Supplement of Solid Earth, 13, 347–365, 2022
https://doi.org/10.5194/se-13-347-2022-supplement

Solid Earth
Open Access

Supplement of

Exhumation and erosion of the Northern Apennines, Italy: new insights from low-temperature thermochronometers

Erica D. Erlanger et al.

Correspondence to: Erica D. Erlanger (ederlanger@gmail.com)

Supplement for SE-2021-96

Supplementary Table 1 Compilation of bedrock AHe cooling ages and sample descriptions.

ID	Method	Lithology	Latitude	Longitude	Sample Elevation (km)	Mean Elevation (km)	Age (Ma)	Error (2σ)	Surface Temperature (°C)	Reference
020620-3	AHe	Macigno Unit	44.122	10.068	0.756	0.383	3.66	0.22	12.19	Fellin et al. (2007)
03AP34	AHe	Macigno Unit	44.066	10.107	0.285	0.340	6.89	1.22	12.40	Fellin et al. (2007)
03AP47	AHe	PseudoMacigno Unit/Apuan autoch.*	44.128	10.259	0.890	0.870	3.60	0.22	9.75	Fellin et al. (2007)
03AP51	AHe	Macigno Unit	44.014	10.380	1.060	0.688	6.85	0.41	10.66	Fellin et al. (2007)
03AP58	AHe	PseudoMacigno Unit/Apuan autoch.*	44.003	10.308	0.305	0.665	5.86	0.35	10.77	Fellin et al. (2007)
03GB04	AHe	PseudoMacigno Unit/Apuan autoch.*	43.974	10.277	0.600	0.440	5.45	0.33	11.90	Fellin et al. (2007)
03GB07	AHe	Macigno Unit	44.124	10.059	0.675	0.356	5.10	0.31	12.32	Fellin et al. (2007)
03GB09	AHe	Macigno Unit	44.162	10.115	0.335	0.546	3.51	0.21	11.37	Fellin et al. (2007)
03GB10	AHe	Macigno Unit	44.177	10.156	0.530	0.656	6.32	0.38	10.82	Fellin et al. (2007)
03RE19	AHe	PseudoMacigno Unit/Apuan autoch.*	44.009	10.315	0.270	0.704	4.04	0.24	10.58	Fellin et al. (2007)
03RE20	AHe	Macigno Unit	44.098	10.326	1.055	0.808	4.74	0.28	10.06	Fellin et al. (2007)
03AP08AB	AHe	Macigno Unit	44.190	10.632	0.880	1.295	3.36	0.20	7.63	Thomson et al. (2010)
03AP12A	AHe	Macigno Unit	44.110	10.735	0.815	1.155	4.65	0.28	8.33	Thomson et al. (2010)
03AP23A	AHe	Macigno Unit	44.129	10.429	0.425	0.709	9.80	0.59	10.56	Thomson et al. (2010)
03AP23B	AHe	Macigno Unit	44.129	10.429	0.425	0.709	6.27	0.38	10.56	Thomson et al. (2010)
03AP28A	AHe	Macigno Unit	44.111	10.529	1.035	0.899	6.60	0.40	9.60	Thomson et al. (2010)
03AP28C	AHe	Macigno Unit	44.111	10.529	1.035	0.899	7.66	0.46	9.60	Thomson et al. (2010)
03AP28D	AHe	Macigno Unit	44.111	10.529	1.035	0.899	6.12	0.37	9.60	Thomson et al. (2010)
03AP29A	AHe	Macigno Unit	44.130	10.542	1.320	1.050	5.33	0.32	8.85	Thomson et al. (2010)
03AP31A	AHe	Macigno Unit	44.142	10.553	1.815	1.131	7.40	0.44	8.44	Thomson et al. (2010)
03AP31B	AHe	Macigno Unit	44.142	10.553	1.815	1.131	5.22	0.31	8.44	Thomson et al. (2010)
03AP51C	AHe	Macigno Unit	44.014	10.380	1.060	0.688	7.92	0.48	10.66	Thomson et al. (2010)
03AP52A	AHe	Macigno Unit	44.084	10.463	0.370	0.582	7.04	0.42	11.19	Thomson et al. (2010)
03AP52B	AHe	Macigno Unit	44.084	10.463	0.370	0.582	7.00	0.42	11.19	Thomson et al. (2010)
03AP52C	AHe	Macigno Unit	44.084	10.463	0.370	0.582	8.01	0.48	11.19	Thomson et al. (2010)
03RE02	AHe	Macigno Unit	44.148	10.438	0.765	0.836	6.85	0.41	9.92	Thomson et al. (2010)
03RE05A	AHe	Macigno Unit	44.188	10.480	1.495	1.138	6.73	0.40	8.41	Thomson et al. (2010)
03RE05B	AHe	Macigno Unit	44.188	10.480	1.495	1.138	5.71	0.34	8.41	Thomson et al. (2010)
03RE05C	AHe	Macigno Unit	44.188	10.480	1.495	0.582	8.10	0.49	11.19	Thomson et al. (2010)
03RE05CD	AHe	Macigno Unit	44.188	10.480	1.495	1.138	9.41	0.56	8.41	Thomson et al. (2010)
03RE05D	AHe	Macigno Unit	44.188	10.480	1.495	0.582	6.37	0.38	11.19	Thomson et al. (2010)
03RE06A	AHe	Macigno Unit	44.201	10.488	1.640	1.194	5.93	0.36	8.13	Thomson et al. (2010)
03RE06B	AHe	Macigno Unit	44.201	10.488	1.640	1.194	6.43	0.39	8.13	Thomson et al. (2010)
03RE12A	AHe	Macigno Unit	44.059	10.767	0.460	0.942	5.87	0.35	9.39	Thomson et al. (2010)
03RE12B	AHe	Macigno Unit	44.059	10.767	0.460	0.942	5.55	0.33	9.39	Thomson et al. (2010)
03RE14A	AHe	Macigno Unit	44.005	10.665	0.840	0.635	5.28	0.32	10.92	Thomson et al. (2010)
03RE14B	AHe	Macigno Unit	44.005	10.665	0.840	0.635	9.95	0.60	10.92	Thomson et al. (2010)
03RE7	AHe	Macigno Unit	44.200	10.676	1.600	1.214	2.88	0.17	8.03	Thomson et al. (2010)
03RE7R1	AHe	Macigno Unit	44.200	10.676	1.600	1.214	3.14	0.19	8.03	Thomson et al. (2010)
03TH02	AHe	Macigno Unit	44.086	10.568	0.979	0.881	6.70	0.40	9.70	Thomson et al. (2010)
03TH02B	AHe	Macigno Unit	44.086	10.568	0.979	0.881	7.51	0.45	9.70	Thomson et al. (2010)
03TH12B	AHe	Macigno Unit	44.080	10.600	0.678	0.904	4.27	0.26	9.58	Thomson et al. (2010)
03TH13A	AHe	Macigno Unit	44.013	10.593	0.153	0.578	8.18	0.49	11.21	Thomson et al. (2010)
03TH13C	AHe	Macigno Unit	44.013	10.593	0.153	0.578	7.27	0.44	11.21	Thomson et al. (2010)
03TH18A	AHe	Macigno Unit	43.980	10.552	0.047	0.449	6.74	0.40	11.85	Thomson et al. (2010)
03TH23A	AHe	Macigno Unit	44.124	10.628	1.645	1.205	4.73	0.28	8.08	Thomson et al. (2010)
03TH23BD	AHe	Macigno Unit	44.124	10.628	1.645	1.205	5.38	0.32	8.08	Thomson et al. (2010)
03TH23C	AHe	Macigno Unit	44.124	10.628	1.645	1.205	4.55	0.27	8.08	Thomson et al. (2010)
050320-1C	AHe	Helminthoid Flysch	44.263	10.664	1.112	1.024	1.15	0.11	8.98	Thomson et al. (2010)
050320-1D	AHe	Helminthoid Flysch	44.263	10.664	1.112	1.024	1.84	0.11	8.98	Thomson et al. (2010)
050320-2B	AHe	Helminthoid Flysch	44.276	10.674	1.239	0.965	5.28	0.32	9.27	Thomson et al. (2010)
050320-2C	AHe	Helminthoid Flysch	44.276	10.674	1.239	0.965	5.42	0.33	9.27	Thomson et al. (2010)
050320-3A	AHe	Helminthoid Flysch	44.280	10.668	1.272	0.957	9.29	0.56	9.31	Thomson et al. (2010)

050320-3B	AHe	Helminthoid Flysch	44.280	10.668	1.272	0.957	6.04	0.66	9.31	Thomson et al. (2010)
050320-3C	AHe	Helminthoid Flysch	44.280	10.668	1.272	0.957	6.61	0.40	9.31	Thomson et al. (2010)
1926	AHe	Marnoso Arenacea Unit	44.107	11.729	0.250	0.471	6.14	0.37	11.75	Thomson et al. (2010)
1926B	AHe	Marnoso Arenacea Unit	44.107	11.729	0.250	0.471	3.16	0.19	11.75	Thomson et al. (2010)
1926C	AHe	Marnoso Arenacea Unit	44.107	11.729	0.250	0.471	5.88	0.35	11.75	Thomson et al. (2010)
1926D	AHe	Marnoso Arenacea Unit	44.107	11.729	0.250	0.471	2.89	0.17	11.75	Thomson et al. (2010)
1929	AHe	Marnoso Arenacea Unit	44.037	11.504	0.700	0.702	1.65	0.10	10.59	Thomson et al. (2010)
AP1	AHe	Marnoso Arenacea Unit	43.790	12.146	0.700	0.776	1.34	0.08	10.22	Thomson et al. (2010)
AP17	AHe	Marnoso Arenacea Unit	43.876	12.110	0.600	0.605	1.94	0.12	11.07	Thomson et al. (2010)
AP2	AHe	Marnoso Arenacea Unit	43.79	12.15	0.60	0.77	2.41	0.14	10.25	Thomson et al. (2010)
AP3	AHe	Marnoso Arenacea Unit	43.815	12.149	0.900	0.727	3.27	0.20	10.46	Thomson et al. (2010)
AP30	AHe	Marnoso Arenacea Unit	43.895	11.779	0.750	0.879	1.62	0.10	9.70	Thomson et al. (2010)
AP33	AHe	Marnoso Arenacea Unit	43.919	11.792	0.650	0.801	1.29	0.08	10.09	Thomson et al. (2010)
AP36E	AHe	Marnoso Arenacea Unit	44.097	11.955	0.370	0.271	9.54	0.77	12.74	Thomson et al. (2010)
AP37	AHe	Marnoso Arenacea Unit	44.015	11.951	0.150	0.423	2.95	0.18	11.99	Thomson et al. (2010)
AP38	AHe	Marnoso Arenacea Unit	43.797	11.914	1.200	0.858	1.97	0.12	9.81	Thomson et al. (2010)
AP43R1	AHe	Marnoso Arenacea Unit	43.818	11.733	0.515	0.860	3.08	0.20	9.80	Thomson et al. (2010)
AP43R2	AHe	Marnoso Arenacea Unit	43.818	11.733	0.515	0.860	3.35	0.20	9.80	Thomson et al. (2010)
AP44R1	AHe	Marnoso Arenacea Unit	43.824	11.746	0.725	0.868	2.02	0.12	9.76	Thomson et al. (2010)
AP45R1	AHe	Marnoso Arenacea Unit	43.844	11.749	0.940	0.897	3.12	0.22	9.62	Thomson et al. (2010)
AP45R2	AHe	Marnoso Arenacea Unit	43.844	11.749	0.940	0.897	1.04	0.06	9.62	Thomson et al. (2010)
AP47R1	AHe	Marnoso Arenacea Unit	43.864	11.739	1.365	0.906	2.33	0.14	9.57	Thomson et al. (2010)
AP48R1	AHe	Marnoso Arenacea Unit	43.879	11.711	1.655	0.907	3.29	0.20	9.56	Thomson et al. (2010)
AP48R2	AHe	Marnoso Arenacea Unit	43.879	11.711	1.655	0.907	3.29	0.20	9.56	Thomson et al. (2010)
AP5	AHe	Marnoso Arenacea Unit	44.189	11.501	0.200	0.521	5.96	0.36	11.50	Thomson et al. (2010)
AP52	AHe	Marnoso Arenacea Unit	43.905	11.791	0.565	0.836	1.92	0.12	9.92	Thomson et al. (2010)
AP53	AHe	Marnoso Arenacea Unit	43.934	11.656	0.907	0.830	5.33	0.32	9.95	Thomson et al. (2010)
AP54	AHe	Marnoso Arenacea Unit	43.961	11.670	0.690	0.811	1.93	0.12	10.05	Thomson et al. (2010)
AP55	AHe	Marnoso Arenacea Unit	44.013	11.687	1.070	0.722	2.08	0.12	10.49	Thomson et al. (2010)
AP57	AHe	Marnoso Arenacea Unit	43.995	11.719	0.450	0.746	1.32	0.08	10.37	Thomson et al. (2010)
AP5B	AHe	Marnoso Arenacea Unit	44.189	11.501	0.200	0.521	2.15	0.13	11.50	Thomson et al. (2010)
AP5C	AHe	Marnoso Arenacea Unit	44.189	11.501	0.200	0.521	1.01	0.06	11.50	Thomson et al. (2010)
AP5D	AHe	Marnoso Arenacea Unit	44.189	11.501	0.200	0.521	2.72	0.16	11.50	Thomson et al. (2010)
AP8	AHe	Marnoso Arenacea Unit	44.147	11.449	0.300	0.629	1.28	0.08	10.95	Thomson et al. (2010)
AP9	AHe	Marnoso Arenacea Unit	44.115	11.431	0.400	0.674	1.37	0.08	10.73	Thomson et al. (2010)
C1	AHe	Cervarola Unit	44.113	11.002	0.500	0.765	3.62	0.22	10.28	Thomson et al. (2010)
C10	AHe	Cervarola Unit	44.143	11.191	0.605	0.766	0.79	0.05	10.27	Thomson et al. (2010)
C11	AHe	Cervarola Unit	44.001	10.807	0.950	0.667	6.11	0.37	10.77	Thomson et al. (2010)
C13	AHe	Cervarola Unit	44.021	10.864	0.700	0.747	3.87	0.23	10.37	Thomson et al. (2010)
C16	AHe	Cervarola Unit	44.060	10.913	0.630	0.909	2.86	0.17	9.55	Thomson et al. (2010)
C17	AHe	Cervarola Unit	44.068	10.919	0.625	0.921	2.80	0.17	9.49	Thomson et al. (2010)
C2	AHe	Cervarola Unit	44.004	11.012	0.830	0.660	3.62	0.22	10.80	Thomson et al. (2010)
C22	AHe	Cervarola Unit	44.041	10.932	0.850	0.821	3.97	0.24	10.00	Thomson et al. (2010)
C23	AHe	Cervarola Unit	44.021	10.929	0.884	0.719	4.27	0.26	10.51	Thomson et al. (2010)
C29	AHe	Cervarola Unit	44.731	9.386	0.320	0.775	2.84	0.17	10.23	Thomson et al. (2010)
C3	AHe	Cervarola Unit	44.014	11.025	0.780	0.706	4.05	0.24	10.57	Thomson et al. (2010)
C34	AHe	Cervarola Unit	44.417	9.949	0.510	0.855	2.73	0.16	9.83	Thomson et al. (2010)
C37	AHe	Cervarola Unit	44.246	10.683	0.641	1.064	1.59	0.10	8.78	Thomson et al. (2010)
C4	AHe	Cervarola Unit	44.028	11.038	0.680	0.753	1.96	0.12	10.34	Thomson et al. (2010)
C40	AHe	Cervarola Unit	44.223	10.758	1.250	0.980	1.73	0.10	9.20	Thomson et al. (2010)
C5	AHe	Cervarola Unit	44.049	11.044	0.610	0.798	3.64	0.22	10.11	Thomson et al. (2010)
C52A	AHe	Cervarola Unit	44.013	11.503	0.360	0.661	3.43	0.21	10.80	Thomson et al. (2010)
C6	AHe	Cervarola Unit	44.095	11.044	0.650	0.779	1.92	0.12	10.21	Thomson et al. (2010)
C7	AHe	Cervarola Unit	44.111	11.039	0.625	0.755	2.05	0.12	10.33	Thomson et al. (2010)
C8	AHe	Cervarola Unit	44.115	11.204	0.700	0.757	1.89	0.11	10.32	Thomson et al. (2010)
C9	AHe	Cervarola Unit	44.106	11.204	1.000	0.738	1.62	0.10	10.41	Thomson et al. (2010)
CIM1	AHe	Cervarola Unit (Modino)	44.194	10.699	2.165	1.174	3.35	0.20	8.23	Thomson et al. (2010)
CIM1R1	AHe	Cervarola Unit (Modino)	44.194	10.699	2.165	1.174	3.34	0.20	8.23	Thomson et al. (2010)

