

Table S1. Details of the dataset

Dataset	Description	Sample number and age	Primer pair and target region	Sequencing platform
Long-term datasets	Franz josef glacier	35 (10-120000 years)	533F_K/515R-NK (V1-V3)	454 Pyrosequencing
	Wilderness sand dune	41 (0-4000 years)	533F_K/515R-NK (V1-V3)	454 Pyrosequencing
Short-term datasets	Austre Lovenbreen glacier	38 (2-142 years)	27F/519R (V1-V3)	454 Pyrosequencing
	Damma glacier	33 (10-110 years)	27F/519R (V1-V3)	454 Pyrosequencing

Abbreviations: 27F/519R: 27F (5'AC-AGAGTTTGATCMTGGCTCAG-3') and 519R (5'-X-AC-GWATTACCGCGGCKGCTG-3')

533F_K/515R-NK: 533F_k (5' -GTGBCAGCMGCCGCGGKAA-3') and 515R_NK (5' -CCGCNGCKGCTGGCAC-3')