

SCIENTIFIC OPINION

By Assoc. Prof. Dr. Kristina Gartsyanova,

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Field of higher education: 4. Natural sciences, mathematics and informatics

Professional field: 4.4. Earth Sciences, Scientific specialty: "Hydrology of Land and Water Resources"

This opinion was prepared based on **order No. RD 38-40/22.01.2024 of the Rector of Sofia University "St. Kliment Ohridski"** for participation in the composition of the scientific jury for the defense of the dissertation work "Assessment of the river runoff and water resources in the watersheds west of the Ogosta River" for awarding the educational and scientific degree "doctor" for field of higher scientific education 4. Natural sciences, mathematics and informatics by professional direction 4.4. Earth Sciences, scientific specialty: "Hydrology of land and water resources" by PhD student Kalin Krastev Seimenov. It complies with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its Implementation and the Rules for the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at Sofia University "St. Kliment Ohridski".

Brief Biographical Data

Kalin Seymenov was born on 22.08.1995. From the autobiography presented in the documents for the defense of the dissertation, it is clear that the doctoral student completed a bachelor's degree in the Faculty of Geology and Geography at Sofia University "St. Kliment Ohridski" in 2018, and in 2019 he became a Master in "Climate Change and Water Management" at the same University. He was enrolled as a doctoral student at the Sofia University "St. Kliment Ohridski" in the Faculty of Geology and Geography in the professional field 4.4 Earth Sciences (Hydrology of land and water resources) in 2020. He was awarded with the right of defense in January 2023. He was an intern at the Ministry of Environment and Water (MOES), Directorate "Water Management" and in the Regional Inspectorate for the Environment and Waters (RIOSV), Directorate "Environmental Control", Directorate "Water Protection". From November 2021 until now, he has been working at the National Institute of Geophysics, Geodesy and Geography (NIGGG BAS) as a specialist geographer. He speaks English and has computer skills.

General Characteristics, Structure, Content and Relevance of the Dissertation Work

The dissertation consists of 212 pages, of which introduction /4 pages/, presentation /123 pages/, conclusion /2 pages/, sources used /5 pages/ and appendices /78 pages/. The list of used literature covers 142 sources, of which 78 in Cyrillic, 55 in Latin and 9 Internet sources.

The dissertability and relevance of the topic chosen for research is based on the need to analyze trends in the volume, regime and physicochemical state of surface waters in the

northwestern part of the country, where small and medium-sized rivers in length and area of the catchment area are developed, which are more sensitive to climate change and anthropogenic influences than large river basins.

The Dissertation is Well Structured in an Introduction, Four Chapters and a Conclusion.

In the introduction, the topicality of the topic, the object and the subject of research, the purpose, the tasks, as well as the limitations and the scientific significance of the research are presented in a clear and concentrated form.

The exposition is constructed in four chapters.

In the first chapter entitled "Theoretical-methodological basis of the study", the doctoral student presents the theoretical statements, approaches and methods for quantitative and qualitative assessment of river waters in the conditions of climate changes and anthropogenic impacts.

Chapter two "Territorial scope, source data and research methods" informs about the geographical location, boundaries and area, the main hydrographic, natural-geographical, administrative-territorial and demographic characteristics of the area, the hydrometric stations and monitoring points, periods and duration are described of observations, selected research approaches and methods.

In the third chapter "Factors for the formation of the quantity and quality of river waters in the watersheds west of the Ogosta River", the author presents an analysis of the factors influencing the formation of the volume, regime and physicochemical state of the surface waters in the area. The analysis is supported by maps, tables and graphics.

In the fourth chapter entitled "River runoff and water resources in the watersheds west of the Ogosta River" the homogeneity and probability distribution, statistical characteristics, fluctuations and trends of the annual river runoff are analyzed, the volume of surface water resources and the degree of water supply of the population are revealed. The same chapter comments on the spatial-temporal and quantitative parameters of high and low water, monthly and seasonal outflow, extremely high and low water levels, informs about the physicochemical state and quality of river waters.

The conclusion synthesizes the obtained results in the fourth chapter of the dissertation.

The abstract correctly reflects the essence of the dissertation work.

The dissertation presented by the candidate shows in-depth theoretical knowledge in the given topic and the doctoral student's ability to carry out independent scientific research.

The Contributions of the Dissertation

The contributions of the dissertation work are formulated in three main directions and are defined as - scientific, scientific-applied and scientific-methodological.

The scientific contribution is expressed in the establishment of statistically significant negative trends in the change of river flow, changes in the intra-annual distribution of water quantities and manifestations of altitudinal zoning of a number of hydrological parameters, as

well as in the proof of a positive trend in the quality of river waters in terms of physicochemical and integral indicators.

The scientific-applied contribution is based on the documentation of the volume and provision of water resources. Activities are proposed to reduce the loss of water resources and improve the quality of river waters.

A scientific-methodological contribution is presented based on a wide range of approaches and methods for calculating and analyzing multiple hydrological quantities. Performing a complex quantitative and qualitative assessment of the river runoff and water resources in the studied watersheds is an essential part of the dissertation work.

Critical notes and recommendations

I have no serious critical comments on the content and substance of the dissertation work.

Conclusion

The relevance and significance of the topic of the dissertation, its structure, content, the results obtained and the formulated contributions point to the competence and sufficient commitment of the doctoral student regarding the researched issues. The candidate has also submitted two independent publications (providing a total of 40 points out of the required 30 points), with which he meets the minimum scientometric requirements in accordance with the Law on the development of the academic staff in the Republic of Bulgaria.

The above gives me the reason to express my positive assessment and to propose to the scientific jury to award Kalin Krastev Seymenov an educational and scientific degree "doctor" for field of higher scientific education 4. Natural sciences, mathematics and informatics, professional field 4.4. "Earth Sciences", scientific specialty "Hydrology of land and water resources".

08 April 2024

Opinion written by:

/Assoc. Prof. Dr. Kristina Gartsyanova /