CIM2	AHe	Cervarola Unit (Modino)	44.194	10.704	2.045	1.165	2.74	0.16	8.27	Thomson et al. (2010)
CIM3	AHe	Cervarola Unit (Modino)	44.196	10.692	1.950	1.184	2.63	0.16	8.18	Thomson et al. (2010)
CIM3R1	AHe	Cervarola Unit (Modino)	44.196	10.692	1.950	1.184	3.55	0.21	8.18	Thomson et al. (2010)
CIM4	AHe	Cervarola Unit (Modino)	44.200	10.684	1.830	1.196	2.84	0.17	8.12	Thomson et al. (2010)
CIM4R1	AHe	Cervarola Unit (Modino)	44.200	10.684	1.830	1.196	2.98	0.18	8.12	Thomson et al. (2010)
CIM5	AHe	Cervarola Unit (Modino)	44.202	10.677	1.750	1.208	2.98	0.18	8.06	Thomson et al. (2010)
CIM5A	AHe	Cervarola Unit (Modino)	44.202	10.677	1.750	1.208	2.69	0.16	8.06	Thomson et al. (2010)
CIM5R1	AHe	Cervarola Unit (Modino)	44.202	10.677	1.750	1.208	2.53	0.15	8.06	Thomson et al. (2010)
CIM6	AHe	Cervarola Unit (Modino)	44.201	10.666	1.660	1.230	2.62	0.16	7.95	Thomson et al. (2010)
CIM6R1	AHe	Cervarola Unit (Modino)	44.201	10.666	1.660	1.230	2.68	0.16	7.95	Thomson et al. (2010)
VALD10a	AHe	Macigno Unit	43.653	11.640	1.4	0.836	3.49	0.21	9.92	Thomson et al. (2010)
VALD1a	AHe	Macigno Unit	43.594	11.603	0.497	0.471	6.94	0.42	11.75	Thomson et al. (2010)
VALD2a	AHe	Macigno Unit	43.612	11.645	0.5	0.685	3.89	0.23	10.67	Thomson et al. (2010)
VALD2R1	AHe	Macigno Unit	43.612	11.645	0.5	0.685	3.87	0.23	10.67	Thomson et al. (2010)
VALD4a1	AHe	Macigno Unit	43.620	11.648	0.74	0.730	3.52	0.21	10.45	Thomson et al. (2010)
VALD4a2	AHe	Macigno Unit	43.620	11.648	0.74	0.730	5.03	0.3	10.45	Thomson et al. (2010)
VALD4R1	AHe	Macigno Unit	43.620	11.648	0.74	0.730	4.01	0.24	10.45	Thomson et al. (2010)
VALD5a	AHe	Macigno Unit	43.621	11.656	0.85	0.747	3.96	0.24	10.36	Thomson et al. (2010)
VALD5R1	AHe	Macigno Unit	43.621	11.656	0.85	0.747	3.92	0.23	10.36	Thomson et al. (2010)
VALD6a	AHe	Macigno Unit	43.620	11.659	0.88	0.746	4.09	0.25	10.37	Thomson et al. (2010)
VALD6R1	AHe	Macigno Unit	43.620	11.659	0.88	0.746	3.86	0.23	10.37	Thomson et al. (2010)
VALD7a	AHe	Macigno Unit	43.604	11.651	1.1	0.658	3.75	0.22	10.81	Thomson et al. (2010)
VALD8R1	AHe	Macigno Unit	43.626	11.684	1.2	0.782	4.11	0.25	10.19	Thomson et al. (2010)
VALD8R2	AHe	Macigno Unit	43.626	11.684	1.2	0.782	3.46	0.21	10.19	Thomson et al. (2010)

*Lithologies exposed in the Alpi Apuane metamorphic dome. These samples were excluded from the erosion rate analysis

Supplementary Table 2 Compilation of bedrock AFT cooling ages and sample descriptions.

ID	Method	Lithology	Latitude	Longitude	Sample Elevation (km)	Mean Elevation (km)	Age (Ma)	Error (1σ)	Surface Temperature (°C)	Reference
AR1	AFT	Pseudomacigno Apuan autochthon*	44.058	10.226	0.840	0.607	4.71	0.59	11.06	Abbate et al. (1994)
(AR2A)a	AFT	Pseudomacigno Apuan autochthon*	44.055	10.256	0.840	0.634	5.24	0.63	10.93	Abbate et al. (1994)
AR3	AFT	Pseudomacigno Apuan autochthon*	44.055	10.256	0.840	0.634	4.95	0.58	10.93	Abbate et al. (1994)
BT1	AFT	graywacke	44.085	9.787	0.475	0.104	4.58	0.78	13.58	Abbate et al. (1994)
BT2	AFT	graywacke	44.085	9.787	0.525	0.104	4.73	0.55	13.58	Abbate et al. (1994)
CB3	AFT	granite cgl	44.051	9.830	0.000	0.079	8.11	1.19	13.70	Abbate et al. (1994)
CB4	AFT	gneiss cgl	44.051	9.830	0.000	0.079	8.46	0.42	13.70	Abbate et al. (1994)
CB5	AFT	graywacke	44.051	9.830	0.000	0.079	7.13	0.67	13.70	Abbate et al. (1994)
CP1	AFT	Hercynian Basement*	44.028	10.264	0.675	0.554	3.93	0.36	11.33	Abbate et al. (1994)
CP3	AFT	Apuan autochthon*	44.017	10.264	0.650	0.554	3.64	0.71	11.33	Abbate et al. (1994)
FC3	AFT	Pseudomacigno Apuan autochthon*	44.078	10.267	1.620	0.701	5.59	0.61	10.59	Abbate et al. (1994)
FC5	AFT	Pseudomacigno Apuan autochthon*	44.078	10.267	1.620	0.701	5.95	0.59	10.59	Abbate et al. (1994)
FO1	AFT	Pseudomacigno Apuan autochthon*	44.036	10.375	0.450	0.619	1.96	0.56	11.00	Abbate et al. (1994)
FO4	AFT	Pseudomacigno Apuan autochthon*	44.033	10.375	0.425	0.610	1.91	0.31	11.05	Abbate et al. (1994)
FO5	AFT	Pseudomacigno Apuan autochthon*	44.044	10.388	0.460	0.636	1.63	0.25	10.92	Abbate et al. (1994)
G2	AFT	Hercynian Basement Apuan autochthon*	44.069	10.193	0.170	0.571	3.96	0.36	11.24	Abbate et al. (1994)
MD1 (MAD1)	AFT	Hercynian Basement*	44.040	10.192	0.787	0.502	3.86	0.77	11.59	Abbate et al. (1994)
ROM1	AFT	Marnoso Arenacea Unit	44.002	11.472	0.890	0.562	5.50	1.10	11.29	Balesterieri et al. (2018)
ROM2	AFT	Marnoso Arenacea Unit	44.001	11.472	0.760	0.560	5.00	0.70	11.30	Balesterieri et al. (2018)
ROM3	AFT	Marnoso Arenacea Unit	44.000	11.475	0.675	0.560	3.90	1.00	11.30	Balesterieri et al. (2018)
ROM4	AFT	Marnoso Arenacea Unit	43.998	11.477	0.575	0.563	4.00	1.00	11.28	Balesterieri et al. (2018)
ROM5	AFT	Marnoso Arenacea Unit	43.994	11.477	0.480	0.562	6.60	1.40	11.29	Balesterieri et al. (2018)
TCGA	AFT	Marnoso Arenacea Unit	43.993	11.476	0.360	0.560	5.00	1.60	11.30	Balesterieri et al. (2018)
CAS1	AFT	Macigno Unit	44.206	10.446	1.300	1.061	8.93	1.34	8.79	Balestrieri (2000)
CAS2	AFT	Macigno Unit	44.174	10.424	0.965	0.980	9.19	1.43	9.20	Balestrieri (2000)
CAST2	AFT	Macigno Unit	44.105	10.415	0.270	0.811	8.91	1.30	10.04	Balestrieri (2000)
CAST3	AFT	Macigno Unit	44.105	10.415	0.240	0.811	8.21	1.00	10.04	Balestrieri (2000)
GOM2	AFT	Macigno Unit	44.125	10.642	1.850	1.061	9.51	1.40	8.79	Balestrieri (2000)
GOM3	AFT	Macigno Unit	44.134	10.656	1.300	1.096	6.19	0.86	8.62	Balestrieri (2000)
BOR2	AFT	Gottero Sandstone	44.4352	9.425	0.452	0.779	7.50	1.00	10.20	Balestrieri et al. (1996)
BORl	AFT	Gottero Sandstone	44.4352	9.425	0.450	0.779	6.40	1.00	10.20	Balestrieri et al. (1996)
MG3	AFT	Gottero Sandstone	44.2345	9.472	0.000	0.193	9.70	1.10	13.13	Balestrieri et al. (1996)
MS1	AFT	Gottero Sandstone	44.1338	9.638	0.000	0.136	9.70	1.10	13.42	Balestrieri et al. (1996)
MS2	AFT	Gottero Sandstone	44.1338	9.638	0.000	0.136	7.60	0.70	13.42	Balestrieri et al. (1996)
MS4	AFT	Gottero Sandstone	44.1338	9.638	0.000	0.136	8.00	1.20	13.42	Balestrieri et al. (1996)
MS5	AFT	Gottero Sandstone	44.1338	9.638	0.000	0.136	8.70	1.20	13.42	Balestrieri et al. (1996)
RAM1	AFT	Gottero Sandstone	44.434	9.311	1.318	0.632	8.60	1.10	10.94	Balestrieri et al. (1996)
RAM3	AFT	Gottero Sandstone	44.4268	9.312	1.075	0.606	6.50	1.10	11.07	Balestrieri et al. (1996)
RAM4	AFT	Gottero Sandstone	44.4268	9.312	1.075	0.606	7.50	1.00	11.07	Balestrieri et al. (1996)
RAM5	AFT	Gottero Sandstone	44.4221	9.311	0.950	0.587	7.30	0.80	11.17	Balestrieri et al. (1996)
RAM6	AFT	Gottero Sandstone	44.4221	9.311	0.948	0.587	6.50	0.70	11.17	Balestrieri et al. (1996)
ZAT2	AFT	Gottero Sandstone	44.3908	9.442	1.349	0.637	9.50	1.30	10.92	Balestrieri et al. (1996)
CH1	AFT	Macigno Unit	43.601	11.411	0.303	0.337	5.60	0.90	12.42	Bonini et al. (2013)
CH2	AFT	Macigno Unit	43.541	11.430	0.504	0.379	6.10	1.00	12.20	Bonini et al. (2013)
CH3	AFT	Macigno Unit	43.565	11.382	0.722	0.373	6.90	0.90	12.24	Bonini et al. (2013)
CH4	AFT	Macigno Unit	43.562	11.380	0.857	0.376	7.40	1.00	12.22	Bonini et al. (2013)
PR 11	AFT	Subligurian	44.463	9.930	0.880	0.808	8.70	1.10	10.06	Carlini et al. (2013)
PR 12	AFT	Tuscan Nappe	44.353	9.776	0.668	0.700	8.70	1.20	10.60	Carlini et al. (2013)
PR 15	AFT	Ligurian	44.472	9.966	1.085	0.837	7.30	1.90	9.92	Carlini et al. (2013)
PR 17	AFT	Ligurian	44.379	10.196	0.860	1.001	4.10	0.50	9.10	Carlini et al. (2013)
PR 18	AFT	Subligurian	44.380	10.194	0.780	1.001	4.60	0.80	9.10	Carlini et al. (2013)
PR 20	AFT	Tusc.	44.338	10.528	0.500	0.881	2.30	0.30	9.69	Carlini et al. (2013)
PR 22	AFT	Subligurian	44.331	10.564	1.082	0.851	2.50	0.50	9.84	Carlini et al. (2013)
PR 23.1	AFT	Ligurian	44.329	10.562	1.111	0.861	4.70	0.90	9.79	Carlini et al. (2013)
PR 25.1	AFT	Tuscan Nappe	44.320	9.995	0.248	0.639	7.00	0.90	10.91	Carlini et al. (2013)
PR 26	AFT	Tuscan Nappe	44.463	9.602	1.135	0.883	5.40	0.90	9.68	Carlini et al. (2013)
PR 27	AFT	Epiligurian	44.525	9.824	0.618	0.726	4.70	1.00	10.47	Carlini et al. (2013)
PR 28.1	AFT	Ligurian	44.522	9.931	0.710	0.776	3.20	0.50	10.22	Carlini et al. (2013)
PR 28.2	AFT	Ligurian	44.522	9.931	0.702	0.776	4.10	0.60	10.22	Carlini et al. (2013)
PR 3	AFT	Tuscan Nappe	44.446	9.943	0.600	0.817	6.20	1.00	10.01	Carlini et al. (2013)

