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Relict landscape evolution and fault reactivation in the eastern Tian Shan: insights from the Harlik Mountains

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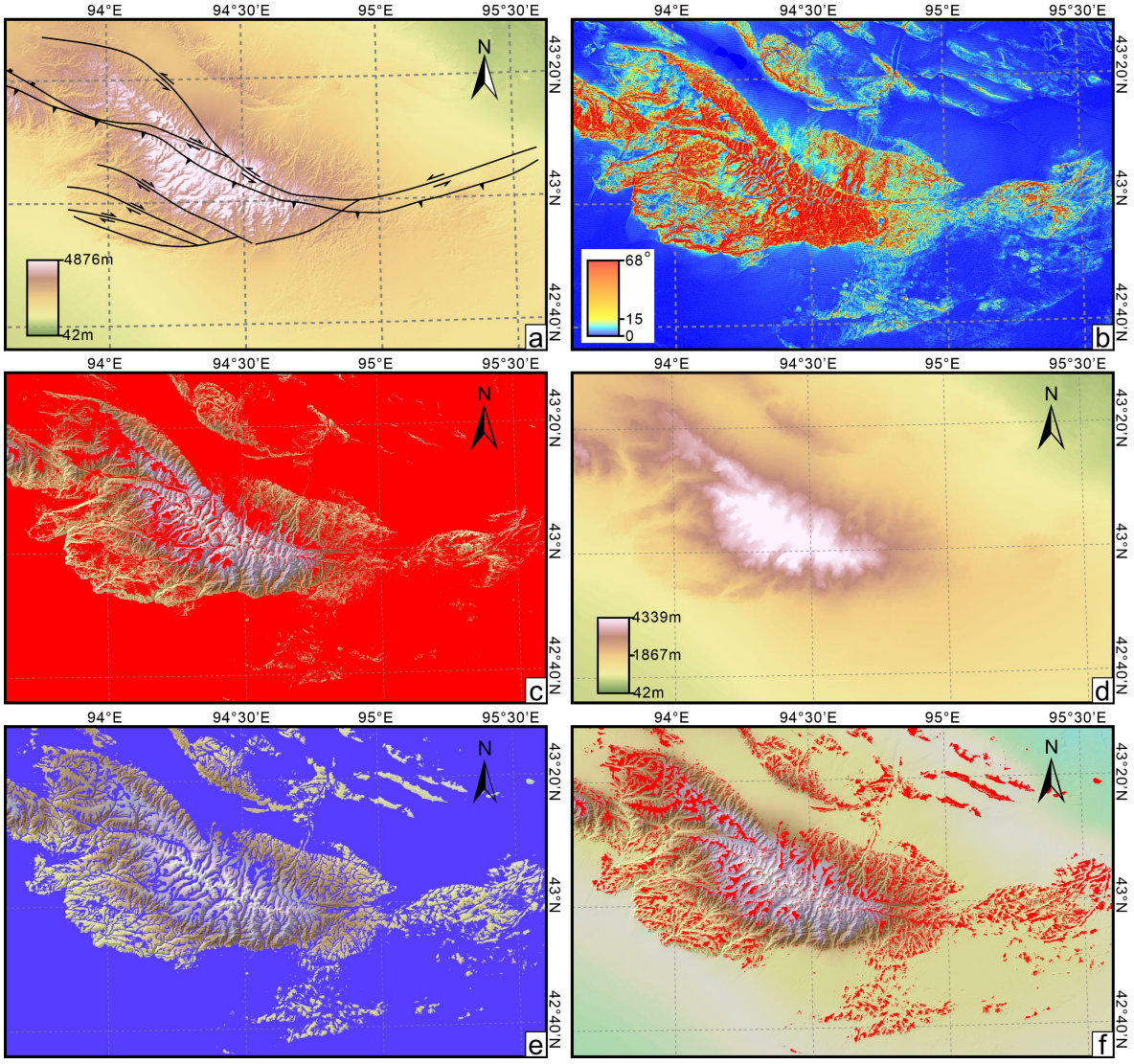

Figure S1 Extraction of relict surfaces: a. original DEM of the Harlik Mountains with faults; b. slope map of the Harlik Mountains; c. areas in and around the Harlik Mountains with slopes less than 14° (in red); d. the erosional base level resulting from interpolation between rivers (defined using a contributing-area threshold of 100 cells); e. areas in and around the Harlik mountain with a relative height (topography – erosional base level) of less than 40 m (in blue); f. resulting relict surfaces identified within the Harlik Mountains (in red).

