

REVIEW

**Prof. DSc Ekaterina Batchvarova, corresponding member of BAS
Member of scientific jury for competition for the position "Associate Professor"
in professional field 4.4. Earth Sciences**

This review was prepared on the basis of the Order of the Director General of NIMH No. ND-04-21/23.08.2021 and the decision of the meeting of the scientific jury of 15.10.2021. It is tailored to the Law on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for its implementation (PPZRASRB) and the NIMH Rules on ZRASRB.

I. Requirements to the candidate

Art. 24 (1) and 26 (1), (2) of ZRASRB; Art. 53 (1) and 54 (1) of PPZRASRB and Art. 53 (1) and 54 (1) of NIMH Rules on ZRASRB

Chief assistant professor Dr. Lilia Bocheva graduated from the Faculty of Physics specialization "Meteorology" at Sofia University "St. Kliment Ohridski" in 1992. During 2014 she completed a PhD study at NIMH on Climate Variability and assessments of hazardous meteorological events related to convective storms in Bulgaria (1961-2010), and the PhD study started in 2009. At NIMH she worked on a number of positions starting from Technician-Meteorologist (1993-1997), passing through chief assistant since 2007 and reaching Director of Department Meteorology since 2020. Her research interests during these almost 30 years are in the fields of climate change, convective storms, hazardous meteorological events and Mediterranean cyclones and are based on archived and operational meteorological information.

After thorough reading of the submitted to the competition documents, I assume that all requirements of ZRASRB and of the regulations for its implementation for the academic position "Docent" are fulfilled. There are no oversights in the procedure and the documents. There are two papers from the period and on the topic of the PhD (papers 4 and 5 in Г 8 4), but they have not been included in the publications of the thesis.

II. Requirements for research and development activities

Art. 24 (1) items 1, 3, 4, 5 and Art. 26 (1) of ZRASRB; Art. 53 (1) items 1, 3, 4, 5 and Art. 54 of PPZRASRB; and Art. 53 items 1, 4, 5, 6, 7 of NIMH Rules on ZRASRB

Chief Assistant Professor Dr. Lilia Bocheva has correctly prepared the necessary information on the indicators defined in the ZRASRB, necessary for the academic position of "Associate Professor", and in her scientific output has included only articles that are not part of the doctoral dissertation, although chronologically before or in the period of part-time doctoral studies.

SUMMARY TABLE

FOR THE VOLUME AND TYPE OF SCIENTIFIC PRODUCTION under Art. 1a (1) and (2) of PPZRASRB and Art. 2 (4) of the Rules of the NIMH for implementation of ZRASRB

of Lilia Ivanova Bocheva, according to her assessment:

Group requirements	For competition for the academic position "Associate Professor"	
	Number of points of the candidate	Required number of points
A	50	50
Б		-
B	189.5	100
Г	204.3	200
Д	100	50
E		-

The publications by groups of indicators are correctly classified by categories and the points are in accordance with the number of authors. In group "B" are given exactly 10 articles from the period before (2007 - 2010) and after (2015-2020) the doctoral studies, all in English. In group "Г" 4 scientific publications in journals that are referenced and indexed in the world databases of scientific information are listed and 16 scientific publications in non-refereed journals with scientific review or in edited collective volumes. Among the

latter, there are 2 publications (Group "Г" 8 articles 4 and 5 in the Reference for minimum requirements), which are included for review in this competition and are on the topic and during the period of the doctoral thesis, but were not included in it. In Group "Г", only 4 of the publications are in Bulgarian, but 8 of those in English are in a Bulgarian journal or conference proceedings. In two of the presented 30 publications Dr. Bocheva is the sole author, and the rest are co-authored with different number of and different colleagues, depending on the topic of the publication.

In the table above, Dr. Bocheva has filled in 100 points out of the 24 proven citations, and in the citation report the value is 120. In both cases the minimum requirements have been met.

One of the first topics that Dr. Bocheva has been working on and publishing since 1995 is the study of the characteristics of Mediterranean cyclones. The main conclusions are based on comparative analyzes of the frequency and paths of Mediterranean cyclones over Bulgaria in the last two decades of the 20th century in her research and previous studies of Bulgarian scientists and foreign scientists working on data from numerical models. A change of the trajectories of these cyclones is noted. These analyzes are of practical use, as they also provide an assessment of the hazardous or dangerous meteorological phenomena on the territory of Bulgaria related to the passage of Mediterranean cyclones. Dr. Bocheva lists 3 of the submitted publications on this topic (B-1 of 2007, Г8-1 of 1995 and Г8-2 of 2005).

An unchanging topic in the research of Dr. Bocheva, to which 6 of the publications submitted to the competition are dedicated (3 and 10 from group "B" and 7-1, 7-4, 8-5 and 8-6 from group "Г"), are the potentially dangerous precipitations in Bulgaria, defined as a precipitation amount greater than or equal to 60 mm / 24 h. In the publication 10 of group B (Bocheva L., Malcheva K., 2020. Climatological assessment of extreme 24-hour precipitation in Bulgaria during the period 1931-2019. Proceedings of the 20th International Multidisciplinary Scientific GeoConference SGEM 2020, Vol. 20, Iss. 4.1, pp. 357-364) assessments of the characteristics of these precipitations by climatic regions for a period of 90 years are made, and the values for three different 30-year periods 1931-1960, 1961-1990 and 1991-2019 are compared. It is interesting to note that the average number of days with potentially dangerous precipitation for these periods does not change significantly in northern and much of southern Bulgaria and is about 2 days per year; increased from 3 during the first period to 4.5 during the second one and 5.5 during the last period for a large part of Southern Bulgaria, for South-Eastern Bulgaria and the Black Sea coast; increases from 2 to 4 and then decreases to 3 days per year from the first to

the last period for Southwestern Bulgaria. Other works have examined the synoptic conditions leading to potentially dangerous precipitation for large areas of the country according to data for the period after 1991. Dr. Bocheva's positions in the NIMH have allowed a gradual increase in the periods of research, which may lead to different conclusions in her publications from different years. The inclusion of new software products in recent publications is also notable.