PR 5	AFT	Ligurian	44.456	9.804	0.718	0.777	7.80	0.80	10.21	Carlini et al. (2013)
PR 6.1	AFT	Subligurian	44.456	9.783	0.600	0.789	4.30	0.90	10.15	Carlini et al. (2013)
PR 7	AFT	Subligurian	44.550	9.940	0.301	0.748	4.90	1.00	10.36	Carlini et al. (2013)
03GB07	AFT	Macigno Unit	44.124	10.059	0.675	0.356	7.90	0.90	12.32	Felin et al. (2007)
03RE20	AFT	Macigno Unit	44.098	10.326	1.055	0.760	7.50	1.00	10.30	Felin et al. (2007)
MSV 2	AFT	Pseudomacigno Apuan*	44.106	10.288	0.654	0.752	5.70	0.75	10.34	Felin et al. (2007)
S 1	AFT	Macigno Unit	44.178	10.160	0.546	0.662	6.50	0.95	10.79	Felin et al. (2007)
S 3	AFT	Macigno Unit	44.139	10.073	0.494	0.374	6.60	0.85	12.23	Felin et al. (2007)
S 4	AFT	Macigno Unit	44.128	10.059	0.636	0.330	5.10	0.85	12.45	Felin et al. (2007)
SC 2	AFT	Macigno Unit	44.081	10.083	0.204	0.342	6.40	1.10	12.39	Felin et al. (2007)
SM 3	AFT	Macigno Unit	44.164	10.129	0.250	0.558	8.80	1.40	11.31	Felin et al. (2007)
SU 1	AFT	Macigno Unit	44.170	10.188	0.773	0.724	6.50	1.05	10.48	Felin et al. (2007)
050320-1a	AFT	Helminthoid Flysch	44.263	10.664	1.112	0.976	7.30	2.30	9.22	Thomson et al. (2010)
050320-1b	AFT	Helminthoid Flysch	44.263	10.664	1.112	0.976	5.00	1.30	9.22	Thomson et al. (2010)
CIM1	AFT	Cervarola Unit (Modino)	44.194	10.699	2.165	1.121	7.53	NA	8.50	Thomson et al. (2010)
CIM2	AFT	Cervarola Unit (Modino)	44.194	10.704	2.045	1.116	7.84	NA	8.52	Thomson et al. (2010)
CIM3	AFT	Cervarola Unit (Modino)	44.196	10.692	1.950	1.124	7.44	NA	8.48	Thomson et al. (2010)
CIM4	AFT	Cervarola Unit (Modino)	44.200	10.684	1.830	1.128	6.68	NA	8.46	Thomson et al. (2010)
CIM5	AFT	Cervarola Unit (Modino)	44.202	10.677	1.750	1.134	7.22	NA	8.43	Thomson et al. (2010)
CIM6	AFT	Cervarola Unit (Modino)	44.201	10.666	1.660	1.149	6.60	NA	8.35	Thomson et al. (2010)
SILL1	AFT	Macigno Unit	44.368	10.064	1.861	0.860	8.70	NA	9.80	Thomson et al. (2010)
SILL10	AFT	Macigno Unit	44.334	10.050	0.730	0.754	7.10	NA	10.33	Thomson et al. (2010)
SILL2	AFT	Macigno Unit	44.361	10.074	1.790	0.863	9.60	NA	9.78	Thomson et al. (2010)
SILL3	AFT	Macigno Unit	44.357	10.073	1.600	0.853	6.60	NA	9.84	Thomson et al. (2010)
SILL4	AFT	Macigno Unit	44.455	10.076	1.530	0.951	5.80	NA	9.34	Thomson et al. (2010)
SILL5	AFT	Macigno Unit	44.354	10.071	1.420	0.843	6.80	NA	9.89	Thomson et al. (2010)
SILL6	AFT	Macigno Unit	44.353	10.057	1.260	0.815	6.80	NA	10.03	Thomson et al. (2010)
SILL7	AFT	Macigno Unit	44.338	10.058	1.130	0.781	6.10	NA	10.19	Thomson et al. (2010)
SILL9	AFT	Macigno Unit	44.334	10.050	0.780	0.755	5.30	NA	10.32	Thomson et al. (2010)
VALD1	AFT	Macigno Unit	43.594	11.603	0.497	0.484	4.97	NA	11.68	Thomson et al. (2010)
VALD10	AFT	Macigno Unit	43.653	11.640	1.400	0.836	7.33	NA	9.92	Thomson et al. (2010)
VALD11	AFT	Macigno Unit	43.663	11.641	1.450	0.644	6.12	NA	10.88	Thomson et al. (2010)
VALD12	AFT	Macigno Unit	43.696	11.673	0.960	0.717	6.63	NA	10.51	Thomson et al. (2010)
VALD2	AFT	Macigno Unit	43.612	11.645	0.500	0.550	7.35	NA	11.35	Thomson et al. (2010)
VALD3	AFT	Macigno Unit	43.614	11.656	0.580	0.559	6.73	NA	11.31	Thomson et al. (2010)
VALD4	AFT	Macigno Unit	43.620	11.648	0.740	0.567	5.35	NA	11.27	Thomson et al. (2010)
VALD5	AFT	Macigno Unit	43.621	11.656	0.850	0.572	4.43	NA	11.24	Thomson et al. (2010)
VALD6	AFT	Macigno Unit	43.620	11.659	0.880	0.571	6.83	NA	11.25	Thomson et al. (2010)
VALD7	AFT	Macigno Unit	43.604	11.651	1.100	0.536	6.88	NA	11.42	Thomson et al. (2010)
VALD8	AFT	Macigno Unit	43.626	11.684	1.200	0.585	8.84	NA	11.18	Thomson et al. (2010)
VALD9	AFT	Macigno Unit	43.646	11.652	1.200	0.619	8.58	NA	11.00	Thomson et al. (2010)
C1	AFT	Cervarola Unit	44.113	11.002	0.500	0.789	6.70	0.08	10.15	Ventura et al. (2001)
C10	AFT	Cervarola Unit	44.143	11.191	0.605	0.683	3.90	0.80	10.68	Ventura et al. (2001)
C11	AFT	Macigno Unit	44.001	10.807	0.950	0.644	9.80	1.20	10.88	Ventura et al. (2001)
C13	AFT	Modino	44.021	10.864	0.700	0.731	6.80	0.90	10.45	Ventura et al. (2001)
C16	AFT	Cervarola Unit	44.060	10.913	0.630	0.807	2.70	0.80	10.07	Ventura et al. (2001)
C17	AFT	Cervarola Unit	44.068	10.919	0.625	0.818	4.90	1.20	10.01	Ventura et al. (2001)
C2	AFT	Cervarola Unit	44.004	11.012	0.830	0.548	6.50	0.80	11.36	Ventura et al. (2001)
C22	AFT	Cervarola Unit	44.041	10.932	0.850	0.747	3.00	1.10	10.36	Ventura et al. (2001)
C23	AFT	Cervarola Unit	44.021	10.929	0.884	0.689	5.20	1.00	10.65	Ventura et al. (2001)
C29	AFT	Cervarola Unit	44.731	9.386	0.320	0.804	4.70	NA	10.08	Ventura et al. (2001)
C3	AFT	Cervarola Unit	44.014	11.025	0.780	0.580	5.00	0.05	11.20	Ventura et al. (2001)
C34	AFT	Cervarola Unit	44.417	9.949	0.510	0.820	8.60	NA	10.00	Ventura et al. (2001)
C37	AFT	Cervarola Unit	44.246	10.683	0.641	1.016	2.60	0.50	9.02	Ventura et al. (2001)
C38	AFT	Cervarola Unit	44.223	10.777	0.980	0.950	3.10	1.10	9.35	Ventura et al. (2001)
C4	AFT	Cervarola Unit	44.028	11.038	0.680	0.620	3.30	0.50	11.00	Ventura et al. (2001)
C40	AFT	Cervarola Unit	44.223	10.758	1.250	0.977	4.10	0.50	9.22	Ventura et al. (2001)
C5	AFT	Cervarola Unit	44.049	11.044	0.610	0.679	5.70	0.60	10.71	Ventura et al. (2001)
C52	AFT	Cervarola Unit	44.013	11.503	0.360	0.594	5.90	1.10	11.13	Ventura et al. (2001)
C6	AFT	Cervarola Unit	44.095	11.044	0.650	0.735	5.00	0.60	10.42	Ventura et al. (2001)
C7	AFT	Cervarola Unit	44.111	11.039	0.625	0.738	5.40	0.70	10.41	Ventura et al. (2001)
C8	AFT	Cervarola Unit	44.115	11.207	0.700	0.680	6.20	0.60	10.70	Ventura et al. (2001)
C9	AFT	Cervarola Unit	44.106	11.204	1.000	0.673	7.40	0.70	10.73	Ventura et al. (2001)
1927	AFT	Marnoso Arenacea Unit	44.064	11.597	0.350	0.667	8.50	NA	10.77	Zattin et al. (2002)