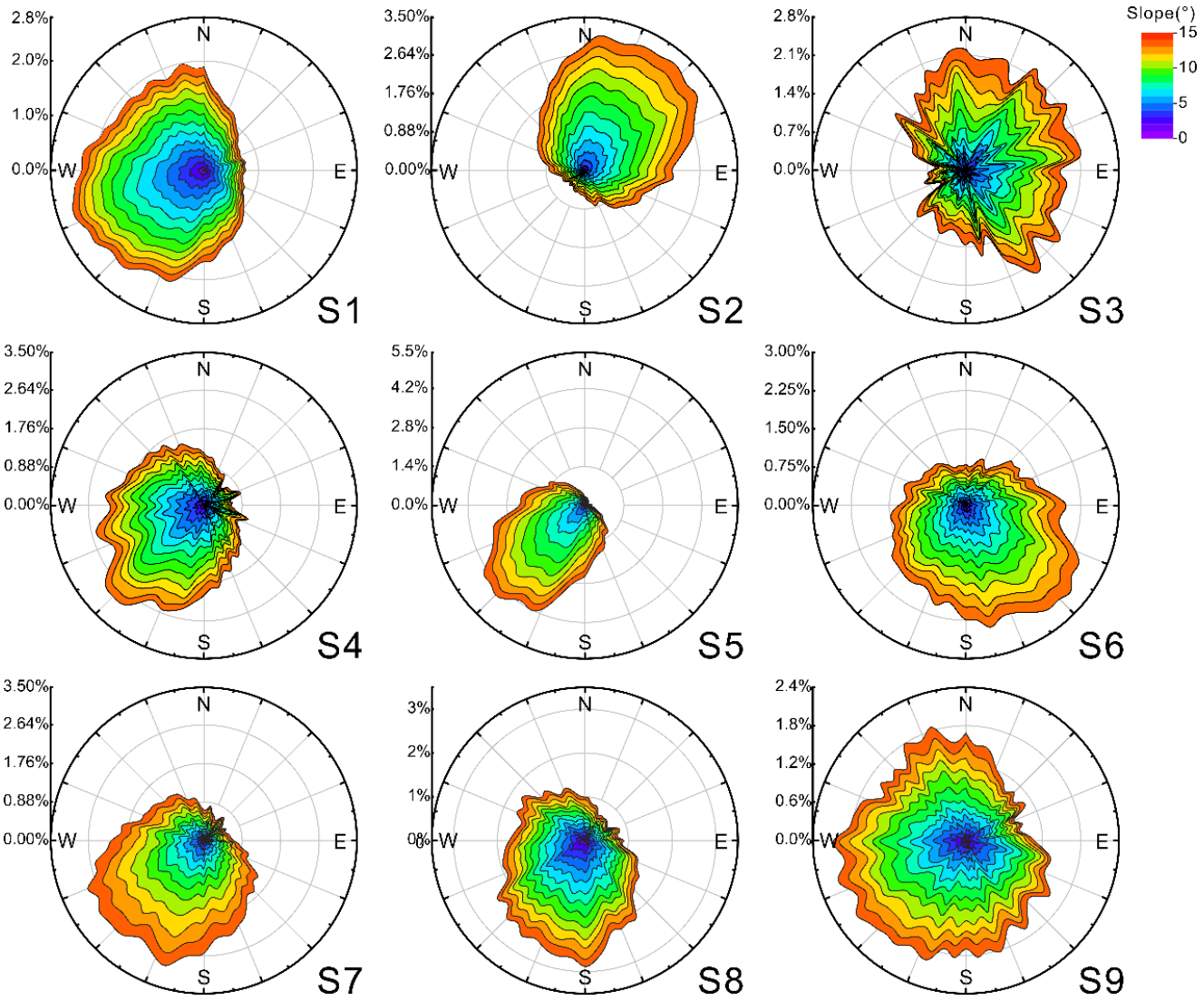

Figure S2 Slope-aspect rose diagrams of the identified relict surfaces in the Harlik Mountains.

