

TO: CHAIRMAN OF SCIENTIFIC JURY
ON COMPETITION FOR ACADEMIC
POSITION "ASSOCIATE PROFESSOR"
AT SRTI BAS,
PROF. DR. EVGENIA RUMMENINA

ИНСТИТУТ ЗА КОСМИЧЕСКИ ИЗСЛЕДВАНИЯ И ТЕХНОЛОГИИ - БАН
Вх. № 315 14.04.2020

REVIEW

by

Prof. Dr. Mariana Nikolova

National Institute of Geophysics, Geodesy and Geography at BAS, Geography Department,
GIS section,

member of the jury in a competition for the occupation of the academic position "Associate Professor", announced in the State Gazette. 98 by 13.12.2019 from the Institute for Space Research and Technology-BAS in the field of higher education 4. Natural sciences, mathematics and informatics, occupational strand 4.4 Earth sciences, Scientific specialty "Remote sensing of the Earth" for the needs of section "Remote sensing and GIS" with candidate Dr. Alexander Georgiev Gikov.

The review was written in accordance with the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Regulations for its implementation, Regulations on the Terms and Conditions for Acquiring of Academic Degrees and Occupation of Academic Positions at the Bulgarian Academy of Sciences, and the Regulations for the implementation of the DASRBA in SRTI BAS, pursuant to a decision by a Scientific Jury appointed by Order No 16/24.01.2020 of the Director of SRTI BAS and Protocol No. 1 of the meeting of the Scientific Jury.

Details of the candidate

Alexander Georgiev Gikov is the only candidate in the competition. He is certified in Geologo-geographic Faculty of Sofia University "St. Kliment Ohridski" in 1995. In 2018 he defended his doctoral thesis in "Remote Sensing of the Earth and the planned" in the SRTI BAN. In 2003, he started working at the Institute for Space Research and Technologies at BAS as a specialist. From 2003 to 2010 he held the position of researcher III-I degree, and since 2011 he is a senior assistant at the same institute. The candidate speaks Bulgarian,

English and Russian. During this period, he enriched his scientific qualification in the field of physical geography and accumulated extensive experience in the application of Geoinformatics for Environmental Research (geographic information systems and processing of aerospace data). As a member of the scientific knee of SRTI, the applicant takes part in a total of 22 research projects, of which 5 are financed by the National Research Fund, 10 are financed in frames of international cooperation (bilateral and European programmes) and others are under other treaties. Aleksandar Gikov is a member of the European Association of Distance Research Laboratories (EARSeL) and the Bulgarian Geographic Society. He has won the award of the BAS "Academician Kiril Serafimov" for a young scientist for 2002 and the honorary sign and diploma for merit and contribution in space research on the occasion of the 40 anniversary of the Institute for Space Research (now SRTI) at BAS.

Research activity

The candidate is the author of 60 scientific publications, from which in the competition he participated with 34 scientific publications. Of these, 8 were developed independently and the rest were co-authored. There are no declarations for the distribution of the copyright in the articles and therefore we accept it as equivalent. Apart from this there is a list of 4 publications, which he has used in a competition for his "Doctor" degree. The Summary of the thesis work of the candidate on the topic "Mapping and analysis of modern landscapes in Rila Mountain through GIS and remote methods" is applied with index A _1 in the list. Equivalent to monographic work are 10 publications from the list indexed as B4_1, B4 _ 2, B4 _ 3, B4 _ 4, B4 _ 5, B4 _ 6, B4 _ 7, B4 _ 8, B4 _ 9 and B4 _ 10, with a total volume of 107 pages.

In the list of articles on the competition for the scientific title "Associate Professor" there are two articles under the numbers B4_5 and G8 _ 1, on which the reviewer is co-author of the candidate and therefore they will not be subject to peer review here. Thus, for review remain 32 publications - 9 publications from the category "Refereed to the World databases of scientific information WoS and SCOPUS" and 23 of the category "scientific publications in non-referenced journals with scientific review or in edited collective volumes". The quotation report shows that 7 publications are quoted 14 times in scientific journals. Of them, quotations in referable and indexed in world-famous databases with scientific information or in monographs and collective volumes are 11 and the quoted works are 4 (G8 _ 5, G8 _ 16, G8 _ 22, B4 _ 4). Quotations in non-referenced journals with scientific review are 4 and the cited publications are 3 (G8 _ 5, G8 _ 16, G8 _ 22).