1929	AFT	Marnoso Arenacea Unit	44.037	11.504	0.700	0.619	6.40	0.70	11.00	Zattin et al. (2002)
1930	AFT	Marnoso Arenacea Unit	44.069	11.492	1.150	0.630	4.70	NA	10.95	Zattin et al. (2002)
AP 10	AFT	Marnoso Arenacea Unit	44.121	11.396	0.500	0.685	3.90	0.70	10.67	Zattin et al. (2002)
Ap 15	AFT	Marnoso Arenacea Unit	43.819	11.952	0.700	0.805	9.20	1.40	10.07	Zattin et al. (2002)
AP 34	AFT	Macigno Unit	44.097	11.315	0.600	0.653	5.90	0.80	10.83	Zattin et al. (2002)
AP 43	AFT	Marnoso Arenacea	43.818	11.733	0.515	0.805	5.30	0.80	10.08	Zattin et al. (2002)
AP 45	AFT	Marnoso Arenacea	43.828	11.749	0.940	0.809	4.70	0.70	10.06	Zattin et al. (2002)
AP 52	AFT	Marnoso Arenacea Unit	43.905	11.723	0.565	0.799	5.10	0.80	10.11	Zattin et al. (2002)
AP 53	AFT	Marnoso Arenacea Unit	43.934	11.656	0.907	0.814	8.60	1.10	10.03	Zattin et al. (2002)
AP 54	AFT	Marnoso Arenacea	43.961	11.670	0.690	0.747	5.60	0.70	10.36	Zattin et al. (2002)
AP 55	AFT	Marnoso Arenacea Unit	44.013	11.687	1.070	0.672	7.90	0.80	10.74	Zattin et al. (2002)
AP 56	AFT	Marnoso Arenacea Unit	43.983	11.686	0.500	0.723	4.10	0.70	10.49	Zattin et al. (2002)
AP 57	AFT	Marnoso Arenacea Unit	43.995	11.719	0.450	0.688	3.60	0.50	10.66	Zattin et al. (2002)
AP 9	AFT	Marnoso Arenacea Unit	44.115	11.431	0.400	0.673	3.90	0.70	10.73	Zattin et al. (2002)
AP44	AFT	Marnoso Arenacea Unit	43.824	11.746	0.725	0.807	6.00	0.90	10.07	Zattin et al. (2002)
AP47	AFT	Marnoso Arenacea	43.864	11.739	1.365	0.816	5.20	0.90	10.02	Zattin et al. (2002)

*Lithologies exposed in the Alpi Apuane metamorphic dome. These samples were excluded from the erosion rate inversions

Supplementary Table 3 Compilation of detrital AFT cooling ages and sample descriptions.

ID	Method	Lithology	Latitude	Longitude	Sample Elevation (km)	Age (Ma)	Error (2σ)	Error (1σ)	Reference
Enza	AFT	Ligurian/EpiLigurian/Macigno	44.620	10.413	0.163	4.70	1.00	0.50	Malusa and Balestrieri (2012)
Nure	AFT	Ligurian	44.872	9.647	0.208	4.10	1.60	0.80	Malusa and Balestrieri (2012)
Panaro	AFT	Ligurian/EpiLigurian/Macigno	44.477	11.027	0.099	6.90	2.20	1.10	Malusa and Balestrieri (2012)
Secchia	AFT	Ligurian/EpiLigurian/Macigno	44.532	10.758	0.119	6.50	1.80	0.90	Malusa and Balestrieri (2012)
Taro	AFT	Ligurian/ EpiLigurian	44.713	10.120	0.117	4.60	1.60	0.80	Malusa and Balestrieri (2012)
Trebbia	AFT	Ligurian	44.901	9.584	0.140	4.00	1.40	0.70	Malusa and Balestrieri (2012)
Bisenzio	AFT	Cervarola and Modino Units	43.928	11.126	0.102	5.30	0.95	0.50	*this study*
Lima1	AFT	Cervarola/Modino/Macigno Units	44.000	10.560	0.097	5.40	1.15	0.60	*this study*
Lima2	AFT	Cervarola/Modino/Macigno Units	44.091	10.760	0.544	6.10	0.85	0.45	*this study*
Magra1	AFT	Ligurian and Macigno Units	44.188	9.925	0.036	5.10	3.10	1.50	*this study*
Magra2	AFT	Macigno and Ligurian Units	44.387	9.887	0.251	5.20	1.00	0.50	*this study*
Pescia	AFT	Macigno Unit	43.929	10.693	0.105	8.00	1.00	0.50	*this study*
Serchio	AFT	Macigno Unit	44.192	10.306	0.525	7.50	1.05	0.50	*this study*
Vara	AFT	Ligurian and Macigno Units	44.198	9.851	0.032	5.90	2.50	1.25	*this study*

Supplementary Table 4 Compilation of bedrock ZHe cooling ages and sample descriptions.

ID	Method	Lithology	Latitude	Longitude	Sample Elevation (km)	Age (Ma)	Error (2σ)	Mean Elevation (km)	Surface Temperature (°C)	Reference
CP3(4)	Zhe	Hercynian Basement Apuan autoch.*	44.017	10.264	0.650	4.98	0.40	0.405	12.075	Abbate et al. (1994)
G3(4) (G3A)a	Zhe	Hercynian Basement Apuan autoch.*	44.067	10.199	0.170	5.7	0.46	0.451	11.843	Abbate et al. (1994)
020620-1	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.096	10.325	0.958	3.61	0.29	0.708	10.560	Fellin et al. (2007)
020620-3	ZHe	Macigno Unit	44.122	10.068	0.756	9.35	0.75	0.395	12.125	Fellin et al. (2007)
020620-3 rep	ZHe	Macigno Unit	44.122	10.068	0.756	9.27	0.74	0.395	12.125	Fellin et al. (2007)
03AP38	ZHe	Met. Mesozoic succ. Massa Unit*	44.069	10.139	0.925	5.94	0.47	0.392	12.140	Fellin et al. (2007)
03AP41	ZHe	Hercynian Basement Massa Unit*	44.050	10.161	0.080	6.44	0.52	0.387	12.164	Fellin et al. (2007)
03AP42	ZHe	Hercynian Basement Apuan autoch.*	44.069	10.175	0.125	7.19	0.58	0.430	11.949	Fellin et al. (2007)
03AP43	ZHe	Hercynian Basement Massa Unit*	44.048	10.179	0.505	5.11	0.41	0.399	12.104	Fellin et al. (2007)
03AP45	ZHe	Hercynian Basement Massa Unit*	44.032	10.194	0.810	5.93	0.47	0.386	12.172	Fellin et al. (2007)
03AP47	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.128	10.259	0.890	4.62	0.37	0.693	10.634	Fellin et al. (2007)
03AP58	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.003	10.308	0.305	4.33	0.35	0.410	12.050	Fellin et al. (2007)
03GB02	ZHe	Hercynian Basement Apuan autoch.*	43.995	10.248	0.080	5.41	0.43	0.356	12.318	Fellin et al. (2007)
03GB04	ZHe	PseudoMacigno Unit/Apuan autoch.*	43.974	10.277	0.600	6.93	0.55	0.333	12.434	Fellin et al. (2007)
03GB06	ZHe	PseudoMacigno Unit/Apuan autoch.*	43.966	10.330	0.440	5.98	0.48	0.348	12.358	Fellin et al. (2007)
03GB12	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.013	10.303	0.670	5.09	0.41	0.428	11.958	Fellin et al. (2007)
03RE17	ZHe	Hercynian Basement Apuan autoch.*	44.036	10.253	0.799	5.29	0.42	0.437	11.917	Fellin et al. (2007)
03RE21	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.075	10.327	0.810	6.40	0.51	0.645	10.875	Fellin et al. (2007)
03RE22	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.066	10.324	0.510	4.77	0.38	0.611	11.043	Fellin et al. (2007)
03RE24	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.159	10.200	0.915	5.58	0.45	0.666	10.771	Fellin et al. (2007)
03RE25A	ZHe	Hercynian Basement Apuan autoch.*	44.133	10.186	1.500	5.42	0.43	0.582	11.190	Fellin et al. (2007)
03RE27	ZHe	Hercynian Basment Massa Unit*	44.071	10.155	0.500	5.54	0.44	0.412	12.040	Fellin et al. (2007)
APUANE-1z1	ZHe	Hercynian Basement Apuan autoch.*	44.024	10.243	0.845	4.81	0.38	0.404	12.081	Fellin et al. (2007)
APUANE-1z2	ZHe	Hercynian Basement Apuan autoch.*	44.024	10.243	0.845	4.58	0.37	0.404	12.081	Fellin et al. (2007)
FIO4z2	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.077	10.265	1.450	4.92	0.39	0.560	11.301	Fellin et al. (2007)
FO4A	ZHe	PseudoMacigno Unit/Apuan autoch.*	44.033	10.375	0.450	5.86	0.47	0.576	11.219	Fellin et al. (2007)

*Lithologies exposed in the Alpi Apuane metamorphic dome. These samples were excluded from the erosion rate inversions

Supplementary Table 5 Erosion rates and parameters for AHe bedrock samples.