In three articles from group "B" and two from group "Г" the spatio-temporal characteristics of thunderstorms for the whole territory of the country are presented and some climatic assessments are made, respectively for the periods 1961-2006 and 1961-2010. The frequencies of hail precipitation for different parts of the country have been estimated, and a 100-year period has been analyzed for Sofia. Such important characteristics as duration, frequency and intensity of hail are summarized. The occurrence and dynamics of powerful convective storms associated with torrential rains, strong winds and destructive hail are analyzed.

Two articles from group "B" and five from group "Г" are devoted to the topic of the doctoral dissertation and complement the statistics and analysis of tornadoes and water sprouts in Bulgaria, registered after 2010, and for each of them a number of thermodynamic characteristics and indices of instability and additional information was collected. It should be noted that with the development of information and communication technologies, the occurrence of these phenomena has increased in the last 20 years – citizens report and describe such events in different media, as the networks of stations are not dense enough to provide coverage for the registration of these phenomena on a local scale.

One article from group "B" and one from group "Г" show a cooperation of Dr. Bocheva with colleagues from biological sciences; two other articles are related to the study of the snow cover regime in Bulgaria; several are devoted to the study of the temperature regime and several to the meteorological features of specific years and periods.

In her documents, Dr. Bocheva presents 24 citations of her work, such as the article Simeonov P., Bocheva L., Gospodinov I., 2013. On space-time distribution of tornado events in Bulgaria (1956-2010) with brief analyzes of two cases. *Atmos. Research*, Volume 123, 61-70 has the most - 7 citations, and the article Bocheva L., T. Marinova, P. Simeonov, I. Gospodinov, 2009. Variability and trends of extreme precipitation events over Bulgaria (1961- 2005). *Atmos. Research*, Volume 93, Issues 1-3, 490-497 - 5 citations.

Both articles are included in the doctoral dissertation and are not submitted to this competition.

The second article from group "B" (Simeonov P., Bocheva L., Marinova T., 2009. Severe convective storms phenomena occurring during the warm half of the year in Bulgaria (1961-2006). Atmos. Research, Volume 93, Issues 1-3, pp. 498-505) has received 6 citations in world databases.

According my search, in the Web of Science database, Dr. Bocheva has 13 registered publications, 80 independent citations and h=5.

Due to the fact that the indicators from group "E" related to the management and participation in research projects are not among the mandatory minimum requirements for the academic position "Associate Professor", evidence for them is presented in a separate file. Dr. Bocheva has managed one project funded by an external company and one internal. She participated in many projects lead by other scientists always providing data and their analysis, which was possible because of her positions over the years related to digitization, control, archiving and processing of all types of meteorological information at NIMH.

In her documents, Dr. Bocheva formulated 4 research contributions related to the 1 - climatology of Mediterranean cyclones, 2 - dangerous rains, 3 - thunderstorms and 4 - the phenomena of tornadoes and water sprouts. After a detailed acquaintance with the publications submitted for the competition, I support these formulations.

Dr. Bocheva classifies as Scientific and Applied Contributions her work in the section Remote Sensing Methods in the Department of Forecasts and on the operational processing, control and input of archival and operational meteorological information. These positions have given her access to the data that underpins all research and publications. My personal impressions are that she really used and uses her scientific experience to improve the organization of the operational work at NIMH.

III. Opinions, recommendations and notes

The documents for the competition have been prepared correctly and comprehensively, for which I congratulate Dr. Bocheva.

In the Summarized table for the volume and the type of the scientific production under Art. 1a (1) and (2) of PPZRASRB and Art. 2 (4) of the Rules of NIMH for implementation of ZRASRB, Dr. Bocheva has filled in 100 points in group „Д“, corresponding to 20 citations. There are 24 independent citations in the citation list, corresponding to 120 points. In both cases the minimum requirements are met, but this is a small mistake that has to be noted.

Conclusion

The examination of the submitted materials for the competition did not reveal any violations in the procedure. The requirements of Art. 24 (1), items 1, 3, 4, 5, (2) and Art. 26 (1) of ZRASRB; Art. 53 (1), items 1, 3, 4, 5 and Art. 54 of the PPZRASRB; as well as Art. 53, items 1, 4, 5, 6, 7 and Art. 54 of the NIMH Regulations on ZRASRB are met.

Based on the acquaintance with the documents submitted by the candidate for the competition Chirf Assistant Professor Dr. Lilia Bocheva, I believe that she has every reason to take the academic position of "Associate Professor" - I give a strong positive assessment of her participation in the competition and I will vote positively for her.

Date: _____

MEMBER OF SCIENTIFIC JURY: _____