

Summary

This doctoral dissertation concerns petrographic studies of hard coal deposits in the Knurów deposit located in the north-western part of the Upper Silesian Coal Basin. The aim of the research undertaken was to attempt to correlate the petrographic parameters of coal seams with natural and aeorological hazards occurring in underground mine workings, such as fire hazard, methane hazard and dust hazard. 16 samples of rock and coal dust were also collected in order to determine the dust-generating potential of coal seams in terms of their petrographic composition.

The collected coals samples came from all three sedimentary series occurring in the Knurów deposit. These are the Paralic Series, the Upper Silesian Sandstone Series and the Mudstone Series. The first stage of the research was a detailed submaceral analysis, which determined all submacerals occurring in the coal seams in the Knurów deposit. Based on the analysis, petrographic indices such as the TPI Tissue Preservation Index, GI Gelatification Index, GWI Groundwater Level Index and VI Vegetation Index were used to recreate the paleo-environment of deposition and determine the coal facies prevailing during the formation of the Knurów deposit. The next stage was the analysis of microlithotypes and, as in the case of submacerals, it was used to reconstruct facies and sedimentary environments. Petrographic analyses showed that the coal seams in the Knurów deposit were developed mainly in mesotropic conditions with a high share of herbaceous plants in wet terrestrial environments in transitional facies between forest and herbaceuos facies.

The collected petrographic data and petrographic indices were correlated with parameters characterizing selected natural hazards occurring in underground mine workings. The use of Pearson's linear correlation analysis and multiple regression allowed for the selection of coal facies and individual components influencing the development of specific natural hazards.