

ELECTRONIC SUPPLEMENTARY MATERIAL

Table S1. Median, trimmed mean, MAD and trimmed SD of misorientation angles calculated by P_{PCA} and $P_{min\ T}$ in the validation period of each station in GHBSN with the number of events in each validation period.

Station	Start	End	Median (PCA)	MAD (PCA)	Mean (PCA)	SD (PCA)	Median (min T)	MAD (min T)	Mean (min T)	SD (min T)	Events (PCA)	Events (min T)
N001	2018–06–12	2019–11–23	−1.35	3.26	−1.73	5.08	65	−1.46	3.43	−1.45	4.88	72
	2020–09–17	2021–03–04	−2.47	2.43	−2.27	3.64	22	−3.38	2.46	−2.41	3.22	21
N002	2018–06–12	2019–11–23	5.41	3.2	4.88	5.14	47	5	3.72	5.33	5.93	47
	2020–08–18	2021–03–04	−15.94	4.38	−16.3	5.37	18	−15.43	4.66	−15.43	6	18
N003	2018–05–17	2019–11–24	22.76	3.06	22.17	4.35	67	21.88	2.77	22.11	4.19	69
	2020–08–18	2021–03–04	1.65	1.88	2.37	3.03	21	1.84	2.13	2.54	3.5	21
N004	2018–06–02	2019–11–24	−0.97	2.43	−0.82	4.2	61	−1.09	2.2	−0.78	3.5	65
	2020–08–18	2021–03–04	−0.24	2.33	0.14	3.14	16	−1.52	2.83	−1.21	4.62	15

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N005	2018–08–05	2019–11–24	−2.14	4.58	−2.56	7.44	30	−2.19	4.63	−0.52	5.6	30
N006	2018–06–12	2019–11–24	−22	2.78	−21.17	4.36	67	−22.28	2.69	−21.88	4.15	65
	2020–08–18	2021–03–04	−1.39	1.63	−1.24	3.29	24	−1.8	2.79	−1.65	4.11	26
N007	2018–06–12	2019–11–24	21.94	4.26	22.5	6.33	32	21.35	4.65	20.94	7.48	35
	2020–09–12	2021–03–04	−2.27	3.27	−3.62	5.67	14	−2.56	2.32	−1.99	4.53	12
N008	2019–02–21	2019–12–10	19.54	4.19	19.7	6.12	39	18.85	4.65	19.16	5.89	45
	2020–02–13	2021–03–04	8.44	3.3	9.03	5.35	40	7.63	4.25	8.43	6.43	45
N009	2019–02–21	2019–09–29	−7.13	2.03	−7.64	3	45	−7.29	1.54	−7.3	2.78	43
	2019–11–08	2021–03–04	19.34	1.94	18.81	3.6	73	19.22	1.92	18.91	3.13	76
N010	2019–02–21	2019–11–08	−16.93	2.53	−17.31	3.65	59	−16.95	2.17	−16.57	3.33	59
	2019–11–14	2021–03–04	−6.1	2.37	−6.36	3.73	80	−6.67	2.31	−6.86	3.88	83
N011	2019–02–21	2019–11–08	−2.69	2.7	−2.32	4.75	57	−1.84	2.56	−2.61	4.24	60
	2019–11–14	2021–03–04	10.91	2.78	10.02	3.78	83	10.46	3.09	10.19	3.8	85
N012	2019–03–04	2019–10–31	9.51	2.76	10.35	4.07	56	10.35	2.93	10.48	4.42	57
	2019–11–14	2020–03–25	−19.48	3.31	−19.39	3.46	13	−20.38	3.83	−20.02	4.04	16