We have identified a clerical error in the table from the performance report of the minimum national requirements concerning the group of indicators below index D (cited). The table indicates that according to the minimum requirements it takes 100 points, and according to the requirements of BAS it takes 60 points. In fact, the requirement for the academic position "Associate Professor" is 50 points, according to the law, which for BAS are inflated at 60 points. With this clarification, we can confirm that the national requirements for the scientific title "Associate Professor" (art. 2b, para. 2 and 3, respectively the requirements of article 2b, para. 5) are fulfilled by the applicant.

The scientific production of Dr. Aleksandar Gikov can be reached by three thematic groups.

The first group concerns the methodology for application of geo-information technologies and landscape methods in the research of the natural environment. In this group are published publications reflecting the results of landscape and eco-system investigations, from climate studies and studies on periglacial processes.

Dr. Gikov applies remote methods and methods from Dendroclimatology to study the changes in mountain ecosystems in selected areas of North Pirin and Rila (B4 _ 1, B4) and explores the changes in modern landscapes (G8 _ 2) and in the pollen accumulations from the Phagus in the mountainous regions of some of the countries in Europe (B4 _ 3). In the region of the Central Balkan (Beklemeto area) is applied the InVEST model for carbon content assessment, validated on the basis of data from nine experimental points with different land use classes (B4). A GIS-based model of the spatial distribution of the values of the climatic elements in mountainous territories was developed. The model is applied for landscape differentiation through climatic indices for model territories in Western Bulgaria (G8 _ 4). Based on the analysis of the land cover and the classes of CORINE, an assessment and mapping of the degree of the anthropogenic pressure on the landscapes (G8 _ 9) was carried out. A spatial analysis of the geochemical background in the upper part of the River basin is carried out through the GIS for Cu, Pb, Zn, Co, Mn, by establishing exceedances of concentrations for Pb (G8).

Research on relict glacial complexes through the application of "Cosmogenic nuclide dating (^{10}Be)" on the glacial material from Rila confirms that the greatest development had glaciers during the last Glacial maximum (B4 _ 4). Another part of the publications presents the results of a study of the small glaciers/snowmen in the mountains of the Balkan peninsula, such as indicators for short-periodic climate fluctuations (B4 _ 8). Identification of 27 relict

stone glaciers in Rila and 55 in Pirin using aerospace imaging SPOT (G8 _ 16, G8 _ 22) was done.

The second thematic group in the publications of the applicant refers to the application of geoinformation technologies for environmental risk studies. Photogrammetric treatment are used for assessment of the horizontal movements of large landslides in the Eastern Rhodopes, which are mapped (B4 _ 6). Aero and satellite images WorldView-1 were used with a resolution of 0.5 m to determine the horizontal movement of the landslide at General Geshevo in the Eastern Rhodopes and for this purpose was created four stage algorithm (G8 _ 17, G8 _ 20). A map of the deformations and the main elements of the landslide was created and a model of its formation (G8 _ 19) was proposed.

The deformation rates of the landslide were investigated at the Orinovo (Simitli) in 2009 for a period of 168 days with repeated GPS measurements and significant movements of 13 to 40 cm/day were found (G8). The connection between the seasonal activation of the landslide and precipitation based on data from the stations in Rila and Sandanski (G8) and the role of slope declination (G8 _ 21) was established. Geo-information technologies have been implemented to assess the dangers of earthquakes in the northern foothills of the Rila and Rhodope Mountains and there has been an increased likelihood of such events in The Fault Zone Sestrimo (G8). Geoinformation technologies were used to assess damage from the tornado event on 22 May 2001 year at Vitosha and damage area was calculated (affected were 75.4 ha / 28 000 m³ timber) (G8).