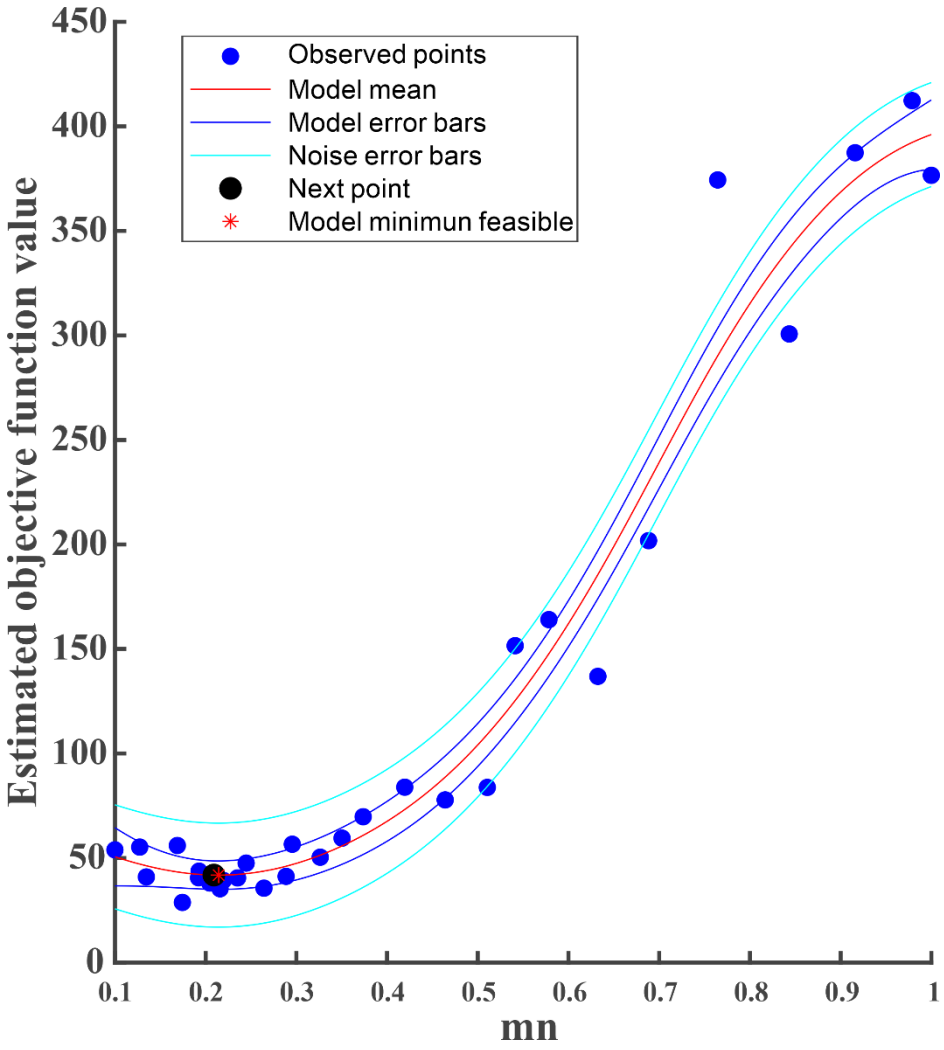

Figure S3 Best-Fit Concavity from χ Plot. The Bayesian Optimization algorithm optimizes a scalar objective function within a constrained domain. In TopoToolbox 2, the 'mnoptim' function applies χ analysis to linearize the river long profile, selecting a random subset of channels or basins to estimate the best-fit concavity, which is subsequently tested against the remaining channels or basins for validation.

