



THE HONG KONG
POLYTECHNIC UNIVERSITY
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FACULTY OF CONSTRUCTION AND LAND USE
DEPARTMENT OF LAND SURVEYING AND GEO-INFORMATICS
建設及地政學院
土地測量及地理資訊學系

REVIEW

of the foreign scientific consultant on the dissertation work
«Assessment of the state of mountain cryosphere components using satellite technologies»
by **Serik Nurakynov**
submitted for the degree of Doctor of Philosophy (PhD) specialty 6D071100 – Geodesy

Nurakynov S.'s dissertation is devoted to studying the state of the mountain cryosphere components of the Zhetysu Alatau using satellite technologies. The study allows obtaining new information on the dynamics of the glacier area changes, the position of the cryolithozone line, and changes in mass balance in the hard-to-reach areas. The research also contributes to effective water resource management and mitigating the negative consequences of emergencies under climate change.

The novelty, practical significance, and structure of the presented dissertation by Nurakynov S. are reflected in the following articles:

- The First Inventory of Rock Glaciers in the Zhetysu Alatau: The Aksu and Lepsy River Basins
- Examination of the accelerated glacier area loss in the Zhetysu (Dzhungar) Alatau Range (Tien Shan) for the Period of 1956-2016
- Application of Artificial Intelligence in Glacier Studies: A State-of-the-Art Review
- Assessment of glacier mass balance changes using remotely sensed earth observation data (in Kazakh)

The candidate generated an inventory of glaciers and rock glaciers in all seven river basins of the Zhetysu Alatau mountain range. Digital data catalog of rock glaciers in Zhetysu Alatau was compiled for the first time. Rock glaciers were classified according to their displacement rate calculated using Small Baseline Subset (SBAS) InSAR technology. The mass balance of glaciers in the entire Zhetysu Alatau was calculated using high-resolution remote sensing data. A scientific and methodological framework for studying the state of the Zhetysu Alatau cryosphere using satellite technologies has been developed.

The methodology and the reliability of the results obtained were presented at high-level scientific conferences and published in scientific journals.

During his dissertation work, Nurakynov S. proved himself a competent researcher, well-versed in the research topic. He successfully completed a scientific internship at The Hong Kong Polytechnic University under my supervision.

The work fully complies with the requirements of the Science and Higher Education Quality Assurance Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan for PhD dissertations in the field of "6D071100 - Geodesy".

**Foreign Scientific consultant,
Dr., Chair Professor of Geomatics**

The Hong Kong Polytechnic University
2024

— DING Xiao-li 12 Dec.

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