Brief information about the project

Title	AP22686414 «Investigating the influence of meteorological factors on $PM_{2.5}$ concentrations in Almaty, analysis of urban pollution transport using WRF-CHIMERE»
Relevance	Air quality degradation in Almaty, characterized by elevated $PM_{2.5}$ concentrations, poses a pressing challenge both for human health and the surrounding environment The formation of pollution episodes is linked to meteorological factors, emphasizing their crucial role in exacerbating air quality issues. Thus, this project aims to assess the underlying factors driving $PM_{2.5}$ pollution episodes in Almaty and the impact of the episodes on the surrounding mountain environment. The objectives of the project will include analysis of $PM_{2.5}$ pollution episodes, and evaluation of the influences of meteorological factors, specifically temperature inversions. Moreover, the evaluation of how $PM_{2.5}$ pollution in Almaty affects the unique surrounding mountain environment, including glaciers will be conducted. For this, the study will employ advanced modeling techniques, specifically the WRF-CHIMERE modeling system, to simulate and assess the dynamics of $PM_{2.5}$ pollution. After validating the model's efficacy in simulating meteorological background and $PM_{2.5}$ concentrations, a detailed analysis will be undertaken to comprehend the interaction between the pollutants and the distinctive topography such as mountains. The study's findings are expected to advance our understanding of the complex interactions between urban air pollution, meteorological conditions, and mountainous environments. Moreover, the results can also be used to develop both local and regional air quality management strategies and policies.
Goal	The goal of the project is to enhance our comprehension of the influence of meteorological parameters on $PM_{2.5}$ concentrations in Almaty city and the impact of urban pollution on surrounding mountain areas, including glaciers.
Tasks	The expected results will comprise a minimum of two publications in peer-reviewed international scientific journals ranked within the top three quartiles based on the impact factor in the Web of Science database or with a CiteScore percentile in the Scopus database not less than 50. The following journals may be considered for submission: Atmospheric Environment, Aerosol, and Air Quality Research. Each article will contain information about this grant as the source of funding. The results of this project will be disseminated among potential users, the community of scientists, and the general public. In the final year of the project, university-level seminars will be organized to disseminate the main findings. Additionally, the project's outcomes will be published in

	international journals and presented at international conferences.
Expected and Achieved Results	1. Analysis of $PM_{2.5}$ pollution episodes and study of the influence of meteorological parameters. 2. Evaluation of the effectiveness of the integrated WRF-CHIMERE system in modeling meteorological parameters and $PM_{2.5}$ concentrations. 3. Analysis of the impact of air pollution in the city of Almaty on the environment (mountain system) using the WRF-CHIMERE model.
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Publications list with links to them	In progress
Patent information	not planned