						Imposed G_0 = 25 (°C/km)					G_f calculated from heat flow measurements					
ID	Method	Latitude	Longitude	Sample Elevation (km)	Mean Elevation (km)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature	Heat Flow Measurement Source
020620-3	AHe	44.122	10.068	0.756	0.383	25.0	35.1	0.558	2.2	66.2	29.6	40.0	0.500	1.84	66.7	della Vedova et al. (2001)
03AP08AB	AHe	44.190	10.632	0.880	1.295	25.0	32.4	0.426	2.3	64.0	35.8	42.5	0.282	1.56	63.5	della Vedova et al. (2001)
03AP12A	AHe	44.110	10.735	0.815	1.155	25.0	30.6	0.327	2.1	61.9	40.1	45.0	0.188	1.32	61.3	della Vedova et al. (2001)
03AP23A	AHe	44.129	10.429	0.425	0.709	25.1	27.4	0.144	1.7	53.6	19.7	40.0	0.188	2.15	52.9	della Vedova et al. (2001)
03AP23B	AHe	44.129	10.429	0.425	0.709	25.0	29	0.241	2.0	59.6	36.4	40.0	0.156	1.34	59.2	della Vedova et al. (2001)
03AP28A	AHe	44.111	10.529	1.035	0.899	25.0	30.1	0.302	2.1	61.0	34.8	40.0	0.229	1.49	61.5	della Vedova et al. (2001)
03AP28C	AHe	44.111	10.529	1.035	0.899	25.0	29.3	0.262	2.0	59.8	35.5	40.0	0.194	1.43	60.3	della Vedova et al. (2001)
03AP28D	AHe	44.111	10.529	1.035	0.899	25.0	30.5	0.325	2.1	61.6	34.3	40.0	0.250	1.53	61.9	della Vedova et al. (2001)
03AP29A	AHe	44.130	10.542	1.320	1.050	25.0	31.9	0.399	2.2	63.4	32.7	40.0	0.326	1.67	63.6	della Vedova et al. (2001)
03AP31A	AHe	44.142	10.553	1.815	1.131	25.0	31	0.353	2.1	62.0	33.4	40.0	0.293	1.62	62.6	della Vedova et al. (2001)
03AP31B	AHe	44.142	10.553	1.815	1.131	25.1	33.6	0.487	2.3	64.9	33.1	42.5	0.411	1.72	65.5	della Vedova et al. (2001)
03AP34	AHe	44.066	10.107	0.285	0.340	25.1	29.1	0.244	1.9	59.6	36.0	40.0	0.172	1.31	59.7	della Vedova et al. (2001)
03AP51	AHe	44.014	10.380	1.060	0.688	25.0	30.4	0.322	2.0	61.5	34.2	40.0	0.256	1.50	62.0	della Vedova et al. (2001)
03AP51C	AHe	44.014	10.380	1.060	0.688	25.0	29.7	0.279	2.0	60.1	35.0	40.0	0.218	1.43	60.9	della Vedova et al. (2001)
03AP52A	AHe	44.084	10.463	0.370	0.582	25.1	28.7	0.222	1.9	58.8	36.6	40.0	0.146	1.30	58.6	della Vedova et al. (2001)
03AP52B	AHe	44.084	10.463	0.370	0.582	25.0	28.7	0.223	1.9	58.8	36.6	40.0	0.147	1.30	58.7	della Vedova et al. (2001)
03AP52C	AHe	44.084	10.463	0.370	0.582	25.0	28.2	0.194	1.9	57.7	37.1	40.0	0.125	1.25	57.5	della Vedova et al. (2001)
03GB07	AHe	44.124	10.059	0.675	0.356	25.0	32	0.402	2.0	63.4	32.7	40.0	0.333	1.58	63.9	della Vedova et al. (2001)
03GB09	AHe	44.162	10.115	0.335	0.546	25.0	32.5	0.432	2.1	64.2	35.2	42.5	0.307	1.50	64.0	della Vedova et al. (2001)
03GB10	AHe	44.177	10.156	0.530	0.656	25.0	29.4	0.265	2.0	60.1	38.2	42.5	0.172	1.29	60.1	della Vedova et al. (2001)
03RE02	AHe	44.148	10.438	0.765	0.836	25.0	29.3	0.258	2.0	59.9	35.8	40.0	0.182	1.40	60.0	della Vedova et al. (2001)
03RE05A	AHe	44.188	10.480	1.495	1.138	25.1	30.8	0.336	2.1	61.7	34.0	40.0	0.269	1.59	62.4	della Vedova et al. (2001)
03RE05B	AHe	44.188	10.480	1.495	1.138	25.1	31.8	0.392	2.2	63.2	32.8	40.0	0.322	1.68	63.6	della Vedova et al. (2001)
03RE05C	AHe	44.188	10.480	1.495	0.582	25.0	30.7	0.342	2.0	61.5	36.0	42.5	0.278	1.44	62.8	della Vedova et al. (2001)
03RE05CD	AHe	44.188	10.480	1.495	1.138	25.0	29	0.243	2.0	58.0	35.7	40.0	0.185	1.42	59.1	della Vedova et al. (2001)
03RE05D	AHe	44.188	10.480	1.495	0.582	25.0	32.4	0.427	2.1	63.6	34.2	42.5	0.360	1.56	64.7	della Vedova et al. (2001)
03RE06A	AHe	44.201	10.488	1.640	1.194	25.0	31.9	0.395	2.2	63.0	35.1	42.5	0.313	1.59	63.8	della Vedova et al. (2001)
03RE06B	AHe	44.201	10.488	1.640	1.194	25.0	31.3	0.367	2.2	62.4	35.7	42.5	0.286	1.54	63.3	della Vedova et al. (2001)
03RE12A	AHe	44.059	10.767	0.460	0.942	25.0	28.8	0.229	2.0	59.2	42.2	45.0	0.104	1.14	57.5	della Vedova et al. (2001)
03RE12B	AHe	44.059	10.767	0.460	0.942	25.0	29	0.243	2.0	59.6	42.0	45.0	0.112	1.16	57.9	della Vedova et al. (2001)
03RE14A	AHe	44.005	10.665	0.840	0.635	25.0	31.5	0.377	2.1	62.9	33.2	40.0	0.303	1.58	63.2	della Vedova et al. (2001)
03RE14B	AHe	44.005	10.665	0.840	0.635	25.0	27.9	0.184	1.6	51.7	36.7	40.0	0.139	1.18	54.3	della Vedova et al. (2001)
03RE20	AHe	44.098	10.326	1.055	0.808	25.0	32.5	0.432	2.2	64.1	32.1	40.0	0.358	1.69	64.3	della Vedova et al. (2001)
03RE7	AHe	44.200	10.676	1.600	1.214	25.0	38.6	0.727	2.4	68.7	30.7	45.0	0.639	1.99	69.1	della Vedova et al. (2001)
03RE7R1	AHe	44.200	10.676	1.600	1.214	25.0	37.5	0.676	2.4	68.0	31.7	45.0	0.581	1.90	68.5	della Vedova et al. (2001)
03TH02	AHe	44.086	10.568	0.979	0.881	25.0	29.9	0.291	2.0	60.7	37.5	42.5	0.206	1.37	61.2	della Vedova et al. (2001)
03TH02B	AHe	44.086	10.568	0.979	0.881	25.0	29.3	0.261	2.0	59.8	38.1	42.5	0.181	1.33	60.3	della Vedova et al. (2001)
03TH12B	AHe	44.080	10.600	0.678	0.904	25.1	31.4	0.371	2.1	63.0	33.8	40.0	0.273	1.57	62.7	della Vedova et al. (2001)
03TH13A	AHe	44.013	10.593	0.153	0.578	25.0	27.6	0.160	1.8	56.4	16.0	40.0	0.273	2.82	56.5	della Vedova et al. (2001)
03TH13C	AHe	44.013	10.593	0.153	0.578	25.0	28	0.182	1.8	57.4	37.6	40.0	0.102	1.20	56.4	della Vedova et al. (2001)
03TH18A	AHe	43.980	10.552	0.047	0.449	25.1	28.3	0.197	1.8	58.0	37.3	40.0	0.114	1.22	57.2	della Vedova et al. (2001)
03TH23A	AHe	44.124	10.628	1.645	1.205	25.0	33.6	0.485	2.3	64.9	33.3	42.5	0.400	1.72	65.4	della Vedova et al. (2001)
03TH23BD	AHe	44.124	10.628	1.645	1.205	25.1	32.6	0.431	2.2	63.8	34.3	42.5	0.347	1.64	64.4	della Vedova et al. (2001)
03TH23C	AHe	44.124	10.628	1.645	1.205	25.0	33.9	0.502	2.3	65.1	33.0	42.5	0.418	1.75	65.8	della Vedova et al. (2001)
050320-1C	AHe	44.263	10.664	1.112	1.024	25.0	51.7	1.255	2.6	74.7	17.8	42.5	1.533	3.68	74.4	della Vedova et al. (2001)
050320-1D	AHe	44.263	10.664	1.112	1.024	25.0	42.5	0.896	2.5	70.8	25.0	42.5	0.896	2.48	70.8	della Vedova et al. (2001)
050320-2B	AHe	44.276	10.674	1.239	0.965	25.0	31.9	0.401	2.2	63.3	35.2	42.5	0.311	1.55	63.9	della Vedova et al. (2001)
050320-2C	AHe	44.276	10.674	1.239	0.965	25.0	31.7	0.392	2.2	63.1	35.4	42.5	0.302	1.54	63.8	della Vedova et al. (2001)
050320-3A	AHe	44.280	10.668	1.272	0.957	25.0	28.9	0.237	2.0	58.2	38.3	42.5	0.171	1.30	59.3	della Vedova et al. (2001)
050320-3B	AHe	44.280	10.668	1.272	0.957	25.0	31.2	0.360	2.1	62.3	35.9	42.5	0.276	1.50	63.0	della Vedova et al. (2001)
050320-3C	AHe	44.280	10.668	1.272	0.957	25.0	30.6	0.331	2.1	61.6	36.5	42.5	0.249	1.45	62.4	della Vedova et al. (2001)
1926	AHe	44.107	11.729	0.250	0.471	25.1	29.2	0.249	1.9	59.8	21.3	25.5	0.295	2.26	59.9	Pauselli et al. (2019)
1926B	AHe	44.107	11.729	0.250	0.471	25.0	33.2	0.467	2.1	64.8	17.2	25.5	0.650	3.08	64.9	Pauselli et al. (2019)
1926C	AHe	44.107	11.729	0.250	0.471	25.0	29.4	0.260	1.9	60.1	21.1	25.5	0.311	2.30	60.1	Pauselli et al. (2019)
1926D	AHe	44.107	11.729	0.250	0.471	25.0	34	0.504	2.1	65.6	16.5	25.5	0.723	3.25	65.6	Pauselli et al. (2019)
1929	AHe	44.037	11.504	0.700	0.702	25.0	42.9	0.910	2.4	71.1	12.6	28.5	1.431	4.78	70.7	Pauselli et al. (2019)
AP1	AHe	43.790	12.146	0.700	0.776	25.0	45.7	1.022	2.5	72.3	15.1	23.5	1.431	4.12	72.3	Pauselli et al. (2019)
AP17	AHe	43.876	12.110	0.600	0.605	25.0	40.2	0.800	2.4	69.8	9.4	22.5	1.539	6.17	69.1	Pauselli et al. (2019)
AP2	AHe	43.789	12.151	0.600	0.771	25.0	36.4	0.622	2.3	67.4	13.1	24.0	1.033	4.36	67.4	Pauselli et al. (2019)
AP3	AHe	43.815	12.149	0.900	0.727	25.0	35.4	0.575	2.2	66.5	14.1	23.5	0.867	3.95	65.9	Pauselli et al. (2019)
AP30	AHe	43.895	11.779	0.750	0.879	25.0	42	0.873	2.4	70.7	12.0	27.5	1.454	5.07	70.6	Pauselli et al. (2019)
AP33	AHe	43.919	11.792	0.650	0.801	25.0	45.3	1.011	2.5	72.3	9.3	27.0	1.921	6.64	72.1	Pauselli et al. (2019)
AP36E	AHe	44.097	11.955	0.370	0.271	25.0	28.1	0.189	1.7	56.3	19.4	22.5	0.236	2.20	55.6	Pauselli et al. (2019)
AP37	AHe	44.015	11.951	0.150	0.423	25.0	33.4	0.478	2.1	65.1	12.5	21.0	0.870	4.24	65.2	Pauselli et al. (2019)
AP38	AHe	43.797	11.914	1.200	0.858	25.0	43.6	0.947	2.5	71.5	10.9	26.0	1.533	5.55	70.2	Pauselli et al. (2019)
AP43R1	AHe	43.818	11.733	0.515	0.860	25.1	33.1	0.458	2.2	64.8	21.3	29.5	0.537	2.58	64.8	Pauselli et al. (2019)
AP43R2	AHe	43.818	11.733	0.515	0.860	25.1	32.5	0.425	2.2	64.1	22.0	29.5	0.485	2.48	64.3	Pauselli et al. (2019)
AP44R1	AHe	43.824	11.746	0.725	0.868	25.0	38.7	0.735	2.4	69.1	16.2	29.5	1.017	3.64	68.9	Pauselli et al. (2019)
AP45R1	AHe	43.844	11.749	0.940	0.897	25.0	35.3	0.568	2.3	66.5	19.5	29.5	0.687	2.90	66.3	Pauselli et al. (2019)
AP45R2	AHe	43.844	11.749	0.940	0.897	25.0	53.1	1.304	2.6	75.1	NA	29.0	0.687	0.99	75.7	Pauselli et al. (2019)