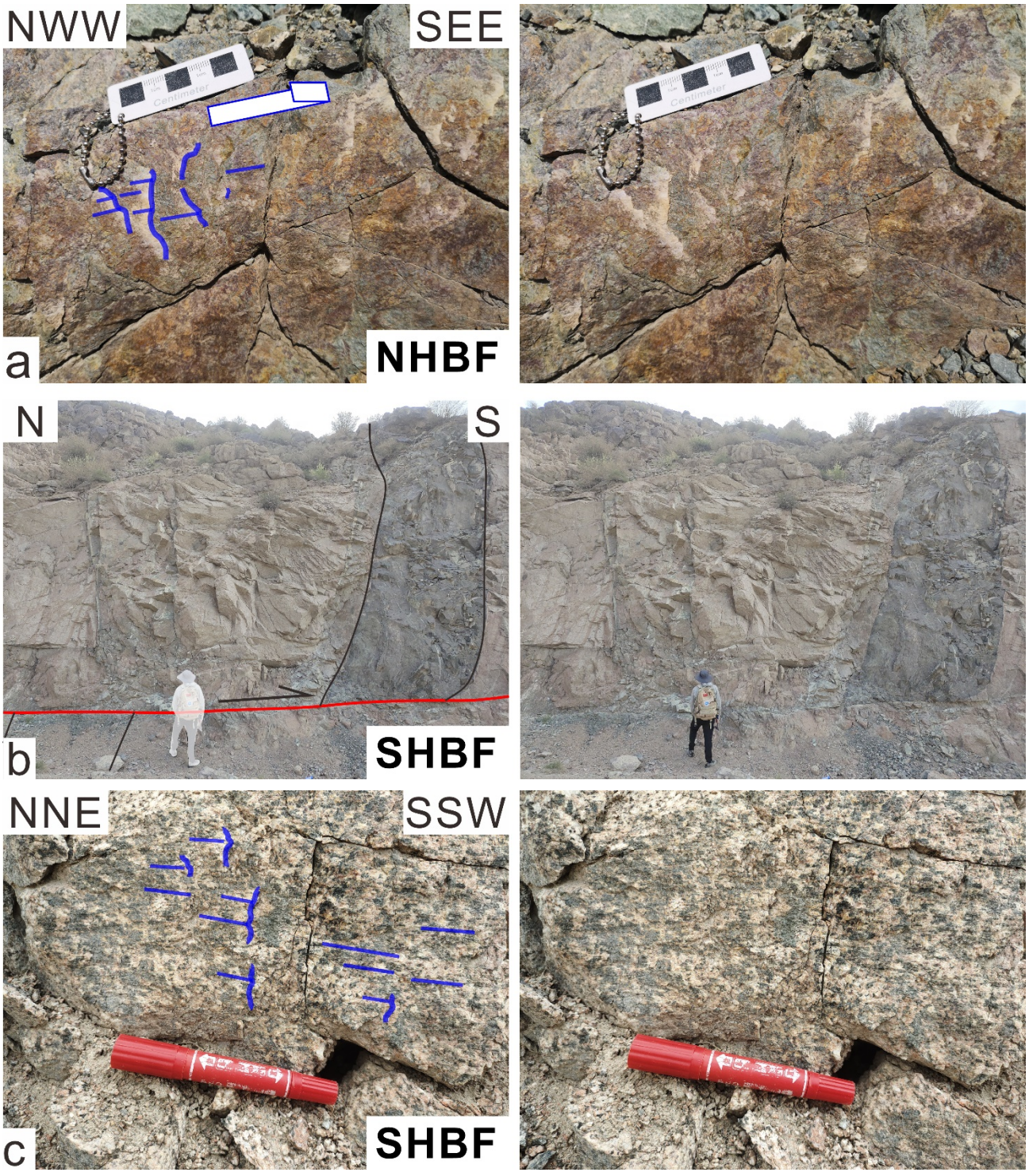

Figure S4 High-resolution versions of Figure 5a–i, including both interpreted (left) and uninterpreted (right) images.

