

To whom it may concern

Date: 12 April 2024

Letter of Recommendation for Zhihao Liu

Zhihao Liu was supervised by me for his M.Sc. thesis at the Department of Geosciences, University of Oslo. Within his thesis “Snow depth retrieval and downscaling using satellite laser altimetry, machine learning, and climate reanalysis”, Zhihao combined datasets with complementary information in an innovative and smart approach to generate high-resolution snow depth maps. His approach addresses an important unsolved problem in hydrology, as snow volumes are notoriously difficult to observe or model.

During the time he worked on his thesis, Zhihao has shown a very high degree of independence, strong motivation and persistent commitment. He has a solid programming background, is learning fast and actively seeking new solutions for problems he encounters on his way. Consequently, working with Zhihao increasingly resembled the supervision of a Ph.D. candidate rather than a M.Sc. student. His ambitions quickly expanded beyond the original, much more narrow scope sketched out in the thesis proposal, guided by insights he gained from working with the data. Both the inclusion of climate reanalysis data and the chosen machine-learning approach were ideas Zhihao had himself, resulting in a considerably more complex workflow than anticipated. The developed methods, scope, results, and workload included in his thesis clearly exceeds what is expected from MSc students at the University of Oslo.

Currently, Zhihao is working on a scientific journal publication of his thesis that will contribute to the SNOWDEPTH project funded by the Norwegian Research Council. Notably, as part of the methods developed for his thesis, Zhihao made a substantial contribution to the open-access python package xdem by adding the possibility to spatially co-register sparse elevation point clouds with digital elevation models (DEMs), which has since been used by several researchers at UiO.

As a highly motivated and skilled student, I can absolutely recommend Zhihao for a Ph.D. position in remote sensing, spatial data analysis/modelling or a related field, and am happy to provide further details upon request.

Sincerely yours



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