AP47R1	AHe	43.864	11.739	1.365	0.906	25.0	42	0.873	2.4	70.6	14.5	29.0	1.200	4.15	69.7	Pauselli et al. (2019)
AP48R1	AHe	43.879	11.711	1.655	0.907	25.0	38.8	0.736	2.4	68.9	17.7	30.0	0.893	3.30	67.9	Pauselli et al. (2019)
AP48R2	AHe	43.879	11.711	1.655	0.907	25.0	38.8	0.736	2.4	68.9	17.7	30.0	0.893	3.30	67.9	Pauselli et al. (2019)
AP5	AHe	44.189	11.501	0.200	0.521	25.0	29	0.241	1.9	59.6	24.5	28.5	0.247	1.96	59.6	della Vedova et al. (2001)
AP52	AHe	43.905	11.791	0.565	0.836	25.1	38.2	0.706	2.3	68.7	13.7	26.5	1.141	4.32	68.9	Pauselli et al. (2019)
AP53	AHe	43.934	11.656	0.907	0.830	25.0	31.1	0.356	2.1	62.5	23.0	29.0	0.383	2.28	62.4	Pauselli et al. (2019)
AP54	AHe	43.961	11.670	0.690	0.811	25.0	39.5	0.765	2.4	69.4	13.9	27.5	1.176	4.26	69.1	Pauselli et al. (2019)
AP55	AHe	44.013	11.687	1.070	0.722	25.0	42.7	0.901	2.4	70.9	12.7	27.5	1.347	4.69	69.9	Pauselli et al. (2019)
AP57	AHe	43.995	11.719	0.450	0.746	25.0	42.9	0.910	2.4	71.2	10.8	27.5	1.669	5.68	71.5	Pauselli et al. (2019)
AP5B	AHe	44.189	11.501	0.200	0.521	25.0	36.1	0.610	2.2	67.3	17.3	28.5	0.841	3.24	67.6	della Vedova et al. (2001)
AP5C	AHe	44.189	11.501	0.200	0.521	25.0	46.5	1.057	2.4	72.8	32.9	28.5	0.841	1.86	72.6	della Vedova et al. (2001)
AP5D	AHe	44.189	11.501	0.200	0.521	25.0	33.9	0.501	2.2	65.5	19.5	28.5	0.634	2.78	65.7	della Vedova et al. (2001)
AP8	AHe	44.147	11.449	0.300	0.629	25.1	42.7	0.903	2.4	71.2	12.9	30.0	1.483	4.69	71.4	della Vedova et al. (2001)
AP9	AHe	44.115	11.431	0.400	0.674	25.0	42.5	0.893	2.4	71.0	11.1	27.5	1.601	5.43	71.3	Pauselli et al. (2019)
C1	AHe	44.113	11.002	0.500	0.765	25.0	32.2	0.415	2.1	63.9	33.0	40.0	0.312	1.62	63.6	della Vedova et al. (2001)
C10	AHe	44.143	11.191	0.605	0.766	25.0	55.2	1.386	2.6	76.0	NA	35.0	0.312	0.49	73.3	della Vedova et al. (2001)
C11	AHe	44.001	10.807	0.950	0.667	25.1	30.9	0.342	2.0	62.0	38.7	45.0	0.247	1.34	62.8	della Vedova et al. (2001)
C13	AHe	44.021	10.864	0.700	0.747	25.0	32.8	0.443	2.2	64.3	39.7	47.5	0.295	1.37	64.6	della Vedova et al. (2001)
C16	AHe	44.060	10.913	0.630	0.909	25.0	34.1	0.513	2.2	65.6	36.2	45.0	0.353	1.54	65.3	della Vedova et al. (2001)
C17	AHe	44.068	10.919	0.625	0.921	25.0	34.2	0.517	2.3	65.8	36.2	45.0	0.355	1.54	65.3	della Vedova et al. (2001)
C2	AHe	44.004	11.012	0.830	0.660	25.0	34.4	0.522	2.2	65.7	35.1	45.0	0.406	1.57	66.1	della Vedova et al. (2001)
C22	AHe	44.041	10.932	0.850	0.821	25.1	33	0.454	2.2	64.6	36.8	45.0	0.330	1.49	64.8	della Vedova et al. (2001)
C23	AHe	44.021	10.929	0.884	0.719	25.0	32.9	0.453	2.2	64.6	36.7	45.0	0.338	1.49	65.0	della Vedova et al. (2001)
C29	AHe	44.731	9.386	0.320	0.775	25.0	32.9	0.454	2.2	64.7	27.2	35.0	0.412	2.00	64.5	della Vedova et al. (2001)
C3	AHe	44.014	11.025	0.780	0.706	25.0	33	0.452	2.2	64.4	36.7	45.0	0.331	1.48	64.8	della Vedova et al. (2001)
C34	AHe	44.417	9.949	0.510	0.855	25.1	34.1	0.508	2.2	65.7	31.2	40.0	0.405	1.78	65.3	della Vedova et al. (2001)
C37	AHe	44.246	10.683	0.641	1.064	25.0	39.3	0.755	2.4	69.3	31.2	45.0	0.610	1.93	69.0	della Vedova et al. (2001)
C4	AHe	44.028	11.038	0.680	0.753	25.1	39.7	0.772	2.4	69.5	28.7	43.5	0.696	2.06	69.6	della Vedova et al. (2001)
C40	AHe	44.223	10.758	1.250	0.980	25.1	45.5	1.017	2.5	72.3	25.4	46.0	1.007	2.48	72.2	della Vedova et al. (2001)
C5	AHe	44.049	11.044	0.610	0.798	25.0	32.6	0.434	2.2	64.2	35.0	42.5	0.313	1.54	64.0	della Vedova et al. (2001)
C52A	AHe	44.013	11.503	0.360	0.661	25.1	32.4	0.419	2.1	63.9	21.1	28.5	0.497	2.53	64.1	Pauselli et al. (2019)
C6	AHe	44.095	11.044	0.650	0.779	25.0	39.5	0.762	2.4	69.3	25.5	40.0	0.751	2.32	69.3	della Vedova et al. (2001)
C7	AHe	44.111	11.039	0.625	0.755	25.0	38.5	0.725	2.3	68.9	26.4	40.0	0.693	2.22	68.8	della Vedova et al. (2001)
C8	AHe	44.115	11.204	0.700	0.757	25.0	40.3	0.802	2.4	69.8	22.4	37.5	0.870	2.66	69.8	della Vedova et al. (2001)
C9	AHe	44.106	11.204	1.000	0.738	25.0	46.3	1.051	2.5	72.7	18.0	37.5	1.275	3.44	72.4	della Vedova et al. (2001)
CIM1	AHe	44.194	10.699	2.165	1.174	25.0	40.2	0.800	2.5	69.5	28.9	45.0	0.745	2.14	70.0	della Vedova et al. (2001)
CIM1R1	AHe	44.194	10.699	2.165	1.174	25.0	40.2	0.802	2.5	69.5	28.9	45.0	0.748	2.14	70.1	della Vedova et al. (2001)
CIM2	AHe	44.194	10.704	2.045	1.165	25.1	42.8	0.908	2.5	71.0	26.8	45.0	0.879	2.35	71.2	della Vedova et al. (2001)
CIM3	AHe	44.196	10.692	1.950	1.184	25.1	42.7	0.903	2.5	70.9	26.9	45.0	0.871	2.34	71.1	della Vedova et al. (2001)
CIM3R1	AHe	44.196	10.692	1.950	1.184	25.0	38.1	0.705	2.4	68.3	30.8	45.0	0.629	1.97	68.7	della Vedova et al. (2001)
CIM4	AHe	44.200	10.684	1.830	1.196	25.0	40.4	0.810	2.5	69.8	28.8	45.0	0.749	2.15	70.0	della Vedova et al. (2001)
CIM4R1	AHe	44.200	10.684	1.830	1.196	25.0	39.7	0.779	2.5	69.3	29.5	45.0	0.710	2.09	69.8	della Vedova et al. (2001)
CIM5	AHe	44.202	10.677	1.750	1.208	25.0	39.2	0.751	2.4	69.0	30.0	45.0	0.675	2.04	69.2	della Vedova et al. (2001)
CIM5A	AHe	44.202	10.677	1.750	1.208	25.0	40.6	0.818	2.5	70.0	28.7	45.0	0.756	2.16	70.1	della Vedova et al. (2001)
CIM5R1	AHe	44.202	10.677	1.750	1.208	25.1	41.7	0.857	2.5	70.4	27.9	45.0	0.808	2.25	70.7	della Vedova et al. (2001)
CIM6	AHe	44.201	10.666	1.660	1.230	25.0	40.2	0.800	2.5	69.7	29.2	45.0	0.730	2.13	70.0	della Vedova et al. (2001)
CIM6R1	AHe	44.201	10.666	1.660	1.230	25.0	39.9	0.785	2.5	69.4	29.4	45.0	0.712	2.10	69.8	della Vedova et al. (2001)
VALD10a	AHe	43.653	11.640	1.400	0.836	25.0	36.9	0.651	2.3	67.7	17.7	28.5	0.804	3.22	67.1	Pauselli et al. (2019)
VALD1a	AHe	43.594	11.603	0.497	0.471	25.0	29.3	0.259	1.9	59.9	24.7	29.0	0.262	1.95	59.9	Pauselli et al. (2019)
VALD2a	AHe	43.612	11.645	0.500	0.685	25.0	32	0.405	2.1	63.7	23.0	30.0	0.438	2.31	63.7	Pauselli et al. (2019)
VALD2R1	AHe	43.612	11.645	0.500	0.685	25.0	32	0.408	2.1	63.7	23.0	30.0	0.441	2.31	63.8	Pauselli et al. (2019)
VALD4a1	AHe	43.620	11.648	0.740	0.730	25.0	33.8	0.497	2.2	65.4	20.8	29.5	0.575	2.63	65.2	Pauselli et al. (2019)
VALD4a2	AHe	43.620	11.648	0.740	0.730	25.0	31.2	0.359	2.1	62.5	23.3	29.5	0.381	2.23	62.4	Pauselli et al. (2019)
VALD4R1	AHe	43.620	11.648	0.740	0.730	25.1	32.8	0.442	2.1	64.3	21.8	29.5	0.495	2.46	64.2	Pauselli et al. (2019)
VALD5a	AHe	43.621	11.656	0.850	0.747	25.0	33.3	0.470	2.2	64.8	21.9	30.0	0.523	2.48	64.7	Pauselli et al. (2019)
VALD5R1	AHe	43.621	11.656	0.850	0.747	25.0	33.4	0.474	2.2	64.8	21.8	30.0	0.529	2.50	64.7	Pauselli et al. (2019)
VALD6a	AHe	43.620	11.659	0.880	0.746	25.0	33.1	0.465	2.2	64.7	22.0	30.0	0.513	2.46	64.5	Pauselli et al. (2019)
VALD6R1	AHe	43.620	11.659	0.880	0.746	25.0	33.6	0.490	2.2	65.2	21.5	30.0	0.548	2.54	64.9	Pauselli et al. (2019)
VALD7a	AHe	43.604	11.651	1.100	0.658	25.0	35.3	0.575	2.2	66.5	21.0	31.0	0.642	2.63	66.1	Pauselli et al. (2019)
VALD8R1	AHe	43.626	11.684	1.200	0.782	25.0	34.5	0.528	2.2	65.6	21.4	30.5	0.587	2.58	65.4	Pauselli et al. (2019)
VALD8R2	AHe	43.626	11.684	1.200	0.782	25.0	36.2	0.615	2.3	67.1	19.9	30.5	0.712	2.84	66.8	Pauselli et al. (2019)

Kinetic Parameters for (U-Th)/He apatite *(from Farley, 2000 and Reiners and Brandon, 2006)*

E_a = 138 kJ mol^{-1} (activation energy)

a_s = 45 μm (effective spherical radius for the diffusion domain)

$\Omega = 1.36 \times 10^6$ (frequency factor calculated as $55D_0a^{-2}$)

$t_{c.10}$ = 62.7°C (effective closure temperature for 10 Myr^{-1} cooling rates and specified a_s value)

Supplementary Table 6 Erosion rates and parameters for AFT bedrock samples.

