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REVIEW

by

Prof. Dr. Atanas Palazov,

Member of the scientific jury, according to order No. 301/29.09.2025, of the Deputy Director of the IO-BAS, on the basis of Art. 4 para. (2) and para. (3), and Art. 25 of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), Art. 2 para. (2) and para. (3) and Art. 57 para. (1) and para. (2) of the Regulations for the Implementation of the ADASRB; Art. 11 para. (4) of the Regulations on the Conditions and Procedure for Acquiring Scientific Degrees and for Holding Academic Positions at the BAS; Art. 3 para. (2) and (8) and Art. 53 para. (6) of the Regulations on the Conditions and Procedure for Acquiring Educational and Scientific Degrees and for Holding Academic Positions at the IO - BAS - Varna, and on the basis of a Decision of the Scientific council of the IO - BAS - Varna, taken with Protocol No. 12, item 3/17.09.2025, published in the State Gazette, issue 63/01.06.2025

for

The only candidate Chief Assistant Dr. Ivelina Yordanova Zlateva,
Marine Physics Department, Institute of Oceanology-BAS-Varna

1. General description of the materials presented

The documents and materials submitted by the only candidate in the competition, Chief Assistant Dr. Ivelina Yordanova Zlateva, contain the necessary information on the basis of which it can be assessed that the requirements of the ADASRB and the Regulations for its implementation, as well as the Regulations on the Terms and Procedure for Acquiring Educational and Scientific Degrees and for Occupying Academic Positions at the Institute of Oceanology - BAS, for applying for the academic position of "Associate Professor", have been met. This gives me reason to review the documents submitted for the competition.

The documents submitted by the candidate include: CV in European format; Diplomas for higher education and for the educational and scientific degree "doctor" - notarized copies; Certificate of internship in the specialty in the relevant scientific field; List of scientific publications; Copies of scientific publications; Summaries of peer-reviewed publications in Bulgarian and English; Reference for original scientific contributions; Reference for citations in scientific publications; List of scientific research projects and participation in scientific forums; Evidence of national minimum requirements and requirements of the Regulations on the conditions and procedure for acquiring educational and scientific degrees and for occupying academic positions at the Institute of Oceanology - BAS (Annex to Art. 1a and in tabular form).

2. Candidate details

General information about the candidate

Ivelina Yordanova Zlateva was born in 1976. She received a master's degree in "Automation Engineer" from the Technical University - Varna in 2000 with a specialty in Automation and Control Systems, narrow specialization - Information management of computer

systems and technologies. In 2009, she also obtained a second master's degree in "Industrial Management" also at TU-Varna.

She successfully received her doctoral degree in 2019 with the thesis topic "Research on the possibilities for applying engineering methods in marine resource management".

Since 2007, she has completed 8 specialized courses, trainings and postgraduate qualifications in various fields, which shows her interest in developing new skills and abilities.

She worked at the Executive Agency for Fisheries and Aquaculture, where she dealt with data analysis, control and monitoring in fisheries, as well as participating in workshops, conferences and working groups. She was also a part-time lecturer at TU-Varna, where she led laboratory and practical exercises in several disciplines. Since 2019, she has been working at the Institute of Oceanology of the Bulgarian Academy of Sciences, and since 2020, she holds the academic position of Chief Assistant.

Candidate's scientific metrics

Chief Assistant Dr. Ivelina Zlateva has included in her documents 6 articles for criterion B4 published in high-ranking journals Q1 and Q2 (in three of them she is the first author), 16 for G7 (in 1 of them she is the lead author) and five publications for G8 (co-author of three chapters of collective monographs and lead author of two chapters of collective monographs). Ivelina Zlateva successfully participates in joint research and publications with various colleagues, which is a testament to her ability to work in a team. Fifteen of the scientific works are referenced in world-renowned databases.

According to the Regulations for the Implementation of the Act on the Development of Academic Staff in the Republic of Bulgaria, to acquire the academic position of "associate professor" in the professional field of "earth sciences" it is necessary: the indicator from group A to be covered with 50 points, from group B with 100 points, from group G with 200 points and from group D with 60 points.

The candidate's presented PhD thesis covers indicator A1 and earns him 50 points.

To indicator B4 "Scientific publications referenced and indexed in world-renowned databases with scientific information", the candidate refers to 6 publications, of which she is the lead author in three, and here the number of points she has reached is 135, therefore she meets the requirements.

In indicator G7, Ivelina Zlateva indicates 16 articles, covering 180 points. To G8, she adds 5 chapters of collective monographs, also carrying 75 points. Thus, in total, 255 points are registered in indicator G (G7+G8), therefore the candidate meets the requirements for the indicator.