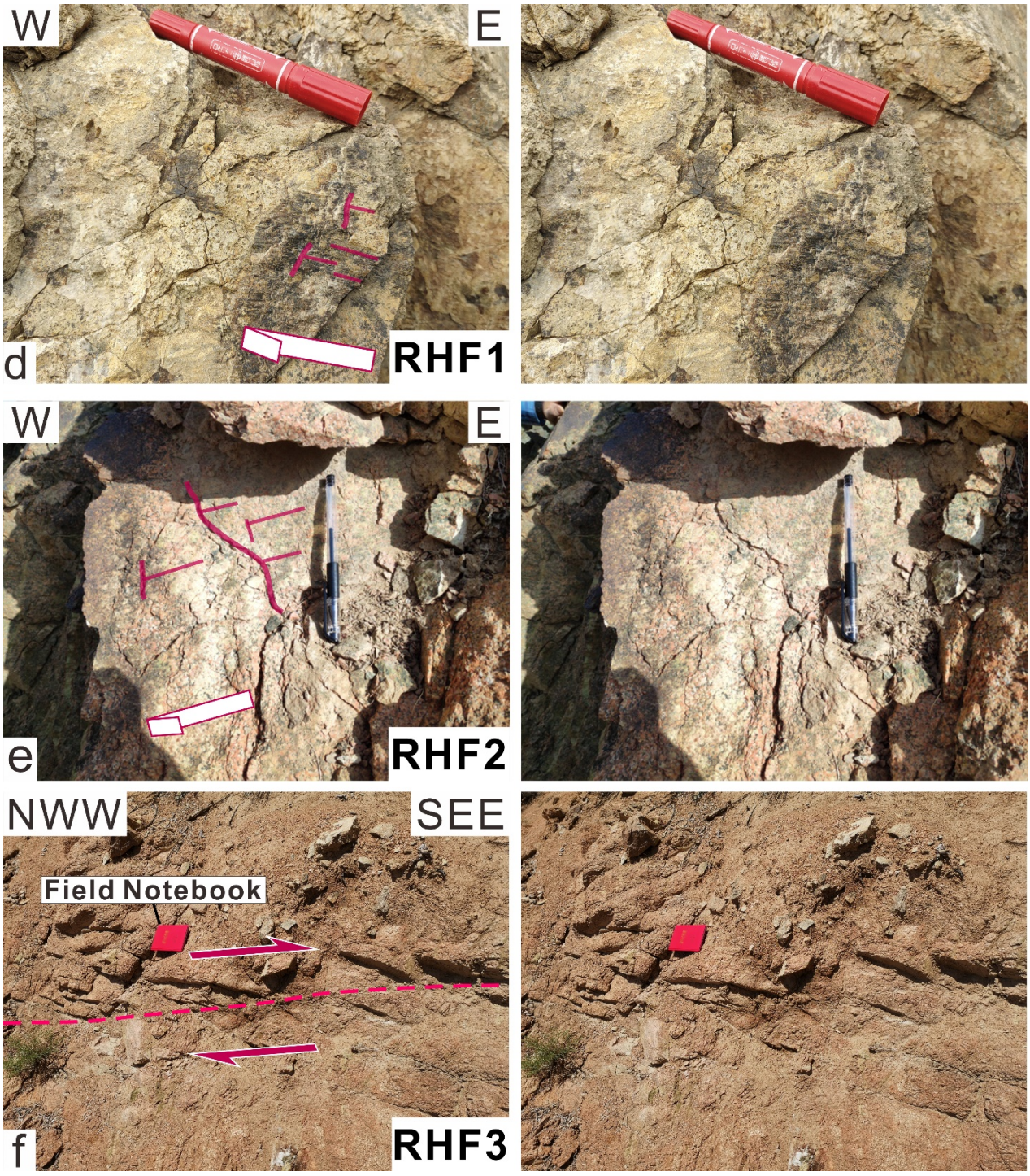

Figure S4 High-resolution versions of Figure 5a–i, including both interpreted (left) and uninterpreted (right) images (continued).

