain and curvature), as well as mapping mining terrain categories based on classification of the values of these parameters as used in Poland.
Acknowledgments. This work has been financed from the National Science Centre Project „Development of a numerical method of mining ground deformation modelling in complex geological and mining conditions” UMO-2012/07/B/ST10/04297 executed at the Faculty of Geoengineering, Mining and Geology of the Wroclaw University of Technology (Poland).