For indicator D11 "Citations in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-renowned databases of scientific information (Web

of Science and Scopus)", the candidate has indicated 13 cited publications in 51 citing sources and 237 points. A reference in the Scopus database shows 61 citations (excluding self-citations by all co-authors) of 17 publications, which brings 305 points. Since the candidate's reference is difficult to verify, I accept the Scopus result – 305 points.

In my opinion, the candidate's data on the fulfillment of the minimum national requirements for occupying the scientific position of "associate professor" are the following:

Group of indicators	Indicator	Number of points according to requirements	Number of points of the candidate
A	1. PhD thesis	50	50
B	4. Habilitation thesis – scientific publications in journals that are refereed and indexed in world-renowned databases of scientific information (Web of Science and Scopus)	100	135
G	7. Scientific publications in journals that are refereed and indexed in world-renowned databases of scientific information (Web of Science and Scopus), outside the habilitation thesis 8. Published study or chapter of a collective monograph	200	255
D	11. Citations in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-renowned databases of scientific information (Web of Science and Scopus)	60	305

Summary

The presented materials, reflecting Ivelina Zlateva's scientific metric indicators at this time, show that she not only meets but also significantly exceeds the minimum national requirements for the academic position of "associate professor".

Teaching activities

The candidate's CV shows that in the period 10.2017 - 04.2019 she led laboratory and practical exercises in several disciplines in the departments of "CST" and "IA" of the Technical University-Varna.

Project activity and dissemination of scientific results

The presented list of research projects shows that the candidate has participated in 18 international projects, two of which she was the coordinator for the IO-BAS. She has also been a team member in 13 national research projects.

Ivelina Zlateva has participated in 25 scientific forums: international and national conferences, round tables and workshops with 31 reports, posters and presentations.

General characteristics

From the submitted materials it is evident that the candidate has developed in recent years actively, and I would say intensively, both scientific, applied scientific and teaching activities.

Dominant among them are scientific and applied scientific activities, while the candidate's teaching activities are of limited scope, which is due to the organizations in which she worked and the positions she held.

Topics in the candidate's research activities

The candidate's work highlights scientific works related to:

- Dinoflagellate Cysts and Their Environmental Significance
- Climate Change Impacts on Species Distribution Models
- Marine Plastic Pollution and Its Impact on the Black Sea ecosystem
- Microplastics as Environmental Pollutants and Risks
- Innovative Approaches to Fisheries Management and Stock Assessment
- Genetic Diversity and Effective Population Management
- Domoic Acid and Its Ecological Impacts
- Phytoplankton Dynamics and Ecosystem Changes in Black Sea
- Genetic Structure of Black Sea Species

From the analysis of the research activities of Dr. Ivelina Zlateva, it can be concluded that her scientific interests are developing in the application of mathematical methods for data processing and analysis in the field of marine biology, marine ecology, fish stock assessment and fisheries management.

This broad competence of the candidate shows the good scientific basis she has.

Contributions

In her Author's Statement, the candidate describes in detail the new knowledge presented in relevant publications of those with which she participates in the competition. She formulates scientific and applied scientific contributions as follows:

SCIENTIFIC CONTRIBUTIONS:

I.1. For the first time, spatial distribution models with high predictive accuracy and habitat suitability of six commercially important fish species in the Bulgarian Black Sea region have been developed: *Sprattus sprattus*, *Mullus barbatus*, *Trachurus mediterraneus*, *Pomatomus saltatrix*, *Merlangius merlangus*, and *Scophthalmus maximus*, through the application of machine learning (maximum entropy method – MaxEnt) based on the integration of abiotic and biotic environmental factors, validated with monitoring data. The importance of biotic interactions as a limiting factor for the distribution of *S. sprattus*, *M. barbatus*, *T. mediterraneus*, *P. saltatrix*, *M. merlangus* has been taken into account. The results obtained are of essential importance for the conservation and effective management of stocks of commercially important fish species in the region (6.3.1-3; 6.3.1-4)

I.2. For the first time, an integrated approach has been applied to analyze molecular genetics and morphological datasets and assess the population genetic structure of turbot (*Scophthalmus maximus*) off the Bulgarian Black Sea coast in combination with the application of machine learning methods to

determine the ecological niche (habitat suitability) occupied by the species. Projections of the habitat suitability model of *S. maximus* under different climate scenarios have been made and the status of turbot populations in Bulgarian Black Sea waters in relation to fishing pressure has been assessed. The results obtained are of essential importance for the conservation and effective management of turbot stocks in the region (6.3.1-3).