						Imposed G_0 = 25 (°C/km)					G_f calculated from heat flow measurements					
ID	Method	Latitude	Longitude	Sample Elevation (km)	Mean Elevation (km)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Heat Flow Measurement Source
1927	AFT	44.064	11.597	0.350	0.667	25.1	32.2	0.410	4.1	113.9	20.8	28.0	0.494	4.9	113.4	Pauselli et al. (2019)
1929	AFT	44.037	11.504	0.700	0.619	25.0	35.3	0.574	4.3	118.8	18.3	28.5	0.743	5.8	117.9	Pauselli et al. (2019)
1930	AFT	44.069	11.492	1.150	0.630	25.0	40.4	0.805	4.5	123.2	14.8	29.0	1.155	7.5	121.8	Pauselli et al. (2019)
03GB07	AFT	44.124	10.059	0.675	0.356	25.0	34.1	0.508	4.2	116.3	30.8	40.0	0.429	3.4	117.2	della Vedova et al. (2001)
03RE20	AFT	44.098	10.326	1.055	0.760	25.0	34.6	0.536	4.3	117.1	30.2	40.0	0.459	3.6	117.7	della Vedova et al. (2001)
050320-1a	AFT	44.263	10.664	1.112	0.976	25.0	34.5	0.532	4.3	117.4	32.9	42.5	0.422	3.3	118.1	della Vedova et al. (2001)
050320-1b	AFT	44.263	10.664	1.112	0.976	25.0	38.3	0.712	4.5	121.7	29.1	42.5	0.634	3.9	122.0	della Vedova et al. (2001)
AP 10	AFT	44.121	11.396	0.500	0.685	25.0	39.8	0.780	4.5	123.2	13.2	27.5	1.277	8.5	121.9	Pauselli et al. (2019)
Ap 15	AFT	43.819	11.952	0.700	0.805	25.0	32.1	0.411	4.1	112.4	22.9	30.0	0.446	4.4	111.8	Pauselli et al. (2019)
AP 34	AFT	44.097	11.315	0.600	0.653	25.0	35.7	0.592	4.3	119.3	17.4	28.0	0.802	6.2	118.3	Pauselli et al. (2019)
AP 43	AFT	43.818	11.733	0.515	0.805	25.0	36	0.608	4.4	119.9	18.4	29.5	0.793	5.9	119.2	Pauselli et al. (2019)
AP 44	AFT	43.824	11.746	0.725	0.807	25.0	38.6	0.725	4.5	122.0	16.7	30.0	0.996	6.7	121.3	Pauselli et al. (2019)
AP 45	AFT	43.828	11.749	0.940	0.809	25.0	38.9	0.741	4.5	122.3	16.1	29.5	1.031	6.9	121.0	Pauselli et al. (2019)
AP 47	AFT	43.864	11.739	1.365	0.816	25.0	40.6	0.816	4.5	123.1	14.6	29.0	1.176	7.6	121.4	Pauselli et al. (2019)
AP 52	AFT	43.905	11.723	0.565	0.799	25.1	36.7	0.633	4.4	120.1	18.4	30.0	0.824	6.0	119.7	Pauselli et al. (2019)
AP 53	AFT	43.934	11.656	0.907	0.814	25.0	33.1	0.458	4.2	114.5	21.0	29.0	0.536	4.9	113.9	Pauselli et al. (2019)
AP 54	AFT	43.961	11.670	0.690	0.747	25.0	36.3	0.617	4.4	119.8	17.4	28.5	0.835	6.3	119.1	Pauselli et al. (2019)
AP 55	AFT	44.013	11.687	1.070	0.672	25.0	34.4	0.525	4.2	116.6	19.3	28.5	0.648	5.4	115.5	Pauselli et al. (2019)
AP 56	AFT	43.983	11.686	0.500	0.723	25.0	39	0.747	4.5	122.4	14.7	28.5	1.134	7.6	121.8	Pauselli et al. (2019)
AP 57	AFT	43.995	11.719	0.450	0.688	25.0	40.6	0.814	4.5	123.5	12.4	27.5	1.384	9.0	122.5	Pauselli et al. (2019)
AP 9	AFT	44.115	11.431	0.400	0.673	25.0	39.4	0.761	4.5	122.8	13.9	28.0	1.211	8.0	122.0	Pauselli et al. (2019)
BOR2	AFT	44.435	9.425	0.452	0.779	25.0	33	0.457	4.2	115.9	32.2	40.0	0.355	3.3	116.2	della Vedova et al. (2001)
BORI	AFT	44.435	9.425	0.450	0.779	25.0	34.2	0.519	4.3	117.8	30.9	40.0	0.422	3.5	117.8	della Vedova et al. (2001)
BT1	AFT	44.085	9.787	0.475	0.104	25.0	39.8	0.780	4.4	123.0	25.2	40.0	0.775	4.3	122.6	della Vedova et al. (2001)
BT2	AFT	44.085	9.787	0.525	0.104	25.0	39.6	0.770	4.4	122.6	25.4	40.0	0.762	4.3	122.5	della Vedova et al. (2001)
C1	AFT	44.113	11.002	0.500	0.789	25.0	34	0.505	4.3	117.1	33.7	42.5	0.379	3.2	117.5	della Vedova et al. (2001)
C10	AFT	44.143	11.191	0.605	0.683	25.0	40.3	0.802	4.5	123.3	19.9	35.0	0.954	5.6	122.9	della Vedova et al. (2001)
C11	AFT	44.001	10.807	0.950	0.644	25.1	32.2	0.414	3.8	106.7	37.4	45.0	0.299	2.7	110.7	della Vedova et al. (2001)
C13	AFT	44.021	10.864	0.700	0.731	25.0	34.6	0.533	4.3	117.6	38.0	47.5	0.369	2.8	118.6	della Vedova et al. (2001)
C16	AFT	44.060	10.913	0.630	0.807	25.0	45.3	1.014	4.7	126.6	24.7	45.0	1.022	4.7	126.5	della Vedova et al. (2001)
C17	AFT	44.068	10.919	0.625	0.818	25.0	37.2	0.661	4.4	121.0	32.9	45.0	0.522	3.4	121.2	della Vedova et al. (2001)
C2	AFT	44.004	11.012	0.830	0.548	25.0	35.8	0.593	4.3	118.9	33.9	45.0	0.466	3.2	119.5	della Vedova et al. (2001)
C22	AFT	44.041	10.932	0.850	0.747	25.0	45.3	1.012	4.6	126.7	24.7	45.0	1.020	4.7	126.4	della Vedova et al. (2001)
C23	AFT	44.021	10.929	0.884	0.689	25.1	38	0.692	4.4	121.0	32.7	46.0	0.563	3.4	121.6	della Vedova et al. (2001)
C29	AFT	44.731	9.386	0.320	0.804	25.0	36.5	0.630	4.4	120.4	23.4	35.0	0.668	4.7	120.2	della Vedova et al. (2001)
C3	AFT	44.014	11.025	0.780	0.580	25.1	38.4	0.711	4.4	121.4	30.0	43.5	0.621	3.7	122.2	della Vedova et al. (2001)
C34	AFT	44.417	9.949	0.510	0.820	25.1	32.2	0.410	4.1	113.8	33.1	40.0	0.309	3.2	114.4	della Vedova et al. (2001)
C37	AFT	44.246	10.683	0.641	1.016	25.0	44.8	0.991	4.7	126.6	23.7	43.5	1.032	4.9	126.3	della Vedova et al. (2001)
C38	AFT	44.223	10.777	0.980	0.950	25.0	44.5	0.977	4.7	125.9	26.0	45.5	0.952	4.5	126.2	della Vedova et al. (2001)
C4	AFT	44.028	11.038	0.680	0.620	25.0	43.4	0.933	4.6	125.5	25.1	43.5	0.930	4.6	125.5	della Vedova et al. (2001)
C40	AFT	44.223	10.758	1.250	0.977	25.0	41.5	0.851	4.6	123.8	29.2	46.0	0.763	3.9	124.4	della Vedova et al. (2001)
C5	AFT	44.049	11.044	0.610	0.679	25.0	36	0.606	4.4	119.6	32.4	43.5	0.484	3.4	120.0	della Vedova et al. (2001)
C52	AFT	44.013	11.503	0.360	0.594	25.0	35.1	0.562	4.3	118.8	18.4	28.5	0.739	5.8	118.3	Pauselli et al. (2019)
C6	AFT	44.095	11.044	0.650	0.735	25.0	37.3	0.669	4.4	120.9	27.6	40.0	0.614	4.0	121.0	della Vedova et al. (2001)
C7	AFT	44.111	11.039	0.625	0.738	25.0	36.4	0.626	4.4	120.1	28.5	40.0	0.558	3.8	120.2	della Vedova et al. (2001)
C8	AFT	44.115	11.207	0.700	0.680	25.0	35.5	0.580	4.3	118.8	27.0	37.5	0.544	4.0	119.1	della Vedova et al. (2001)
C9	AFT	44.106	11.204	1.000	0.673	27.0	36.8	0.512	4.0	117.7	27.7	37.5	0.502	3.9	117.9	della Vedova et al. (2001)
CAS1	AFT	44.206	10.446	1.300	1.061	25.0	33.2	0.466	4.2	113.9	31.7	40.0	0.380	3.4	115.0	della Vedova et al. (2001)
CAS2	AFT	44.174	10.424	0.965	0.980	25.1	32.4	0.424	4.1	112.6	32.7	40.0	0.331	3.2	113.7	della Vedova et al. (2001)
CAST2	AFT	44.105	10.415	0.270	0.811	25.0	31.4	0.372	4.1	112.2	34.0	40.0	0.264	3.0	113.0	della Vedova et al. (2001)
CAST3	AFT	44.105	10.415	0.240	0.811	25.1	31.9	0.395	4.1	113.9	33.5	40.0	0.285	3.1	114.0	della Vedova et al. (2001)
CB3	AFT	44.051	9.830	0.000	0.079	25.0	32.8	0.443	4.0	115.1	32.3	40.0	0.350	3.2	115.7	della Vedova et al. (2001)
CB4	AFT	44.051	9.830	0.000	0.079	25.1	32.5	0.428	4.0	114.5	32.6	40.0	0.334	3.1	115.0	della Vedova et al. (2001)
CB5	AFT	44.051	9.830	0.000	0.079	24.9	33.7	0.493	4.1	116.7	31.3	40.0	0.402	3.3	117.3	della Vedova et al. (2001)
CH1	AFT	43.601	11.411	0.303	0.337	25.0	36.1	0.611	4.3	119.7	23.9	35.0	0.634	4.5	119.8	Pauselli et al. (2019)
CH2	AFT	43.541	11.430	0.504	0.379	25.0	35.8	0.596	4.3	119.2	29.1	40.0	0.526	3.7	119.7	Pauselli et al. (2019)
CH3	AFT	43.565	11.382	0.722	0.373	25.0	35.3	0.571	4.2	118.2	28.1	38.5	0.521	3.8	118.7	Pauselli et al. (2019)
CH4	AFT	43.562	11.380	0.857	0.376	25.1	35.1	0.556	4.2	117.7	28.4	38.5	0.506	3.7	118.3	Pauselli et al. (2019)
CIM1	AFT	44.194	10.699	2.165	1.121	25.0	36.7	0.637	4.4	118.9	32.5	45.0	0.533	3.4	119.8	della Vedova et al. (2001)
CIM2	AFT	44.194	10.704	2.045	1.116	25.0	36	0.603	4.4	118.0	33.4	45.0	0.494	3.3	119.3	della Vedova et al. (2001)
CIM3	AFT	44.196	10.692	1.950	1.124	25.0	36.2	0.616	4.4	118.5	33.2	45.0	0.504	3.4	119.8	della Vedova et al. (2001)
CIM4	AFT	44.200	10.684	1.830	1.128	25.0	37	0.652	4.4	119.7	30.1	42.5	0.571	3.7	120.2	della Vedova et al. (2001)
CIM5	AFT	44.202	10.677	1.750	1.134	25.1	36	0.603	4.4	118.8	33.0	44.5	0.490	3.4	119.4	della Vedova et al. (2001)
CIM6	AFT	44.201	10.666	1.660	1.149	25.1	36.6	0.632	4.4	119.6	32.0	44.0	0.526	3.5	120.2	della Vedova et al. (2001)
GOM2	AFT	44.125	10.642	1.850	1.061	25.0	33.9	0.498	4.1	112.0	34.6	44.0	0.392	3.1	114.6	della Vedova et al. (2001)
GOM3	AFT	44.134	10.656	1.300	1.096	25.0	36.3	0.618	4.4	119.4	32.5	44.0	0.501	3.4	120.0	della Vedova et al. (2001)
MG3	AFT	44.235	9.472	0.000	0.193	25.0	31.2	0.362	3.8	108.0	33.9	40.0	0.269	2.9	110.1	della Vedova et al. (2001)
MS1	AFT	44.134	9.638	0.000	0.136	25.0	31.3	0.367	3.8	108.1	33.8	40.0	0.276	2.9	110.3	della Vedova et al. (2001)
MS2	AFT	44.134	9.638	0.000	0.136	25.0	33.1	0.462	4.1	115.9	32.0	40.0	0.367	3.2	116.4	della Vedova et al. (2001)
MS4	AFT	44.134	9.638	0.000	0.136	25.1	32.8	0.442	4.1	115.2	32.3	40.0	0.347	3.2	115.6	della Vedova et al. (2001)
MS5	AFT	44.134	9.638	0.000	0.136	25.1	32.2	0.413	4.0	113.7	33.0	40.0	0.317	3.1	114.5	della Vedova et al. (2001)

