UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Instituto de Ingeniería del Agua y Medio Ambiente

grupo de HIDROGEOLOGIA

REVIEW

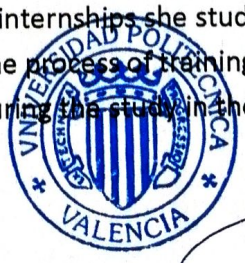
of foreign scientific supervisor, PhD, Professor Javier Rodrigo Ilarri,
for the PhD dissertation of **Rysmagambetova Aina Akanovna** titled **«Assessment of the boron pollution dynamics of the groundwater and surface water of Ilek river valley»**,
provided for the degree of Philosophy Doctor PhD in specialty «6D060800-Ecology»

PhD dissertation by Rysmagambetova A.A. is devoted to the identification of dispersed wedging processes by local sources in modeling the spread and transport of pollution in the Ilek River. This original work has been performed at a high research level and it is a complete scientific research. The purpose of the thesis is to identify the characteristics of fate and transport of boron in groundwater in the Ilek River Valley.

The PhD degree applicant has successfully completed the research planned tasks. She has performed hydrodynamic calculations based on regime observations of pinch-out of groundwater contaminated with boron into the Ilek River. She has constructed a turbulent diffusion computational mode and has conducted numerical experiments on the dilution of contaminated groundwater that squeezed out into the Ilek River with different formulations of the plane turbulent diffusion problem. Self-cleaning processes of the Ilek River have been evaluated. The biological role and influence of boron on the human body is shown. Besides, the insufficiency of the ecological capacity of the Ilek river is substantiated even with a 95% runoff supply volume.

The research work pays much attention to the study of groundwater pollution processes using the multivariate statistics methodologies and principle component analysis. Interesting results were obtained on the change in the nature of migration processes as the role of individual sources of groundwater pollution decreases.

It is useful to note, that in the framework of a PhD doctoral dissertation Rysmagambetova Aina had a scientific internship at the Universitat Politècnica de València (Valencia, Spain) under my supervision, from September 15th to October 30th, 2017, and from March 1st to April 15th, 2019. During these internships she studied the basic hydrogeological parameters for groundwater modeling. In the process of training, she developed the ability to analyze and present the results obtained during the study in the form of completed research and development.



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Based on a joint analysis of the available materials on the hydrogeochemical situation of the object of study, it was proposed to create a three-dimensional finite-difference model of groundwater movement using MODFLOW. However, due to the lack of detailed geological and hydrogeological information on the territory of the Ilek River Valley the model development could not be completed.

Overall, PhD dissertation of Rysmagambetova Aina Akanovna contains significant research material, based on versatile approaches to solving the tasks. It should be noted the personal contribution of the dissertation author to the development of the provisions and results put forward for oral presentation, having good theoretical justification and practical confirmation. I fully recommend this PhD dissertation for public presentation defence. The PhD dissertation is logically organized, completed, and certainly, meets the requirements for the degree of PhD in Ecology.

Valencia, December 6th 2019

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