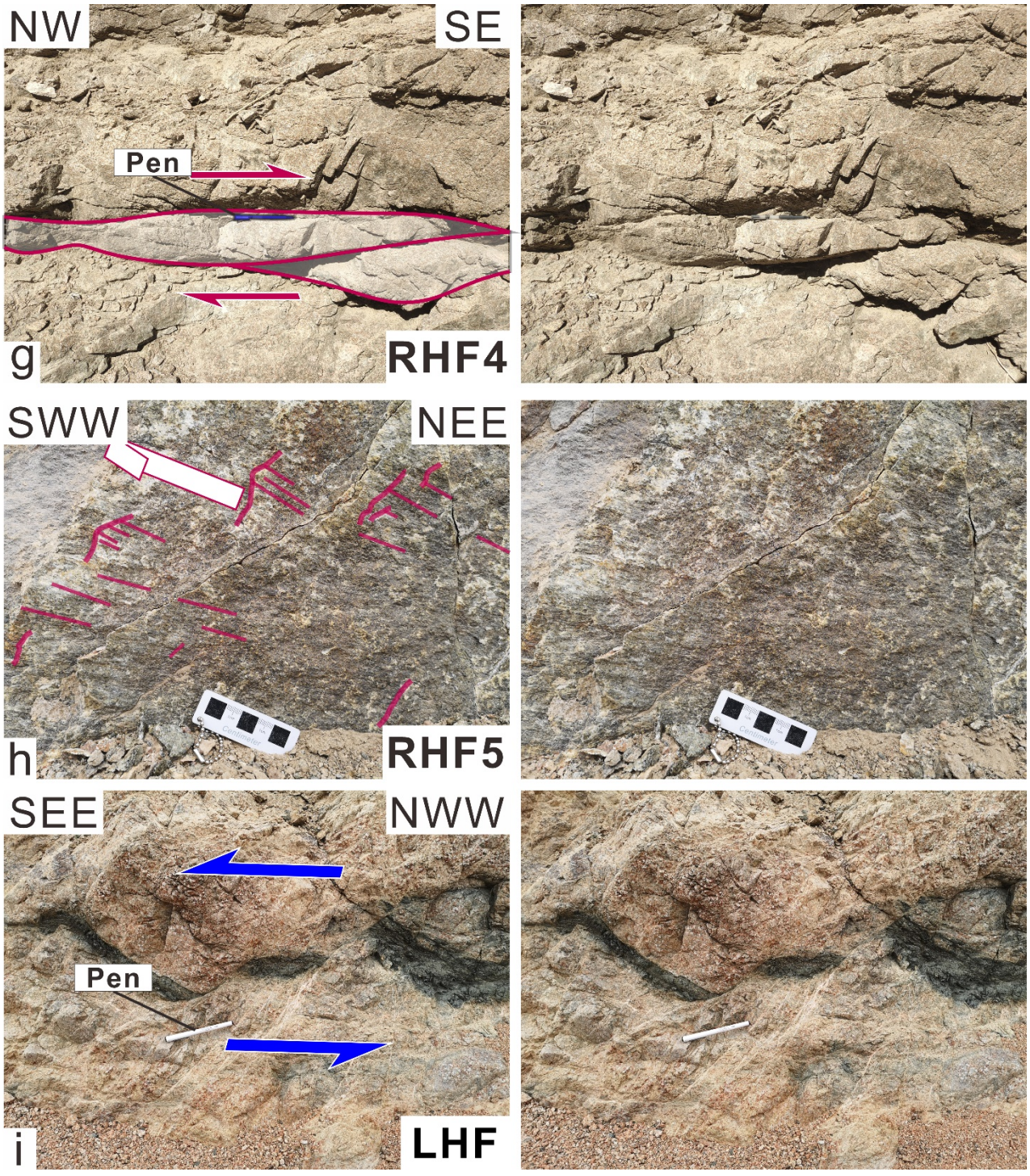

Figure S4 High-resolution versions of Figure 5a–i, including both interpreted (left) and uninterpreted (right) images (continued).

