REVIEW

by Prof. Dr. Elena Koleva-Rekalova, Geological Institute, BAS, Sofia

Subject: competition for the academic position of "Associate Professor" in the field of higher education: 4. "Natural Sciences, Mathematics and Informatics", Professional field: 4.4. "Earth Sciences", Scientific specialty: "Geology of the Oceans and Seas", Scientific field: "Paleoclimate and Geoecology of the Black Sea", for the needs of the scientific section "Marine Geology and Archaeology" at the Institute of Oceanology, BAS, Varna, announced in the State Gazette No. 63 of 01.08.2025.

The review was prepared in connection with an order of the Director of the Institute of Oceanology, BAS, Varna, No. 300 of 26.09.2025 and a decision of the first meeting of the Scientific Jury, held on 10.10.2025. Senior Research Assistant Dr. **Krasimira Ruseva Slavova** is the only candidate in the competition. The materials submitted by the candidate meet the requirements of the "Act on the Development of the Academic Staff in the Republic of Bulgaria" and the requirements of Art. 52 para. (1) and Art. 53 para. (4) of the Rules for the Conditions and Procedure for Acquiring Educational and Scientific Degrees and for Holding Academic Positions at the Institute of Oceanology, BAS, Varna.

Krasimira Slavova graduated from the Nikola Vaptsarov Naval Academy, Varna, Civil Faculty, in 1997 as a Master in "Ecology", specialty "Ecology and Environmental Protection". From 1999 to 2005 she worked as an ecologist in the scientific section "Marine Geology and Archaeology" at the Institute of Oceanology, BAS, Varna. In 2005 she received the educational and scientific degree "Doctor" after defending a dissertation on the topic "Climatic and geocatastrophic events in the Black Sea 7500 calendar years ago". From 2005 to 2011 the candidate was a Research Associate, first degree, at the same section. Since the beginning of 2011 she has held the academic position of Senior Research Assistant in the field of higher education: 4. "Natural Sciences, Mathematics and Informatics", Professional field: 4.4. "Earth Sciences", Scientific specialty: "Geology of the Oceans and Seas", Scientific direction: "Paleoclimate and geoecology of the Black Sea". Currently, she continues to work in the scientific section "Marine Geology and Archaeology" at the Institute of Oceanology, BAS, Varna.

Publication activity

Senior Research Assistant Dr. Krasimira Slavova participated in the competition with a total of 34 publications. The scientific publications in editions that are referenced and indexed in world-

renowned databases of scientific information (Web of Science and Scopus) and represent the equivalent of a habilitation thesis (indicator B4) are 6 in number: two articles in journals with quartile Q1, one with Q2 and three with Q3. The candidate is the first author of one article. All articles are in English. The scientific publications in editions that are referenced and indexed in world-renowned databases of scientific information, outside the equivalent of a habilitation thesis, are 28. This indicator G7 includes 8 articles with quartiles from Q1 to Q4 (Web of Science and Scopus); 2 articles in WoS and Scopus without SJR and without IF; 18 publications that are referenced and indexed in world-renowned databases of scientific information. Of these, 5 publications are from reports in various scientific forums, which are also refereed and indexed in world-renowned databases of scientific information.

Citations of the competition publications

Sixteen publications of the candidate have been cited a total of 115 times. The number of citations in scientific publications, referenced and indexed in Web of Science and Scopus is 81, in monographs and collective volumes with scientific review – 14 and in non-refereed journals with scientific review – 20. It is noteworthy that the publication of Yanchilina et al. (2017) receives 53 citations. This fact proves that when the collective is well selected, the topic is complex and topical, and the publication is in a journal with a quartile Q1, as in the case of Marine Geology, then it has a wide specialized response. The remaining 15 publications have been cited 62 times.

Participation in research projects and scientific forums

Senior Research Assistant Dr. Krasimira Slavova participates in 15 international research projects. She is the coordinator of 7 of them. She is a member of 8 national research projects. She participates in 17 scientific forums held in Bulgaria and abroad, with oral and poster presentations. Almost all of them are related to research affecting various aspects of the Black Sea and the coast.

Minimum required points by indicator groups for the academic position of "Associate Professor"

From the reference to the national minimum requirements and the requirements of the regulations of the Institute of Oceanology, BAS, Varna, it is established that the candidate exactly covers a group of indicators A, slightly exceeds a group of indicators B (indicator B4 – 115 with a required 100 points), exceeds a group of indicators Г (indicator Г7 – 262 with a required 220 points) and significantly exceeds a group of indicators Д (indicator Д11 – 487 with a required 60 points). The number of participations of the candidate in international and national research projects is large and if for the academic position of "Associate Professor" there was a requirement for minimum points in group of indicators E (indicators E16 and E17), then they would have been exceeded several times.

