

THE OPINION OF THE ADVISOR OF FINAL QUALIFYING WORK

Title of the final qualifying work Monitoring of land subsidence phenomena in mining areas

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Educational program Geoinformation Mapping

Level Master

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Training requirements*	Corresponds	Mainly corresponds	Not corresponds
to be able to formulate and set tasks (problems) of the FQW correctly, to analyze and diagnose the genesis of the problems, to define relevance	+		
to be able to set priorities and methods for solving tasks (problems)	+		
to be able to use, process and analyze modern scientific, statistical, analytical information	+		
to be able to provide modern methods of analysis and interpretation of the information, to assess capabilities of the particular methods in task (problem) solving	+		
to be able to plan the time of work rationally, to determine the correct sequence and volume of operations and decisions in the performance of the task	+		
to be able to evaluate the results of computations objectively	+		
to be able to analyze the results of data interpretation	+		
to know and apply methods of the system analysis	+		
to be able to carry out interdisciplinary research	+		
to be able to make independent informed and reliable conclusions from the work done	+		
to be able to use domain-specific scientific literature	+		
to be able to apply modern graphic, cartographic, computer and multimedia technologies in research	+		
to be able to use cartographic methods and GISs	+		

*Correspondance/non-correspondance to the training requirements have to be marked with plus sign in the table

Advantages of the work

The work studied the problem of land subsidence of open pit mines located in the Kuznetsk coal basin (Kuzbass), Kemerovo region. In particular, the use of a time series of Sentinel-1 images was investigated as means to monitor the land subsidence. The SAR interferometry technique was used to process the Sentinel-1 image, providing a set of interferograms and coherence maps, useful to detect the areas affected by subsidence phenomena. The main advantage of the this work is related to the development of methodology, based on open data (Sentinel-1) and a free software (snap), which can be lead to an operational tool to remotely monitor terrain displacements in open-pit mines, in any weather conditions.

Noted shortcomings of the work

The work is well structured, presenting an analysis of land subsidence processes and monitoring experiences in mining areas, before detailing the processing of about 1-year of Sentinel-1 data acquired over the study area. Both methodology and results clearly presented, emphasizing also the limits of the approach. Future development direction for this work are provided. No significative shortcomings were noted.

Conclusion

The output of the work is a set of interferograms and coherence maps over the open pit mines located in the Kuznetsk coal basin (Kuzbass), Kemerovo region, obtained by the interferometric SAR processing of Sentinel-1 images acquired from March to December 2019. The description of

the methodology and processing tools used to produce the results is also an output which is worth mentioning as a conclusion of the work.

Advisor

Giovanni Nico

A handwritten signature in blue ink that reads "Giovanni Nico". The signature is written in a cursive style with a large initial 'G'.

05 June 2020