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N012	2020–04–10	2021–03–04	28.78	3.13	28.59	4.57	68	29.27	2.75	29.11	4.35	68
N013	2019–03–06	2019–12–16	1.84	2.26	1.78	3.67	55	1.63	1.91	2	3.28	57
N013	2020–01–02	2021–03–04	−5.45	3.39	−5.69	4.3	64	−5.22	3.06	−5.78	4.42	71
N014	2019–02–21	2019–10–31	−17.81	1.8	−18.03	2.54	32	−17	2.02	−17.59	2.74	37
N014	2019–11–08	2021–03–04	−1.19	4.17	−2.11	5.47	53	−1.65	3.78	−2.16	5.43	53
N015	2019–02–21	2019–12–10	0.7	2.44	0.17	3.48	50	0.37	2.22	0.09	3.54	55
N015	2020–01–02	2021–03–04	7.31	2.05	7	4.18	64	7.08	2.3	6.82	4	62
N016	2019–02–21	2019–11–14	−2.2	3.03	−2.77	5.13	53	−1.61	2.62	−1.97	4.51	56
N016	2019–11–23	2021–03–04	4.05	2.24	3.6	3.69	81	4.09	2.24	3.92	3.85	75
N017	2019–02–21	2021–03–04	−5.51	2.76	−5.74	3.65	146	−5.61	2.9	−5.92	3.98	152
N018	2019–03–06	2019–11–04	6.03	2.37	6.04	3.59	39	7	2.66	6.44	3.72	40
N018	2019–11–08	2021–03–04	−2.15	3.32	−1.68	5.38	88	−2.2	3.06	−2.54	4.91	88
N019	2019–02–21	2019–12–15	1.7	3.17	1.13	4.51	73	1.92	2.34	1.62	4.08	67
N019	2020–01–02	2021–03–04	7.01	2.2	7.13	3.28	77	6.94	2.47	7.17	3.81	75
N020	2019–02–02	2019–03–06	−24.86	1.67	−24.22	3.34	6	−22.95	2.14	−23.55	2.77	6

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N020	2019–03–08	2019–12–15	−2.77	2.28	−3.3	3.87	64	−1.93	2.07	−2.85	3.64	63
N020	2020–01–02	2021–03–04	−18.85	2.68	−18.85	3.73	81	−18.65	2.51	−18.58	3.79	82
N021	2019–03–02	2019–11–24	3.15	2.37	3.21	3.55	44	3.57	1.9	3.47	3.49	47
N021	2019–12–10	2021–03–04	−5.19	2.52	−5.83	3.66	55	−5.3	2.45	−5.63	3.79	61
N022	2019–02–21	2019–12–15	22.91	2.03	22.68	3.69	70	22.73	2.47	22.43	3.97	76
N022	2020–01–02	2021–03–04	36.9	2.69	36.83	3.46	70	36.51	2.32	36.02	3.54	75
N023	2019–03–06	2019–10–31	7.92	3.48	7.88	4.4	51	8.08	2.81	8.18	3.89	54
N023	2019–11–08	2021–03–04	−14.28	2.54	−14.61	3.65	83	−14.6	2.41	−14.65	3.4	81
N024	2019–03–08	2019–11–14	1.79	2.36	1.77	3.96	51	1.32	2.26	1.54	3.83	53
N024	2019–11–23	2021–03–04	−2.13	2.1	−2.11	3.12	76	−2.4	2.33	−2.03	3.81	75
N025	2019–02–21	2019–10–31	−2.49	3.52	−3.04	5.73	33	−2.73	3.03	−2.47	5.73	35
N025	2019–11–08	2021–03–04	−33.96	3.2	−33.58	4.05	52	−33.5	3.16	−33.44	4.14	52
N026	2019–02–21	2020–01–19	2.17	3.16	1.84	4.36	69	2.41	2.56	2.3	3.97	67
N026	2020–04–10	2021–03–04	7.14	2.39	7.44	3.65	63	7.67	2.42	7.5	3.41	69
N027	2019–02–21	2019–12–15	−4.48	2.82	−4.29	4.4	83	−3.43	2.53	−3.69	3.84	76