Scientific and applied scientific contributions

Senior Research Assistant Dr. Krasimira Slavova separates scientific from applied scientific contributions.

The scientific contributions can be summarized in several thematic directions.

I. ***Study of correlations between data from different paleoclimatic archives (cave deposits and sediments) and different dating methods.*** The most important conclusion from these studies is that the influence of solar insolation in the past, which is a result of the inherent variations of solar luminosity, is recorded in the change of the paleoclimatic environment in the Black Sea region and can explain the fluctuations of sea level. The U/Th method was used to date the cycles of solar luminosity.

II. ***Supplementing and refining the existing models for paleoexchange of water masses between the Aegean, Marmara and Black Seas and the existing chronostratigraphic schemes for the Black Sea area.*** The contributions are related to a proposal for a new interpretation of paleoexchange of water masses between the Aegean, Marmara and Black Seas (II.1.) and a proposal for a chronostratigraphic scheme for correlation of lithostratigraphic units from the shelf and deep waters of the Black Sea (II.2).

III. ***Criteria for studying the transition of the Black Sea Basin from a regressive lacustrine phase to a transgressive marine phase at the end of the early Holocene have been established.*** As a result of a detailed lithological description of three sediment cores from deep-sea Black Sea drillings, white laminae from Holocene Unit 2, sapropel (III.1.), have been identified. They are composed almost entirely of rice-shaped aragonite crystals and spheroidal aggregates (III.2.). The genesis of aragonite as a key geochemical indicator associated with a dry climate has been studied (III.4.). A mechanism for the redeposition of aragonite at the base of the sapropel has been substantiated (III.5.). The geological settings of the drilling locations during the Late Pleistocene and Early Holocene have been traced (III.3.).

IV. ***Interpretation and reconstruction of the evolution of the Black Sea Basin during the Late Pleistocene-Holocene.*** New data have been obtained that trace the evolution of the basin during the Late Glacial and Holocene (IV.1.). By using a multidisciplinary approach and methods, a rapid, Early Holocene, Mediterranean flood, rather than a slow-onset flooding of the dried-up old coastlines of the Black Sea Basin, has been proven (IV.2.). Time-varying radiocarbon (^{14}C) reservoir ages during the Late Pleistocene and Holocene for the Black Sea basin have been determined (IV.3.).

V. ***Detailed reconstruction of paleoclimatic and paleoecological changes in the Black Sea region and basin over the last ~26,000 years.*** New data on paleoclimatic changes and ecosystem responses of the Black Sea zone over the last ~26000 years have been obtained using data from comparative spore-pollen analysis (V.1. and V.2.). In Black Sea sediments (Akad 11-17 borehole) a climatic oscillation in the period 8.5–8.3 ka BP has been confirmed by high-resolution spore-pollen analysis (V.5.). The time interval of the change in paleoecological conditions in the Black Sea Basin during the early Holocene has been marked by the study of dinoflagellate complex zones (RDAZ) (V.3. and V.4.).

VI. ***A curve of the averaged surface salinity for the Black Sea Basin for the last 20000 years has been derived.*** This curve has been derived by comparing the surface salinity, water temperature and water level of the Black Sea Basin (VI.1.). New ^{14}C ages of fossilized specimens of *Ostrea edulis* from the base of the reef at Perla Beach have been obtained. Using the curve of the averaged surface salinity for the Black Sea Basin and the new ^{14}C dates obtained, it is concluded that the settlement of *Ostrea edulis* in the Black Sea occurred at a surface water salinity of 16 psu about 5000 ^{14}C years ago (VI.2.).

VII. ***Applying a new approach to obtaining data on carbon stored in coastal marine sediments.*** New evidence for accelerated sedimentation and increased rates of organic and inorganic carbon accumulation over the past 100 years has been obtained from sediment records from one borehole drilled in the western Black Sea and two boreholes from the southern Adriatic Sea. The rate of sedimentation and the accumulation of organic and inorganic C increased with time in both seas. It is hypothesized that the increase in organic C is a consequence of an increase in atmospheric C, which provides more carbon dioxide available to phytoplankton, allowing for more efficient photosynthesis.

VIII. ***Research and assessment of the contamination of the Black Sea sediments with radionuclides and heavy metals and the pollution of the marine environment with floating waste.*** New data have been obtained on the accumulation of the technogenic radionuclide 137Cs and natural radionuclides from the 238U and 232Th series (238U, 226Ra, 232Th), as well as 40K in sediment cores from 2 boreholes sampled against Cape Galata. The comparative analysis with data from previous studies shows that the values for 137Cs, 238U, 226Ra and 232Th from previous studies are significantly higher than those measured in the present study (VIII.1.). New data on technogenic 137Cs and natural radionuclides 232Th, 234Th, 226Ra and 40K were obtained from two sediment samples collected from depths of -14 and -20 m in the area of Perla beach (Primorsko). The data indicate that the measured values are low and close to background values (VIII.2.). The degree of pollution of coastal sediments in the Bulgarian Black Sea coastal zone was

assessed by calculating various pollution indices. It was found that most of the studied areas are from unpolluted to moderately polluted, with one exception of significant pollution with Pb and Zn (VIII.3.). An depth assessment of plastic pollution in the Black Sea water area was carried out. The main sources of plastic waste were identified, which include the cities of Varna and Burgas, the Kamchia River and the transboundary transfer via the Danube (VIII.4.).

Comment: it is more appropriate to refer the data from the eighth thematic direction to the scientific and applied contributions.

Scientific and applied contributions are presented in three thematic directions.

I. ***Contribution to the development of documents related to sampling and sample preparation of sediments for analysis with nuclear analytical techniques.*** A synchronized and harmonized protocol for sampling and sample preparation of sediment material has been prepared and adopted.

II. ***Integration of sediment data from the Black Sea area obtained using nuclear analytical techniques into the IAEA Marine Radioactivity Information System (MARIS) database.*** A database has been created from an inventory of measured concentrations of radionuclides and toxic elements (Mn, Ni, Zn, Cu, Pb, As, Cr, Cd and Co) and new data obtained for sediments from the Black Sea area.

III. ***Application of a new approach for better interpretation of paleoclimatic, paleoecological and paleogeological data on the evolution of the Black Sea Basin during the early Holocene.*** The approach is applied in which the aragonite laminae deposited at the base of marine Unit 2 (sapropelic muds) are used as markers for a better understanding of the paleoclimatic, paleoecological and sedimentological conditions during the transition from regressive to transgressive phase of the basin during the early Holocene.

As a summary, it can be concluded that the scientific and applied scientific contributions of the candidate are related to the study of various aspects of the coastal and deep-sea sediments of the Black Sea. The goal is to establish correlations between climate change, the change in the paleoecological conditions of the basin, sea level fluctuations and the dynamics of deposition of Late Pleistocene and Holocene sediments after the last glacial maximum. The interpretation and reconstruction of the evolution of the Black Sea Basin are in the context of the interrelationship between the various paleoindicators of the environment and paleoclimatic changes during the period under consideration. Krasimira Slavova's participation in various national (8) and international (15, 3 of which she is the national coordinator) research projects contributes significantly to the expansion of her scientific and research activities. Of great importance for geoecology are the

studies and data obtained on the degree of contamination of the Black Sea sediments and the marine environment with radionuclides, heavy metals and floating waste.

Impression of the candidate

I have not met Krasimira Slavova in person. Our contacts are mainly by phone and e-mails, in connection with our joint publications. However, I have the impression that she is a responsible person, she is dialogical and enjoys her current job.

Conclusion

I have no recommendations or critical remarks about the scientific and applied scientific activities of Senior Research Assistant Dr. Krasimira Slavova.

The candidate in the competition fully meets the requirements of the "Act on the Development of the Academic Staff in the Republic of Bulgaria" and the requirements of Art. 52 para. (1) and Art. 53 para. (4) of the Rules for the Terms and Procedure for Acquiring Educational and Scientific Degrees and for Holding Academic Positions at the Institute of Oceanology, BAS, Varna, with respect to previous academic position, acquired scientific degree, presented scientific publications, citations, scientific and applied scientific contributions, participation in scientific forums and projects, etc.

In conclusion, I recommend of the members of the Scientific Jury to propose of the Scientific Council of the Institute of Oceanology, BAS, Varna, to award the academic position of "**Associate Professor**" to Senior Research Assistant Dr. **Krasimira Ruseva Slavova** in the field of higher education: 4. "Natural Sciences, Mathematics and Informatics", Professional field: 4.4. "Earth Sciences", Scientific specialty: "Geology of the Oceans and Seas", Scientific field: "Paleoclimate and Geoecology of the Black Sea", for the needs of the scientific section "Marine Geology and Archaeology".

03.11.2025
Sofia

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