PR 11	AFT	44.463	9.930	0.880	0.808	25.0	32.9	0.452	4.2	114.4	32.0	40.0	0.361	3.3	115.1	della Vedova et al. (2001)
PR 12	AFT	44.353	9.776	0.668	0.700	25.0	32.6	0.438	4.1	114.0	32.4	40.0	0.344	3.2	115.0	della Vedova et al. (2001)
PR 15	AFT	44.472	9.966	1.085	0.837	25.1	34.8	0.543	4.3	117.7	30.1	40.0	0.466	3.6	118.0	della Vedova et al. (2001)
PR 17	AFT	44.379	10.196	0.860	1.001	25.0	39.6	0.770	4.5	122.9	32.8	47.5	0.617	3.5	123.1	della Vedova et al. (2001)
PR 18	AFT	44.380	10.194	0.780	1.001	25.0	37.9	0.693	4.5	121.5	34.6	47.5	0.522	3.3	121.5	della Vedova et al. (2001)
PR 20	AFT	44.338	10.528	0.500	0.881	25.0	46.6	1.068	4.7	127.6	16.4	37.5	1.451	7.2	127.5	della Vedova et al. (2001)
PR 22	AFT	44.331	10.564	1.082	0.851	25.0	49.7	1.186	4.8	129.0	14.9	37.5	1.634	7.9	127.9	della Vedova et al. (2001)
PR 23.1	AFT	44.329	10.562	1.111	0.861	25.0	39.5	0.762	4.5	122.3	23.2	37.5	0.807	4.8	122.2	della Vedova et al. (2001)
PR 25.1	AFT	44.320	9.995	0.248	0.639	25.0	33.3	0.471	4.2	116.5	34.5	42.5	0.339	3.1	116.7	della Vedova et al. (2001)
PR 26	AFT	44.463	9.602	1.135	0.883	25.0	37.8	0.688	4.4	120.9	27.1	40.0	0.647	4.1	121.3	della Vedova et al. (2001)
PR 27	AFT	44.525	9.824	0.618	0.726	25.0	37.9	0.696	4.4	121.6	24.6	37.5	0.705	4.5	121.3	della Vedova et al. (2001)
PR 28.1	AFT	44.522	9.931	0.710	0.776	25.0	43.2	0.930	4.6	125.4	17.4	35.0	1.208	6.6	125.1	della Vedova et al. (2001)
PR 28.2	AFT	44.522	9.931	0.702	0.776	25.0	39.8	0.776	4.5	122.7	20.5	35.0	0.908	5.5	122.8	della Vedova et al. (2001)
PR 3	AFT	44.446	9.943	0.600	0.817	25.0	34.9	0.548	4.3	118.1	30.2	40.0	0.461	3.6	118.6	della Vedova et al. (2001)
PR 5	AFT	44.456	9.804	0.718	0.777	25.0	33.4	0.476	4.2	115.9	29.2	37.5	0.414	3.6	116.5	della Vedova et al. (2001)
PR 6.1	AFT	44.456	9.783	0.600	0.789	25.1	38.7	0.728	4.5	122.2	23.8	37.5	0.757	4.7	121.9	della Vedova et al. (2001)
PR 7	AFT	44.550	9.940	0.301	0.748	25.0	36.2	0.615	4.4	120.2	23.7	35.0	0.645	4.6	120.0	della Vedova et al. (2001)
RAM1	AFT	44.434	9.311	1.318	0.632	25.0	34.3	0.524	4.2	115.7	30.4	40.0	0.451	3.5	116.8	della Vedova et al. (2001)
RAM3	AFT	44.427	9.312	1.075	0.606	25.1	36.4	0.620	4.3	119.4	28.5	40.0	0.563	3.8	119.8	della Vedova et al. (2001)
RAM4	AFT	44.427	9.312	1.075	0.606	25.0	35	0.555	4.3	117.6	29.9	40.0	0.484	3.6	118.4	della Vedova et al. (2001)
RAM5	AFT	44.422	9.311	0.950	0.587	25.0	34.9	0.554	4.3	117.8	29.9	40.0	0.480	3.6	118.4	della Vedova et al. (2001)
RAM6	AFT	44.422	9.311	0.948	0.587	25.0	36	0.606	4.3	119.2	28.9	40.0	0.542	3.8	119.7	della Vedova et al. (2001)
ROM1	AFT	44.002	11.472	0.890	0.562	25.0	37.7	0.682	4.4	120.9	16.8	29.0	0.918	6.4	119.7	Pauselli et al. (2019)
ROM2	AFT	44.001	11.472	0.760	0.560	25.0	38.3	0.712	4.4	121.7	16.2	29.0	0.986	6.7	120.4	Pauselli et al. (2019)
ROM3	AFT	44.000	11.475	0.675	0.560	25.0	41.1	0.839	4.5	123.8	13.8	29.0	1.280	8.0	122.5	Pauselli et al. (2019)
ROM4	AFT	43.998	11.477	0.575	0.563	25.0	40.3	0.802	4.5	123.3	14.4	29.0	1.208	7.7	122.4	Pauselli et al. (2019)
ROM5	AFT	43.994	11.477	0.480	0.562	25.0	34.6	0.535	4.3	117.8	19.4	29.0	0.667	5.5	117.4	Pauselli et al. (2019)
S 1	AFT	44.178	10.160	0.546	0.662	25.1	34.7	0.539	4.3	118.0	32.9	42.5	0.421	3.3	118.5	della Vedova et al. (2001)
S 3	AFT	44.139	10.073	0.494	0.374	25.1	35.1	0.559	4.2	118.4	32.3	42.5	0.451	3.3	118.9	della Vedova et al. (2001)
S 4	AFT	44.128	10.059	0.636	0.330	25.0	38.3	0.714	4.4	121.6	28.9	42.5	0.640	3.8	121.8	della Vedova et al. (2001)
SC 2	AFT	44.081	10.083	0.204	0.342	25.1	34.6	0.534	4.2	118.1	30.5	40.0	0.448	3.5	118.4	della Vedova et al. (2001)
SILL1	AFT	44.368	10.064	1.861	0.860	25.0	35	0.560	4.3	116.2	33.9	44.5	0.453	3.2	118.0	della Vedova et al. (2001)
SILL10	AFT	44.334	10.050	0.730	0.754	25.1	34.3	0.516	4.3	117.1	35.3	44.5	0.381	3.0	118.0	della Vedova et al. (2001)
SILL2	AFT	44.361	10.074	1.790	0.863	25.1	34	0.503	4.1	111.6	35.4	45.0	0.394	3.0	114.4	della Vedova et al. (2001)
SILL3	AFT	44.357	10.073	1.600	0.853	25.0	37.1	0.659	4.4	120.0	32.3	45.0	0.551	3.4	121.0	della Vedova et al. (2001)
SILL4	AFT	44.455	10.076	1.530	0.951	25.0	38.1	0.704	4.5	121.2	26.8	40.0	0.671	4.2	121.4	della Vedova et al. (2001)
SILL5	AFT	44.354	10.071	1.420	0.843	25.0	36.3	0.620	4.4	119.2	33.2	45.0	0.503	3.3	120.2	della Vedova et al. (2001)
SILL6	AFT	44.353	10.057	1.260	0.815	25.0	35.9	0.602	4.4	118.9	33.1	44.5	0.484	3.3	119.5	della Vedova et al. (2001)
SILL7	AFT	44.338	10.058	1.130	0.781	25.0	36.7	0.639	4.4	120.0	32.4	44.5	0.524	3.4	120.4	della Vedova et al. (2001)
SILL9	AFT	44.334	10.050	0.780	0.755	25.0	37.1	0.658	4.4	120.5	32.2	44.5	0.534	3.4	121.0	della Vedova et al. (2001)
SM 3	AFT	44.164	10.129	0.250	0.558	25.0	31.9	0.398	4.1	113.1	35.9	42.5	0.274	2.9	114.0	della Vedova et al. (2001)
SU 1	AFT	44.170	10.188	0.773	0.724	25.0	35.1	0.566	4.3	118.6	32.3	42.5	0.454	3.4	119.1	della Vedova et al. (2001)
TCGA	AFT	43.993	11.476	0.360	0.560	25.0	36.8	0.643	4.4	120.6	17.2	29.0	0.877	6.3	119.7	Pauselli et al. (2019)
VALD1	AFT	43.594	11.603	0.497	0.484	25.0	37.6	0.681	4.4	121.3	16.7	29.0	0.937	6.5	120.1	Pauselli et al. (2019)
VALD10	AFT	43.653	11.640	1.400	0.836	25.0	35.6	0.582	4.3	118.1	18.3	28.5	0.740	5.8	116.9	Pauselli et al. (2019)
VALD11	AFT	43.663	11.641	1.450	0.644	25.0	38.1	0.701	4.4	120.8	15.9	28.0	0.962	6.8	119.3	Pauselli et al. (2019)
VALD12	AFT	43.696	11.673	0.960	0.717	25.0	35.6	0.582	4.3	118.5	17.7	28.0	0.769	6.1	117.5	Pauselli et al. (2019)
VALD2	AFT	43.612	11.645	0.500	0.550	25.0	33.8	0.495	4.2	116.6	21.2	30.0	0.573	4.9	116.1	Pauselli et al. (2019)
VALD3	AFT	43.614	11.656	0.580	0.559	25.0	34.7	0.541	4.3	117.8	20.4	30.0	0.646	5.2	117.5	Pauselli et al. (2019)
VALD4	AFT	43.620	11.648	0.740	0.567	25.0	37.4	0.673	4.4	120.9	17.4	29.5	0.888	6.2	119.9	Pauselli et al. (2019)
VALD5	AFT	43.621	11.656	0.850	0.572	25.0	40.1	0.796	4.5	123.1	15.7	30.0	1.109	7.0	121.8	Pauselli et al. (2019)
VALD6	AFT	43.620	11.659	0.880	0.571	25.0	35.4	0.575	4.3	118.3	19.8	30.0	0.692	5.4	117.6	Pauselli et al. (2019)
VALD7	AFT	43.604	11.651	1.100	0.536	25.0	36	0.606	4.3	119.0	20.2	31.0	0.709	5.3	118.0	Pauselli et al. (2019)
VALD8	AFT	43.626	11.684	1.200	0.585	25.0	33.9	0.503	4.2	115.2	21.7	30.5	0.562	4.7	114.2	Pauselli et al. (2019)
VALD9	AFT	43.646	11.652	1.200	0.619	25.0	34.1	0.512	4.2	115.7	20.1	29.0	0.608	5.1	114.4	Pauselli et al. (2019)
ZAT2	AFT	44.391	9.442	1.349	0.637	25.0	33.5	0.483	4.0	112.2	31.2	40.0	0.408	3.3	113.7	della Vedova et al. (2001)

Kinetic Parameters for FT apatite *(from Ketcham et al., 1999)*

E_a = 147 kJ mol^{-1} (activation energy)

Ω = 2.05 x 10^6 (measured directly from annealing experiments)

$t_{c,10}$ = 116°C (effective closure temperature for 10 Myr^{-1} cooling rates)

Supplementary Table 7 Erosion rates and parameters for AFT detrital samples.

					Imposed G_0 = 25 (°C/km)					G_f calculated from heat flow measurements					
ID	Method	Latitude	Longitude	Sample Elevation (km)	Geothermal Gradient (°C/km)	Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Heat Flow Measurement Source
Enza	AFT Detrital	44.620	10.413	0.163	25.0	38.0	0.699	4.3	121.5	12.5	25.0	1.189	8.5	120.1	della Vedova et al. (2001)
Nure	AFT Detrital	44.872	9.647	0.208	25.0	39.7	0.775	4.4	123.0	12.1	26.0	1.327	8.9	121.2	della Vedova et al. (2001)
Panaro	AFT Detrital	44.477	11.027	0.099	25.0	34.2	0.517	4.2	117.3	13.3	22.5	0.882	7.6	115.2	della Vedova et al. (2001)
Secchia	AFT Detrital	44.532	10.758	0.119	25.0	34.7	0.543	4.2	118.1	9.9	19.5	1.173	10.3	114.9	della Vedova et al. (2001)
Taro	AFT Detrital	44.713	10.120	0.117	25.0	38.2	0.710	4.3	121.7	14.7	27.5	1.067	7.3	120.7	della Vedova et al. (2001)
Trebbia	AFT Detrital	44.901	9.584	0.140	25.0	39.9	0.789	4.4	123.2	11.0	25.0	1.439	9.8	121.3	della Vedova et al. (2001)
Bisenzio	AFT Detrital	43.928	11.126	0.102	25.0	36.6	0.637	4.3	120.4	19.5	31.0	0.779	5.5	119.8	Pauselli et al. (2019)
Lima1	AFT Detrital	44.000	10.560	0.097	25.0	36.4	0.628	4.3	120.2	28.4	40.0	0.563	3.7	120.2	della Vedova et al. (2001)
Lima2	AFT Detrital	44.091	10.760	0.544	25.0	35.5	0.582	4.3	118.8	34.4	45.0	0.442	3.1	119.6	della Vedova et al. (2001)
Magra1	AFT Detrital	44.188	9.925	0.036	25.0	37.0	0.654	4.3	120.6	27.9	40.0	0.597	3.8	120.6	della Vedova et al. (2001)
Magra2	AFT Detrital	44.387	9.887	0.251	25.0	36.9	0.651	4.3	120.5	27.9	40.0	0.592	3.9	120.6	della Vedova et al. (2001)
Pescia	AFT Detrital	43.929	10.693	0.105	25.1	33.1	0.459	4.1	115.6	34.4	42.5	0.343	3.0	116.2	della Vedova et al. (2001)
Serchio	AFT Detrital	44.192	10.306	0.525	25.0	33.7	0.494	4.2	116.6	33.8	42.5	0.377	3.1	117.2	della Vedova et al. (2001)
Vara	AFT Detrital	44.198	9.851	0.032	25.0	35.5	0.585	4.2	119.3	29.4	40.0	0.509	3.6	119.5	della Vedova et al. (2001)

Kinetic Parameters for FT apatite *(from Ketcham et al., 1999)*

E_a = 147 kJ mol^{-1} (activation energy)

$\Omega = 2.05 \times 10^6$ (measured directly from annealing experiments)

$t_{c,10}$ = 116°C (effective closure temperature for 10 Myr^{-1} cooling rates)

Supplementary Table 8 Erosion rates and parameters for ZHe samples.

						Imposed G_0 = 25 (°C/km)					G_f calculated from heat flow measurements					
ID	Method	Latitude	Longitude	Sample Elevation (km)	Mean Elevation (km)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Inital Geothermal Gradient (°C/km)	Final Geothermal Gradient (°C/km)	Erosion Rate (km/My)	Closure Depth (km)	Closure Temperature (°C)	Heat Flow Measurement Source
020620-3	ZHe	44.122	10.068	0.756	0.395	25	38.2	0.71	6.6	178.1	27	40	0.667	6.23	179.4	della Vedova et al. (2001)
020620-3 rep	ZHe	44.122	10.068	0.756	0.395	25	38.3	0.71	6.7	179.0	27	40	0.675	6.29	180.1	della Vedova et al. (2001)

Kinetic Parameters for (U-Th)/He zircon *(from Reiners et al., 2004)*

E_a = 169 kJ mol^{-1} (activation energy)

a_s = 60 μm (effective spherical radius for the diffusion domain)

$\Omega = 7.03 \times 10^5$ (frequency factor calculated as $55D_0a^{-2}$)

$t_{c,10}$ = 183°C (effective closure temperature for 10 Myr^{-1} cooling rates and specified a_s value)