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N027	2020–01–02	2021–03–04	1.2	2.41	1.1	3.8	88	1.34	2.64	1.05	4.43	88
N028	2019–02–02	2021–03–04	4.77	3.08	5.09	4.5	156	5.69	3.14	5.42	4.56	157
N029	2019–03–08	2019–10–31	−2.89	2.99	−2.2	4.37	35	−1.03	2.9	−2.08	4.29	41
N029	2019–11–14	2021–03–04	14.53	2.48	14.9	3.64	62	14.93	2.58	14.76	4.36	69
N030	2019–02–21	2020–01–26	−7.09	4.6	−8.73	8	75	−7.15	4.39	−8.38	7.7	69
N030	2020–02–20	2021–03–04	3.76	13.75	2.62	14.62	68	4.17	12.93	3.28	13.98	67
N031	2019–02–21	2019–10–29	2.26	1.66	1.82	2.49	51	2.46	1.85	2	3.38	56
N031	2019–11–08	2021–03–04	−14.53	1.98	−14.17	3.26	75	−14.16	1.84	−14.61	2.9	72
N032	2019–03–20	2019–10–31	−1.7	3	−2.14	4.33	40	−1.61	3.05	−1.81	4.29	40
N032	2019–01–02	2021–03–04	9.46	3.53	8.92	4.87	56	9.2	3.13	8.93	4.81	58
N033	2019–03–24	2019–09–27	−8.3	4.71	−7.95	6.46	33	−8.33	4.73	−9.08	6.12	33
N033	2020–01–02	2021–03–04	2.52	3.19	2.31	4.82	71	2.12	3.51	2.08	4.47	72
N034	2019–03–06	2019–10–29	21.46	3.98	22.01	6.44	43	21.64	3.48	21.32	5.07	44
N034	2019–11–08	2020–01–07	0.91	5.58	−0.85	6.32	9	0.3	6.17	−1.31	7.13	9
N034	2020–02–05	2021–03–04	24.85	3.14	24.65	5.37	60	24.66	3.16	24.97	5.36	66

N035	2019–02–21	2020–01–07	−18.13	3.53	−18.23	4.46	35	−16.98	2.83	−17.72	4.9	38
N035	2020–01–19	2021–03–04	6.13	2.61	6.06	3.93	54	6.98	2.37	6.66	3.7	58
N036	2020–03–14	2020–06–07	−6.87	3.75	−6.7	4.86	14	−6.32	3.44	−6.4	5.4	14
N036	2020–06–13	2021–03–04	8.41	2.57	8.84	4.09	52	8.82	2.66	9.16	4.21	50
N037	2019–02–21	2019–12–15	−7.86	2.38	−6.96	3.58	55	−7.34	2.17	−6.8	3.14	55
N037	2020–01–19	2021–03–04	−31.41	2.89	−31.37	3.89	55	−31.28	2.34	−31.39	3.67	58
N038	2019–02–21	2021–03–04	−2.54	3.11	−2.63	4.46	116	−2.31	2.6	−2.69	3.85	117
N039	2019–03–10	2019–10–21	7.81	2.39	8.31	3.37	47	8.23	2.31	8.49	2.87	48
N039	2019–11–08	2021–03–04	−15.13	2.67	−15.29	3.71	87	−15.32	2.6	−15.56	3.86	85
N040	2019–02–02	2019–03–06	−23.53	1.95	−23.58	2.91	6	−23.93	2.21	−23.59	3.48	5
N040	2019–03–08	2019–12–10	−2.54	2.57	−2.54	3.64	60	−2.59	2.36	−2.45	3.36	60
N040	2020–01–07	2021–03–04	8.82	2.18	8.69	3.29	70	8.04	2.34	7.8	4.13	71
N041	2019–03–06	2019–12–15	−0.22	3.31	−0.57	4.56	38	−0.25	3.33	−0.81	4.33	36
N041	2020–01–02	2021–03–04	5.15	3.68	4.96	4.86	67	4.74	3.42	5.14	4.24	69
N042	2019–03–08	2021–03–05	−6.67	2.28	−6.57	3.56	124	−6.14	2.33	−6.31	3.76	122