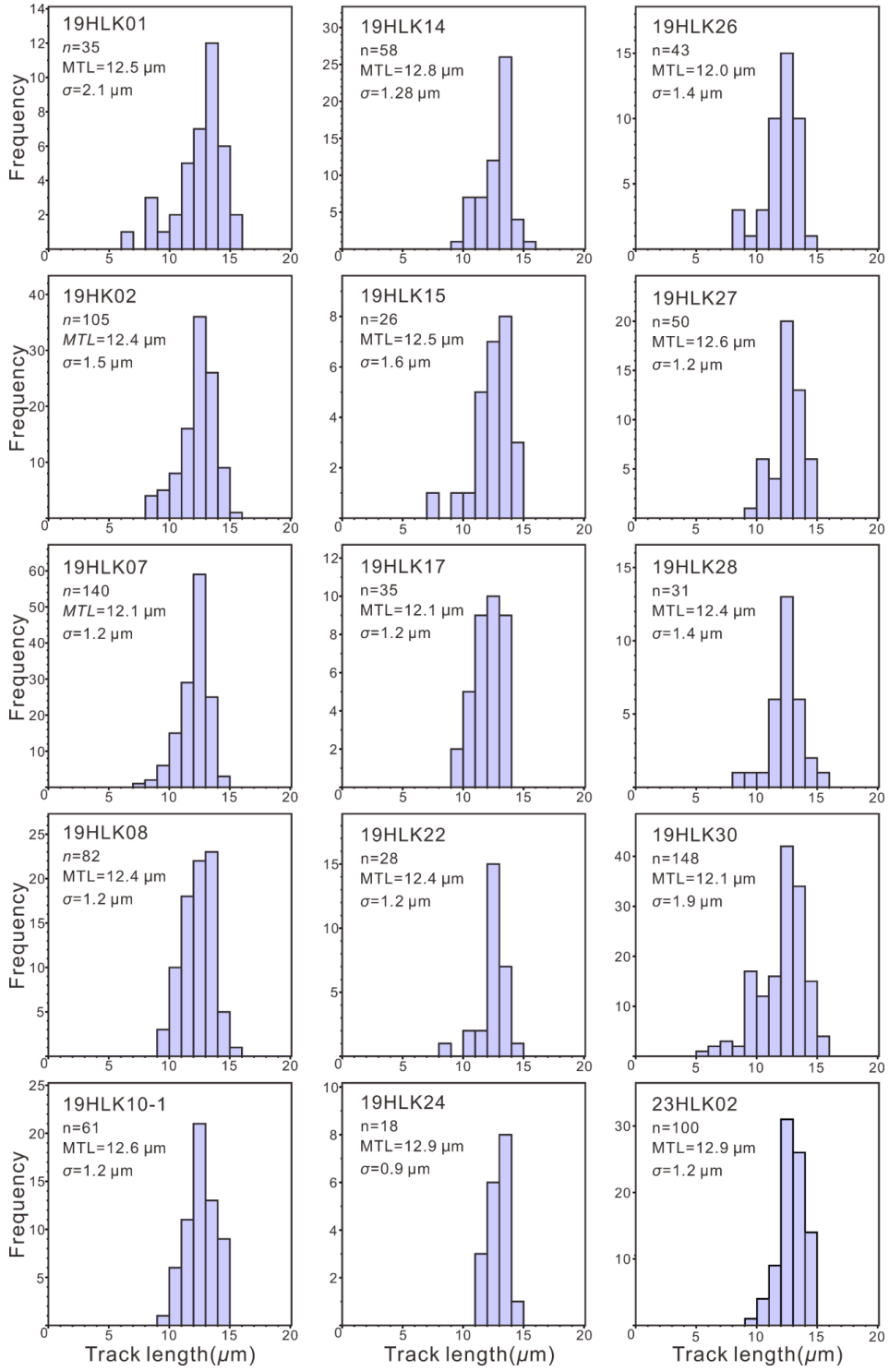

Figure S5 Confined AFT length distributions for each sample.