Maps of fire-stricken territories in Rila (2000) generated on the basis of satellite images KOMPSAT-2, Quick-Bird 2 Landsat-5, Landsat-7, ASTER (G8 _ 11, G8 _ 12, G8 _ 13, G8 _ 14) were created. Used were satellite images with medium resolution to assess the area affected by the fire at Vitosha in 2012 in the reserve "Bistrishko Branishte". The assessment was performed by visually decrypting the images and using the spectral indices dNBR and RdNBR (G8 _ 23).

The third group of publications is focused on the application of GIS and remote methods in mapping. An algorithm for image processing is presented for the creation of large-scale landscape maps (G8), as well as for creating a spatial database for the Mesta River Basin (G8 _ 3). A model of a scientific and informational complex has been developed with thematic processing of satellite and sub-satellite databases for seven test areas in Bulgaria for Global Monitoring for Environment and Security (GMES), presented in collective work by 13 authors (G8 _ 10). The application of satellite data in agriculture and landscape-environmental

monitoring is presented in an overview article (G8), which gives an idea of the wide application of these data in a very wide range of research interests.

The types of crops in Bulgaria are classified based on data from PROBA-V 100 m and normalized vegetation index (NDVI) (B4 _ 9). A methodology for verifying and validating the types of crops has been developed. On the basis of satellite data from Sentinel-2 (S2) a mapping of the types of agricultural crops in the country and in two model areas was achieved, with an accuracy of 74 to 95% after further processing (Q4 _ 10).

The research activity of the candidate is distinguished with profound interest in the field of Geoinformation technologies and search for new methods and technical solutions for their application for achieving new scientific results, as well as with practical purpose. Essential is the contribution of the applicant to the improvement of the methods of application of the geoinformative ICT in the environmental studies and in particular of the geographic studies in the field of Landland ecology, climatology, geoenereology, environmental risk research and cartography. The study of dangerous natural phenomena and processes is dedicated to about 47% of the publications submitted for review. They are distinguished by originality of the research approach, application of geoinformation Technologies, field tests for verification, precision of the results obtained and quick reaction of the izsedovatelâ in response to specific events with increased public interest to them. The results presented in the publications sufficiently support the scientific and scientific-applied contributions mentioned in the author's report and we accept them.

Recommendations

Given the long-standing research experience of Dr. Aleksandar Gikov and his work on a number of major national and international projects, we recommend systematization of the results of his work in a monographic book.

We also recommend greater rigour to the editions in which the applicant publish his scientific results in order to have a broader resonance in the international scientific community and to increase the opportunity to be cited.

Conclusion

From the review of the competition materials and the verification made, no violations of the procedure were found. The requirements of the DASRBA and rules of its application, as well as those of тхѐиrc application in SRTI have been complied.

The minimum requirements for the occupation of the academic position "Associate Professor" in accordance with the regulations for acquisition of scientific degrees and occupation of academic positions in BAS, respectively of the requirements of art. 2b of the DASRBA. According to the presented report for implementation of the minimum requirements and the inspection carried out, Dr. Aleksandar Gikov has a total of 583.3 points for the required to occupy the post in BAS 430, exceeding the mandatory minimum for each of the groups of indicators B, D and E. The presented scientific production for participation in the competition is in sufficient volume, at a high scientific level, contains scientific and applied contributions and does not include publications presenting the result of his doctoral thesis.

Based on these conclusions and the compliance of the competition documents with the requirements of the DASRBA, I give a positive assessment of the scientific works presented for the competition and I recommend to the Scientific Jury to select Dr. Aleksandar Gikov for the academic position "Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, occupational strand 4.4 Earth sciences, Scientific specialty "Remote Sensing of the Earth" for the needs of section "Remote Sensing and GIS" at the Institute for Space Research and Technologies – BAS.

14.04.2020

Sofia

Compiled by:


Prof. Dr. Mariana Nikolova