N043	2019–03–08	2019–12–10	3.23	2.01	3.14	2.66	44	3.85	2.79	3.23	3.94	47
N043	2020–01–02	2021–03–04	−1.96	2.14	−1.93	3.45	74	−2.26	2.15	−2.5	3.75	79
N044	2019–06–15	2019–11–08	9.76	1.84	9.6	3.55	26	10.42	2.04	10.24	3.14	30
N044	2020–12–10	2021–03–04	4.33	1.64	3.36	2.54	11	4.46	1.94	3.63	2.81	10
N045	2019–03–08	2019–12–10	4.51	2.26	4.14	3.23	54	4.41	2.09	3.87	3.23	52
N045	2020–01–02	2021–03–04	−0.27	2.41	−0.64	3.43	68	−0.77	2.52	−1.46	3.76	69
N046	2019–03–08	2019–12–15	−1.36	2.7	−1.66	3.44	57	−0.69	2.27	−0.96	3.25	63
N046	2020–01–23	2021–03–04	−9.37	2.7	−9.44	3.96	65	−9.49	2.56	−9.69	3.58	66
N047	2019–03–08	2019–12–15	−4.11	2.33	−4.35	3.38	64	−3.96	2.53	−4.21	4.04	64
N047	2020–01–02	2021–03–04	2.41	2.69	1.81	3.35	72	2.62	2.73	2.38	3.55	75
N048	2019–03–24	2020–01–02	17.17	5.17	19.05	8.8	32	17.67	4.42	17.62	7.54	34
N048	2020–02–13	2021–03–04	0.61	4.39	0.62	6.3	44	0.59	3.85	0.24	6.36	44
N049	2019–03–20	2019–11–04	−6.97	3.14	−6.61	5.23	43	−7.4	3.43	−7.56	4.99	43
N049	2019–11–08	2021–03–04	17.85	3.76	17.28	5.65	77	17.68	4.13	16.95	5.72	75
N050	2019–03–10	2019–11–04	−9.12	2.48	−8.88	4.11	50	−8.97	2.55	−8.38	4.19	51

N050	2019–11–08	2021–03–04	8.17	2.46	8.49	4.04	82	8.02	2.65	8.14	4.06	82
N051	2019–03–10	2019–10–21	−6.88	2.3	−6.31	2.86	44	−7.07	2.21	−6.92	3.58	44
N051	2019–11–04	2021–03–04	14.32	2.14	13.92	3.93	72	14.49	2.44	14.77	3.91	74
N052	2019–03–02	2020–01–26	−27.56	5.66	−28.74	7.25	52	−28.12	4.72	−29.43	7.28	55
N052	2020–02–13	2021–03–04	23.2	2.95	23.17	4.32	53	23.01	3.88	23.38	5.42	62
N053	2019–03–30	2019–10–31	−3.93	2.18	−4.09	3.64	58	−3.99	1.82	−4.01	3.34	58
N053	2019–11–08	2021–03–04	−13.41	2.3	−13.3	3.77	83	−13.96	2.45	−13.94	3.76	82
N054	2019–03–20	2019–10–31	−0.9	2.4	−1.05	4.42	50	−0.55	2.42	−0.63	3.98	53
N054	2019–11–04	2021–03–04	−11.52	2.23	−11.19	3.34	85	−12	2.31	−11.46	3.55	87
N055	2019–03–24	2019–10–31	−8.76	2.41	−9.1	3.54	54	−8.74	2.18	−9.29	3.5	54
N055	2019–11–08	2021–03–04	5.68	2.51	5.56	4.22	90	5.95	2.38	5.84	3.52	88
N056	2019–03–28	2019–10–29	2.63	2.03	2.79	3.52	41	3.67	2.28	3.12	3.58	45
N056	2019–11–04	2021–03–04	−7.14	2.22	−7.22	3.67	67	−7.02	2.22	−7.04	3.47	69
N057	2019–03–20	2021–03–04	−8.18	3.11	−7.89	4.78	147	−8.3	3.04	−8.38	4.55	142
N058	2019–03–10	2019–11–26	−3.35	2.63	−3.06	4.53	53	−2.6	2.09	−2.34	3.61	52