I.3. Significant results have been achieved by applying various statistical and machine learning methods in studying the biodiversity and spatial distribution of phytoplankton cysts in the Black Sea. The maximum entropy method was used to predict the habitat suitability of cysts of three potentially toxic microalgae species (*Lingulodinium polyedra*, *Polykrikos hartmannii* and *Alexandrium* spp.). Key environmental factors have been identified that determine the probability of occurrence of cysts of the potentially toxic species *Alexandrium* spp., *L. polyedra* and *P. hartmannii*. The region with the highest probability of occurrence of cysts of *L. polyedra* according to the obtained habitat maps is the waters along the western coast and shelf of the Black Sea, which coincide with documented blooms of *L. polyedra*. The conceptual framework of the study and the obtained results can serve for future integration into a system for monitoring blooms of potentially toxic species and assessing ecological risks (6.3.1-2).

I.4. Stratified spatial methodologies for quantitative assessment of marine litter and for mapping of “hot spots” have been developed, supporting sustainable management of the marine environment. Methods for automatically determining threshold values of the indices of environmental loading with plastic waste have been applied for the first time. A Lagrangian numerical model has been applied to study the complex dynamics and transfer of transboundary and plastic pollution from river and land-based sources to the Black Sea, taking into account the percentage contribution of the sources with the probability of pollution emission, which provides a new quantitative basis for assessing transboundary loading, with simulation studies validated with monitoring data (6.3.1-1; 6.3.3-3).

I.5. The relationship between the spatial distribution and abundance of different cyst morphotypes of the bloom-inducing complex *Scrippsiella acuminata* in surface sediments in the Black Sea with selected environmental variables was investigated using different statistical approaches and the application of multivariate statistical and gradient methods (applied in community ecology to establish the relationship between abundance/biomass/contractions of species with specific environmental factors). A relationship was established for all cyst morphotypes of *S. acuminata* with one or a combination of environmental variables, such as salinity, temperature, currents, oxygen uptake and nutrients. The results of the analyses add valuable information about the mechanism of geographical distribution of *Scrippsiella* blooms in the Black Sea. (6.3.1-6)

I.7. Data from microscopic analysis and metabarcoding and phycotoxins of 20 potentially toxic species in the Black Sea were analyzed, some of which: *Dinophysis acuminata*, *Dinophysis acuta*, *Gonyaulax spinifera* and *Karlodinium veneficum* were found in over 95% of the stations. A positive correlation was established between the abundance of *Dinophysis acuta* and pectenotoxins, and between *Lingulodinium polyedra* and *Protoceratium reticulatum* and yestotoxins, suggesting the toxigenicity of these species. A relationship was established between the abundance and spatial distribution of toxic microalgae and toxins, and environmental parameters by applying multivariate statistical and gradient methods. The results will help to build a hypothesis regarding the influence of environmental factors on the

toxigenic potential of species and can be used to build systems and algorithms for assessing the risk to human health and ecosystem health (6.3.1-5).

I.8. Conceptual and applied frameworks for the management of marine living resources have been developed, which combine the use of indicators for stocks of key fish species such as quantitative assessment of sustainability, assessment of the impact of fishing pressure on population dynamics. In this context, analytical methods have been introduced that allow the integration of biological, ecological and socio-economic data in order to build reliable systems for assessing the state of the sector, fish resources and their sustainability. In parallel, a systems and engineering-systems approach has been applied, through which marine ecosystems are considered as complex systems subject to modeling, analysis and simulation. This approach allows for the assessment of the interaction between natural processes and anthropogenic impacts, as well as the development of scenarios for sustainable ecosystem management. The unification of these research lines confirms an interdisciplinary approach in which statistical, numerical methods and systems analysis are applied together to develop integrated models for the management of marine living resources. This supports the creation of a new scientific basis for sustainable fisheries, environmental management and strategic planning in the Black Sea region (6.3.2-11; 6.3.2-12; 6.3.2-14).