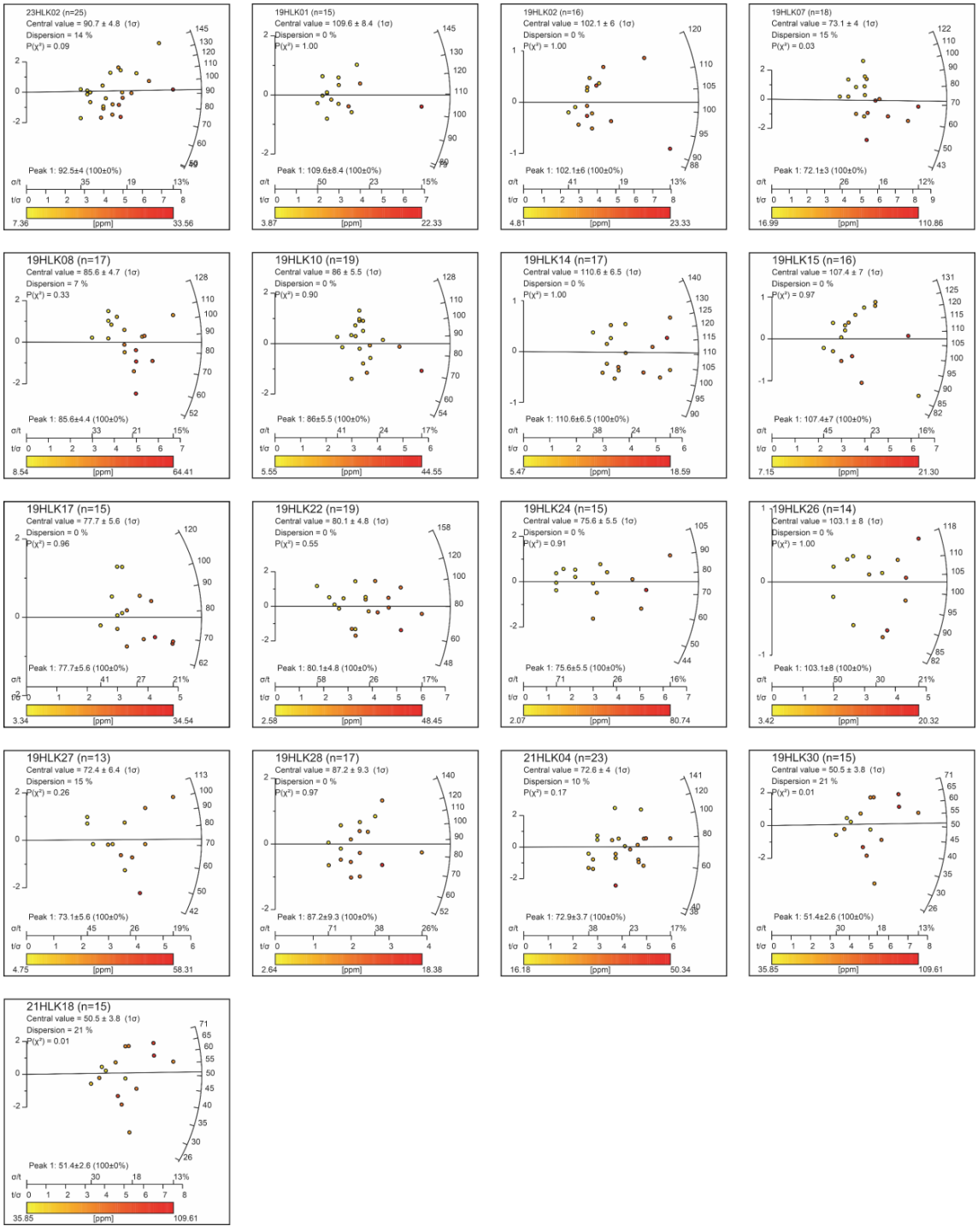

Figure S6 Radial plots of AFT single-grain age data of bedrock samples from the Harlik Mountains.

Fault Name	Data definition		Fault plane		Slip line		Slip sense
	Data ID	Data type	Dip angle	Dip direction	Plunge angle	Azimuth	
NHBF	1	Fault plane with slip line	70	195	3	284	Sinistral
	2		71	197	19	280	Sinistral
RHF2	1	Fault plane with slip line	49	176	36	228	Dextral
	2		66	19	61	55	Dextral
	3		80	200	70	261	Dextral
	4	Fault plane	60	180	-	-	Dextral
	5		65	170	-	-	Dextral
RHF3	1	Fault plane with slip line	75	125	5	36	Dextral
	2		75	155	30	235	Dextral
	3		82	115	29	30	Dextral
	4		75	145	25	228	Dextral
	5		84	145	22	233	Dextral
	6		87	170	32	258	Dextral
	7		86	186	35	273	Dextral
	8		85	175	30	262	Dextral
	9		85	175	30	262	Dextral
	10		87	170	32	258	Dextral
	11		86	186	35	273	Dextral
	12		85	165	25	253	Dextral
	13		85	175	35	262	Dextral
	14		75	197	28	279	Dextral
RHF5	1	Fault plane with slip line	88	170	20	259	Dextral
	2		88	170	10	260	Dextral
	3		90	185	15	275	Dextral
	4		80	175	9	263	Dextral
	5		80	165	18	252	Dextral
	6		85	25	5	295	Dextral
	7		90	15	16	285	Dextral
	8		75	355	17	270	Dextral
	9		78	4	15	277	Dextral
	10		90	340	28	250	Dextral
	11		82	350	12	262	Dextral
	12		85	343	24	255	Dextral
	13		88	5	23	276	Dextral
LHF	1	Fault plane with slip line	70	10	29	292	Sinistral
	2		65	25	13	301	Sinistral
	3		76	2	4	92	Sinistral

Table S1 Fault Data Table for Paleostress Analysis.