N058	2019–12–10	2021–03–04	1.63	2.35	1.58	4.05	67	1.78	2.04	2.04	3.96	63
N059	2019–03–24	2019–12–15	4.74	3.61	4.45	6.65	57	5.34	4.27	4.66	5.54	52
N059	2020–01–02	2021–03–04	10.56	3.69	9.79	5.04	72	10.07	2.96	9.5	4.54	67
N060	2019–03–02	2021–03–04	14.07	2.97	13.89	4.6	117	14.24	3.31	13.93	5.28	131
N061	2019–03–02	2020–01–26	7.84	2.98	7.43	4.89	80	7.91	3.04	7.35	5.02	76
N061	2020–02–05	2021–03–04	−9.59	2.75	−9.68	4.42	73	−9.35	3.05	−9.93	5.1	75
N062	2019–03–02	2019–11–04	7.81	2.99	7.08	4.27	40	8.72	2.99	7.96	4.12	38
N062	2019–11–08	2021–03–04	−2.52	2.8	−2.82	3.58	51	−3.6	2.57	−3.62	4.36	57
N063	2019–03–02	2019–12–15	−15.94	2.71	−16.29	3.38	66	−15.53	2.02	−15.67	3.32	65
N063	2020–01–02	2021–03–04	0.5	2.32	0.3	3.36	75	0.21	2.19	−0.01	3.3	77
N064	2019–03–28	2019–05–09	−13.06	3.45	−13.14	3.93	13	−11.66	2.12	−11.76	3.52	12
N064	2019–07–26	2019–12–15	−11.92	2.28	−11.28	3.59	26	−10.86	2.24	−11.1	3.56	25
N064	2020–01–02	2021–03–04	12.29	2.98	11.98	4.28	76	12.1	2.99	11.8	4.29	77
N065	2019–03–02	2019–11–04	−18.03	2.04	−17.91	3.35	33	−18.04	3.65	−18.18	5.8	39
N065	2019–11–08	2020–01–19	5.81	3.47	4.22	5.59	9	2.37	4.84	1.74	5.56	8

N065	2020–03–14	2021–03–04	−20.8	3.33	−21.28	4.43	54	−20.96	3.49	−21.11	4.73	52
N066	2019–03–24	2020–01–07	−10.16	3.26	−10.27	4.59	53	−10.12	2.46	−10.45	4.37	54
N066	2020–02–13	2021–03–04	5.49	2.68	5.97	4.14	65	5.55	2.52	5.56	4.16	66
N067	2019–03–28	2021–03–04	0.43	2.45	−0.02	3.94	83	0.94	2.58	0.65	4.28	82
N068	2019–03–24	2019–11–26	11.49	3.34	10.92	4.82	54	11.81	2.94	11.61	4.61	55
N068	2019–12–10	2021–03–04	5.06	3.29	4.36	4.31	73	4.4	2.91	3.67	4.08	76
N069	2019–03–06	2019–12–15	−13.31	2.23	−13.3	3.01	55	−12.93	2.11	−13.03	3.16	59
N069	2020–01–02	2021–03–04	−1.47	1.94	−1.15	2.7	66	−1.39	1.82	−1.39	2.93	67
N070	2019–03–24	2021–03–04	−0.47	2.93	−0.18	4.42	142	0.03	3.06	0.07	4.73	139
N071	2019–03–02	2019–11–04	−6.78	2.37	−7.22	3.52	40	−7.62	2.09	−7.64	3.37	34
N071	2019–11–08	2021–03–04	−22.67	2.84	−23.33	4.16	78	−22.6	2.09	−23.5	3.68	76
N072	2019–03–02	2020–01–26	21.63	2.23	21.38	4.38	66	22.01	2.49	21.53	4.07	72
N072	2020–02–05	2021–03–04	8.44	1.92	8.05	3.26	65	8.07	2.35	7.86	3.48	67
N073	2019–03–24	2019–12–10	3.04	2.32	2.71	3.16	57	3.29	2.67	3.48	3.57	59
N073	2020–01–02	2021–03–04	−4.4	2.83	−4.76	4.34	74	−4.75	2.88	−5.39	4.76	73