II.1. Data science tools for pre-processing, qualitative analysis and post-processing of multidimensional ecological and climatic arrays and time series are applied, implemented through software developed in the R programming environment for all applied statistical and ecological methods, as well as software developed in the R and Python programming environments for spatial modeling of species and integration of data from numerical models (CMEMS; ERA5). (6.3.1-1-6; 6.3.2-1-2; 6.3.2-4-6; 6.3.2-9-12; 6.3.2-9-14; 6.3.3-6-7; 6.4-1)

SCIENTIFIC AND APPLIED CONTRIBUTIONS:

I. Management and conservation of fishery resources

I.1. The developed models for spatial distribution and habitat suitability of commercially important fish species (*Sprattus sprattus*, *Mullus barbatus*, *Trachurus mediterraneus*, *Pomatomus saltatrix*, *Merlangius merlangus*, *Scophthalmus maximus*) support the strategic management of stocks and their effective conservation, by providing a toolkit for forecasting and planning fishing activities. (6.3.1-3; 6.3.1-4)

I.2. Projections of habitat suitability of turbot (*Scophthalmus maximus*) under different climate scenarios provide a scientific basis for assessing the long-term sustainability of stocks, taking into account fishing pressure and changes in climate conditions. (6.3.1-3)

I.3. The introduced indicators for the status and sustainable exploitation of stocks of fish species of high commercial importance and the integrated systems for the assessment of marine living resources can be used to develop management policies aimed at sustainable fisheries and strategic planning of the sector. (6.3.2-11; 6.3.2-12; 6.3.2-14)

II. Monitoring and assessment of environmental risks

II.1. The developed model and conceptual framework for predicting the habitat suitability of potentially toxic microalgae and phytoplankton cysts creates conditions for integrating models into early warning and monitoring systems for harmful blooms. This has direct application in the assessment of risk to human health and the health of ecosystems. (6.3.1-2; 6.3.1-5)

II.2. The established relationships between *Scrippsiella acuminata* cyst morphotypes and

environmental factors (salinity, temperature, nutrients) have practical value for predicting the probability of bloom events and for their inclusion in models for environmental risk management. (6.3.1-6)

III. Pollution and Marine Environment Management

III.1. The application of Lagrange numerical models for the transport of plastic waste pollution from riverine and land-based sources provides new opportunities for the quantitative assessment of transboundary transport and for the development of policies for pollution management and reduction. (6.3.1-1; 6.3.3-3)

III.2. Stratified spatial methodologies for the quantitative assessment and mapping of “hotspots”, accumulation and divergence zones of marine plastic waste can be integrated into national and regional monitoring programs and in the implementation of measures within the framework of European and international regulations for the management of the marine environment. (6.3.1-1; 6.3.2-7; 6.3.3-3)

IV. Application of data science and statistical methods

IV.1. The developed R and Python software for processing, statistical analysis and spatial modeling of multidimensional environmental and climate data has direct application for automation of scientific research, development of operational monitoring systems, risk management systems and for supporting management decision-making. (6.3.1-1-6; 6.3.2-1-2; 6.3.2-4-6; 6.3.2-9-12; 6.3.2-9-14; 6.3.3-6-7; 6.4-1)

I have no objections to the contributions formulated by the candidate and accept them. The analysis of the scientific achievements indicated by the candidate shows that they were obtained through the application of mathematical methods for data processing and analysis in the fields of marine biology, marine ecology, fish stock assessment and fisheries management, the nature of the scientific contributions consisting in enriching and supplementing existing knowledge.

The candidate's recognition in the scientific community is very good. In the nearly seven years since she has been working at the Institute of Oceanology, she has 60 citations according to Scopus data. Her publications are new to the region of research, which completely rules out the possibility of plagiarism and explains the interest in her work.

Critical notes and recommendations

I have no critical remarks about the candidate's work. I was only surprised by the fact that she did not include in the list of projects on which she has worked and is still working, the Black Sea Monitoring and Forecasting Center project under the Copernicus program, where she is part of the project management team. Given her current position as Head of the "Marine Physics" department at the Institute of Oceanology, I recommend that she pay attention to the administration of scientific teams, which under her leadership would achieve success in marine science.

Conclusion

My personal impressions of the candidate are very good. She has a very good mathematical background, high work capacity, excellent command of English, works very well in scientific teams and has excellent skills in communicating scientific knowledge to a wide

audience.

Chief Asst. Dr. Ivelina Zlateva shows publication and project activity more than sufficient for the academic position "Associate Professor". The minimum national requirements for the academic position "Associate Professor" are met and exceeded for all groups of indicators with a total of 745 points.

Getting acquainted with the materials on the competition convinces me that the competition procedure was carried out exactly in accordance with the requirements of the ADASRB and the Regulations for its implementation, as well as those of the Regulations for its implementation at the Institute of Oceanology at the Bulgarian Academy of Sciences.

In conclusion, I give a positive assessment for awarding the academic position of "Associate Professor" to Chief Assistant Dr. Ivelina Yordanova Zlateva in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.4. Earth Sciences, scientific specialty "Oceanology" for the needs of the "Marine Physics" Department, Institute of Oceanology-BAS-Varna.

Signature: