



Supplement of

A continuous 6000 a age depth relationship for the remainder of the Weiβseespitze summit glacier based on ^{39}Ar and ^{14}C dating

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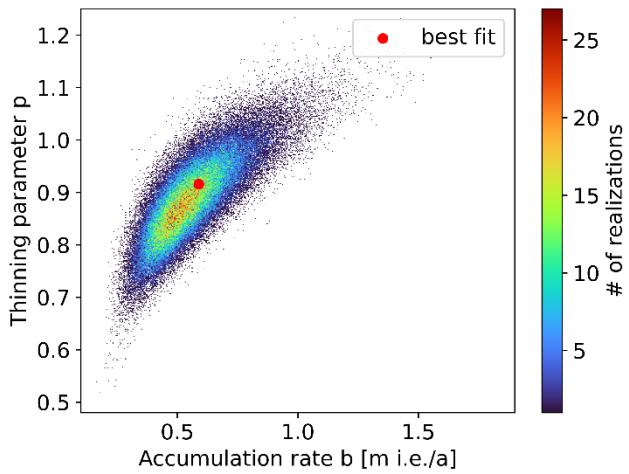
Supplementary Information



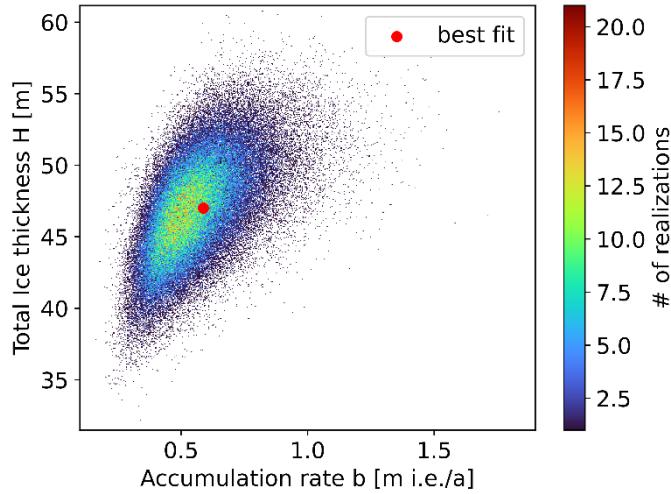
5 **Figure S1: Aerial photos taken from the WSS summit region from August 2024. (a) from NE (b) from SE**



Figure S2: Photo of the summit region of the WSS summit glacier. The uniformly appearing dust layer due to ablation indicates the homogeneous common depth horizon across the summit region. Photo taken by A. Fischer.

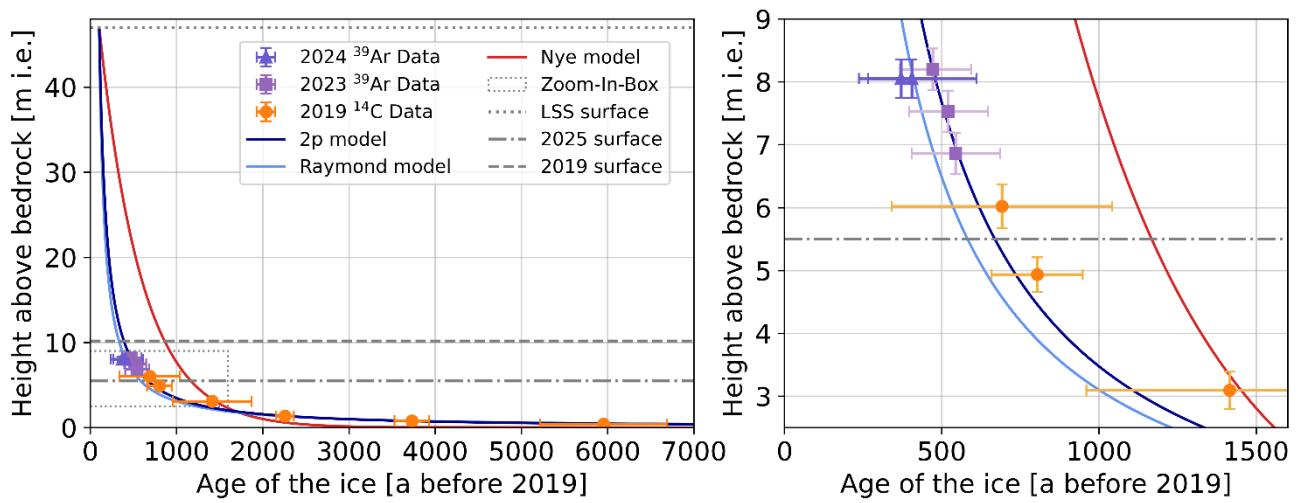


10 **Figure S3:** Parameter distribution of the 10^5 MC realizations of the 2p model. The best fit was obtained by fitting the measured values, while all other realizations stem from MC sampling from the age distributions and the variation of the LSS parameters. The best fit results are not in the center of the cloud of the MC sampling. We attribute this to the correlation of the parameters of the 2p model, undersampling has been ruled out. Please note that this deviation is within the 1σ uncertainty of the parameters (compare Table 3, main text).



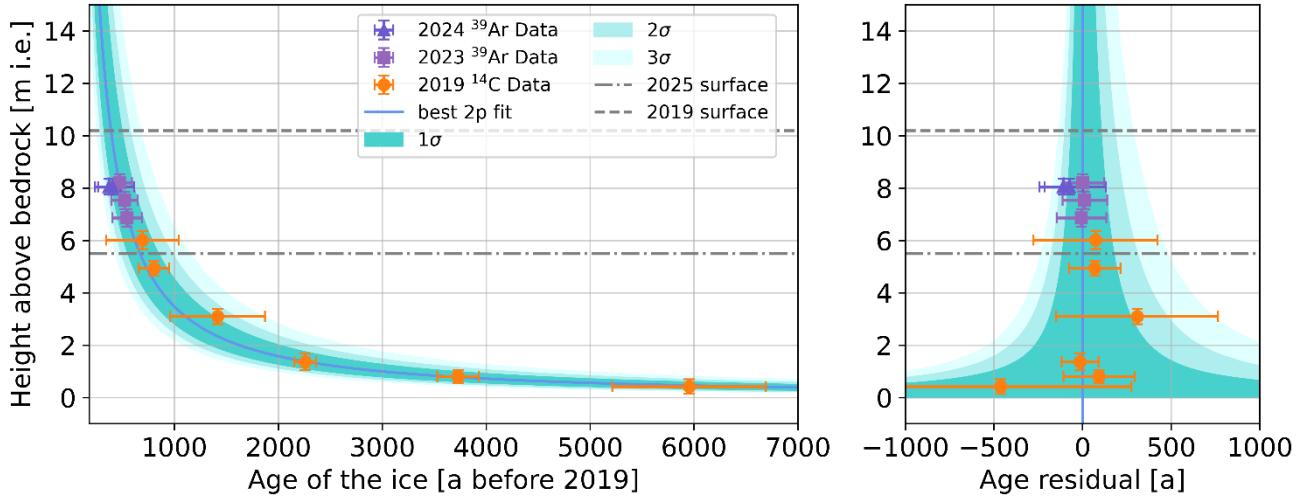
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Figure S4: Parameter distribution b vs. H of the 10^5 MC realizations of the 2p model. The best fit was obtained by fitting the measured values, while all other realizations stem from MC sampling from the age distributions and the variation of the LSS parameters.



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Figure S5: Plot of the best fits of the different models and age data points vs. their height above bedrock (in meters ice equivalent) considering the proposed ^{39}Ar half-life by DEAP Collaboration, 2025. The maximum of the height axis is set to the last steady state (LSS) from 1914 (47 m ice thickness) and thus the full age-depth profile during the LSS is shown. The left side shows the full profile, the right side shows a close-up view of the younger section. The depth error bars indicate the length of the sample, not the depth uncertainty.



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Figure S6: Plot of the age-depth relationship for the 2p model considering the proposed ^{39}Ar half-life by DEAP Collaboration, 2025. On the right, a residual plot of the model and data points is shown for better visualization. The shaded areas indicate the model age uncertainties obtained from the 1σ , 2σ , and 3σ values from the MC fitting. The depth error bars indicate the length of the sample, not the depth uncertainty.