

OPINION

by Prof. DSc Mila Atanasova – Zlatareva

National Institute of Geophysics, Geodesy and Geography – BAS,

member of the Scientific Jury, according to the order of the Director of the "Institute of Oceanology" at BAS No. 299 of 26.09.2025,

on the materials submitted for participation in the competition for the academic position of "associate professor" in the field of higher education: code 4. "Natural Sciences, Mathematics and Informatics"; Professional field: code 4.4. "Earth Sciences"; Scientific specialty: "Geology of the oceans and seas"; Scientific field: "Geological-geomorphological mapping and monitoring of the coastal zone", announced in the state newspaper no. 63 / 01.08.2025.

In the competition for the academic position of "associate professor", announced in the state newspaper, issue 63 of 01.08.2025, the candidate participating is **Chief Assistant Professor Dr. Bogdan Kirilov Prodanov** - the only candidate from the "Coastal Zone Dynamics" section at the "Institute of Oceanology" at the Bulgarian Academy of Sciences.

1. Brief biographical data

Ch. Assoc. Prof. Dr. Bogdan Kirilov Prodanov graduated from the Vocational High School of Architecture, Construction and Geodesy "Vasil Levski" - Varna as a specialist-geodesist in 2006.

He obtained a master's degree:

- Master - Engineer in Exploration Geophysics at the University of Mining and Geology "St. Ivan Rilski" with a defended diploma thesis on the topic: "Application of multibeam sonar systems to assist in the geological mapping of Burgas bottom sediments"
- Master in Geomorphology at Sofia University "St. Kliment Ohridski" with a defended diploma thesis on the topic: "Beach-dune forms and anthropogenic changes in the relief in the area of the beaches Kavatsi and Smokini (Bulgarian Black Sea Coast)"

During the period (06/04/2009 - 06/07/2012) he worked as a specialist - geophysicist at the Department of Seismology at the National Institute of Geophysics, Geodesy and Geography at the Bulgarian Academy of Sciences.

He started his scientific development as a full-time doctoral student in 2013 at the "Coastal Zone Dynamics" section at the Institute of Oceanology "Prof. Fridtjof Nansen" - Bulgarian Academy of Sciences. He successively held the position of assistant and chief assistant professor at the same "Coastal Zone Dynamics" section at the Institute of Oceanology

Ch. Assis. Prof. Dr. Bogdan Kirilov Prodanov has professional skills and extensive practical experience in:

- Application of geomorphological, geological, geophysical and remote sensing methods for mapping the relief in the coastal zone and shelf;
- Application of remotely controlled unmanned aerial systems for mapping the coastal zone;
- Compilation of substrate maps as a geological basis for mapping bottom physical habitats;
- Preparation of forensic technical expertise in relation to sand dunes and dune habitats, anthropogenic activities that have caused changes in the relief;
- Experience working with specialized equipment for marine research (single-beam and multi-beam sonar systems, side-scan sonar systems), underwater surveys and sampling of bottom sediments in geological surveys;

The candidate has skills and competencies to work with: ArcGIS; Global Mapper, Hydra, Statistics; Agisoft; Metashape; Drones; Photoshop; and holds licenses for: UAV management (A1/A3 Open Sub Category) from the Civil Aviation Administration; Diving qualification and participation in underwater research (DiveMaster and Technical Divers, IANTD); Captain's qualification.

2. General description of the submitted materials

For participation in the competition for the academic position of "associate professor" candidate Ch. Assis. Prof. Dr. Bogdan Kirilov Prodanov applies the following documents:

- 2.1. Application for participation in the competition - cited state newspaper with the announcement;
- 2.2. List of documents;
- 2.3. European-style CV;
- 2.4. Diplomas of higher education and scientific degree - certified copies;
- 2.5. Certificate of internship in the specialty in the relevant scientific field;
- 2.6. List and copies of scientific publications and participation in scientific forums with the candidate's signature;
- 2.7. Summaries of peer-reviewed publications in Bulgarian and English;
- 2.8. Reference of original scientific contributions;
- 2.9. Reference of citations;
- 2.10. Other documents related to the competition;
- 2.11. Evidence of national minimum requirements of the Regulations (Annex to Art. 1a and in tabular form).

3. Reflection of the candidate's scientific publications in the literature (known citations) In the documents, the candidate has indicated the citations of 4 of his publications under indicator D, 16 citations in referenced and indexed in world-renowned databases with scientific information or in monographs and collective volumes (5 points each) total number of points - 80 points.

4. General characteristics of the candidate's activity

4.1. Educational and pedagogical activity Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov is an honorary lecturer at the Department of Climatology, Hydrology and Geomorphology of Sofia University "St. Kliment Ohridski", Faculty of Geology and Geography.

4.2. Scientific and scientific applied activity Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov was the head of 2 international and 10 national scientific or educational projects. He declared participation in 17 international and 18 national scientific and applied scientific projects.

The results of the scientific and applied scientific research carried out by the candidate are presented in 40 publications distributed by indicators:

B-4. (Habilitation thesis or scientific publications that are referenced and indexed in world-renowned databases with scientific information) with 5 articles with quartile Q2 (20 points each) and 2 articles published in a publication with SJR without IF (10 points each) in total - 120 points

D-7. (Scientific publications that are referenced and indexed in world-renowned databases with scientific information) with 1 publication with quartile Q1, (25 points each), 7 publications in a publication with SJR without IF (10 points each) - 70 points,

5 articles in Web of Science and Scopus without SJR and without IF (8 points each) - 40 points, 19 other publications in peer-reviewed journals (6 points each) - 114 points, and a chapter of a collective monograph - 15 points - a total of 264 points

4.3. Implementation activity- none announced, but I accept the created methodology as such.

Prodanov B, Valcheva M, Gusev Ch, Sopotlieva D (2024) Methodology for mapping, determining boundaries and types of sand dunes, according to Art. on the creation and maintenance of specialized maps and registers of sites under Art. 6, para. 4 and 5 of the Law on the Development of the Black Sea Coast 4 and 5 of the Law on the Development of the Black Sea Coast .

4.4. Contributions (scientific, scientifically applied, applied) The habilitation papers submitted for participation in the competition by Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov can be thematically grouped into the following main areas with corresponding scientific, scientifically applied and applied contributions:

4.4.1. Scientific contributions

I. The geological-geomorphological mapping of the coastal zone is presented - complex multidisciplinary studies of the seabed, the bottom substrate and the processes that shape the modern appearance of the underwater coastal slope of the Bulgarian shelf and coastal zone [B.4-1], [B.42], [B.4.6], [B.4.7], [D.7-13].

I.1. A geomorphological map of the underwater coastal slope between Cape Galata and Cape Palets has been prepared, at a scale of 1:10,000 for the region of the Avren coast between Cape Galata and Cape Ilandzhik [B.4-1].

I.2. A detailed geomorphological map has been prepared for the water area of the Varna Bay, based on the morphological forms and hydrodynamic processes of the seabed [B.4-2].

I.3. A complex morphostructural map of the above-water and underwater coastal slope of the Strandzha Black Sea sector has been constructed [B.4-6].

I.4. An initial spatiotemporal assessment of the loss of natural seabed along the entire Bulgarian Black Sea coast as a result of the construction of coastal infrastructure for the period 1970/83–2017 has been carried out, based on a highly precise map base (Scale 1:5,000) [B.4-7].

I.5. Mapping of coastal dunes along the Bulgarian Black Sea coast has been carried out [B.4-5], [D.7-9], [D.7-11]. For the first time, coastal dunes have been classified according to geomorphological characteristics (morphogenetic origin), applying the internationally accepted typology. A spatiotemporal analysis between current and archival orthophotographs and aerial photography is also presented to track changes in the relief over the last 100 years.

II. Monitoring and estimates of the geo-ecological state of the coastal zone

II.1. Estimates of macro-litter pollution on the beach-dune systems along the Bulgarian Black Sea coast [B.4-4], [D.7-1].

II.2. Investigation of the loss of bottom habitats. A quantitative estimate of the loss of broad types of bottom habitats along the entire Bulgarian Black Sea coast has been carried out, according to the criteria of the Marine Strategy Framework Directive (MSFD) [B.4-7].

II.3. Mapping and a comprehensive inventory of dune habitats along the Bulgarian Black Sea coast have been carried out [B.4-5], [D.7-11]. Based on spatial analysis in a GIS environment, it was established the percentage of dune habitats falling within Natura 2000 areas and those located outside them, with a significant share of the latter being in urbanized and tourist built-up areas.

II.4. Estimates of the physical loss of dune habitats. A quantitative estimate of the anthropogenic pressure on sand dune habitats was made. [B.4-5]

4.4.2. Scientific and applied contributions:

I. Introduction of aerial photogrammetry with unmanned aerial systems for high-precision reconstruction of the surface in the coastal zone. An integrated methodology for aerial photogrammetry with unmanned aerial systems (UAS) for mapping the coastline and sea waters has been developed and applied for the first time for the Bulgarian coast. In addition to the traditional filming of the surface relief, success has been achieved in mapping underwater structures at a depth of up to 4-5 m, depending on the conditions of the sea water. The photogrammetry is supplemented by control echo sounder measurements, through which the standard error and deviations can be reduced [B.4-3], [B.4-4], [B.4-5], [B.4-6], [B.4-7], [D.7-1], [D.7-5], [D.7-6], [D.7-7], [D.7-9], [D.7-11], [D.7-27], [D.7-28], [D.7-29], [D.8-1].

II. Multidisciplinary studies of coastal lakes [G.7-2], [G.7-7], [G.7-8], [G.715], [G.7-22], [G.7-25].

III. Combining remote sensing and geophysical methods in geo-archaeological studies of the Bulgarian Black Sea coast and shelf [G.7 5], [G.7-28], [G.7-30], [G.7-31], [G.8-1].

IV. Determination of type-specific reference hydro- morphological conditions in Bulgarian coastal waters in support of marine ecological management [G.7-10], [G.7-17].

V. The study of hydrodynamic conditions and the management of the risk of sea floods [D.7-18], [D.7-21], [D.7-23], [D.7-26], [D.7-32].

VI. Monitoring and space-time dynamics of the coastline [B.4-5], [B.4-7].

VII. The development of strategic documents for the Republic of Bulgaria in the field of nature protection. Within the framework of a normative document, a standardized procedure for geomorphological mapping of dune landforms has been introduced, combining remote sensing methods, sedimentary, morphometric analyses and morphogenetic classification, based on the first comprehensive mapping of our Black Sea dunes [B.4-5].

5. Estimates of the candidate's personal contribution-From the materials presented in the competition, it can be categorically stated that they are the work of the candidate, Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov, or were developed with his active participation. No plagiarism has been established.

6. Critical remarks. The contributions should be formulated more briefly and clearly. The telegraphic style of reporting with a few sentences is most often used, regardless of the huge amount of work done by the candidate, on the basis of which the claims for scientific and scientific-applied contributions are formed. Some of the contributions should be combined (example II.3 and II.4. can be combined)

7. Personal impressions I have formed a positive opinion of the materials presented in the competition and of the participation of Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov in scientific sessions at conferences and other scientific forums.

8. Conclusion:

Considering the above, I believe that the candidate, Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov meets the criteria for holding the academic position of "Associate Professor" at the Institute of Oceanology - BAS. **I give my positive estimates and propose on Ch. Asst. Prof. Dr. Bogdan Kirilov Prodanov to be selected as an "Associate Professor"** in the professional field 4.4. "Earth Sciences"; Scientific specialty: " Geology of the oceans and seas "; Scientific field: " Geological-geomorphological mapping and monitoring of the coastal zone ",