N074	2019–03–28	2019–12–10	6.64	2.09	7.99	3.64	41	7.72	2.17	8.13	3.79	40
N074	2020–01–07	2021–03–04	14.86	2.75	14.41	5.13	58	15	2.66	14.34	4.96	54
N075	2019–03–20	2019–12–15	−7.06	2.58	−6.8	3.28	69	−6.48	2	−6.82	3.12	62
N075	2020–01–02	2021–03–04	−0.06	2.03	−0.1	3.46	78	0.21	2.33	−0.53	4	77
N076	2019–03–02	2019–12–15	3.54	2.58	2.55	4.83	60	2.86	3.43	2.7	5.01	60
N076	2020–02–13	2021–03–04	23.42	3.5	23.31	4.33	63	22.91	3.62	22.82	4.99	71
N077	2019–03–06	2020–02–05	30.52	3.57	29.87	6.28	65	29.99	2.51	29.08	5.07	70
N077	2020–02–13	2021–03–04	16.13	4.83	16.34	5.37	66	17.12	4.57	16.54	5.38	71
N078	2019–03–06	2019–10–16	−4.68	3.72	−3.16	5.52	36	−2.76	3.49	−2.63	5.89	36
N078	2019–11–08	2021–03–04	−9.44	4	−9.01	6.33	54	−10.59	4.02	−10.43	6.21	55
N079	2019–03–02	2020–01–19	1.06	6.44	0.41	8.8	40	−1.59	5.2	−1.09	7.16	35
N079	2020–02–13	2021–03–04	−11.76	4.02	−11.79	5.6	48	−11.85	3.43	−12.47	5.17	48
N080	2019–03–02	2019–10–31	3.44	2.13	3.57	3.41	60	3.76	2.48	3.39	3.57	61
N080	2019–11–08	2021–03–04	−2.09	3.33	−2.41	5.08	87	−2.68	3.51	−3.05	4.62	88
N081	2019–03–02	2021–03–04	3.53	3.61	2.81	6.35	128	2.77	3.39	1.79	6.2	132

N082	2019–03–28	2019–11–04	−8.67	2.45	−7.83	4.12	39	−8.26	2.61	−8.26	4.14	35
N082	2020–01–19	2021–03–04	10.27	2.47	11.13	3.91	49	10.97	2.47	10.8	4.71	59
N083	2019–03–02	2019–10–31	−37.45	2.34	−37.82	3.36	56	−37.39	2.58	−37.89	3.83	58
N083	2019–11–08	2021–03–04	−2.49	2.93	−2.52	4.04	80	−2.89	2.85	−3.24	4.28	83
N084	2019–03–02	2019–10–29	−12.82	2.78	−12.94	3.72	53	−12.69	2.56	−12.97	3.27	53
N084	2019–11–08	2021–03–04	−66.99	2.99	−66.96	4.65	77	−67.34	2.29	−67.45	3.84	73
N085	2020–02–05	2021–03–04	0.96	1.96	1.41	3.07	63	1.04	2.68	0.63	3.8	67
N086	2019–03–20	2020–01–26	9.59	16.79	10.08	22.04	58	10.66	17.22	10.89	21.52	61
N086	2020–02–05	2021–03–04	−13.14	2.26	−12.7	3.53	69	−13.31	2.33	−13.5	3.41	68
N087	2019–03–02	2019–10–21	10.06	4.79	11.1	6.34	38	9.7	3.74	10.17	6.14	42
N087	2019–11–08	2021–03–04	−9.52	2.89	−10.28	4.97	63	−9.91	3.36	−10.32	5.65	64
N088	2019–03–20	2021–03–04	−6.52	2.5	−6.43	3.89	124	−6.14	2.02	−5.95	3.23	125
N089	2019–03–20	2019–10–31	−7.2	2.63	−6.97	4.57	51	−6.88	2.87	−6.7	4.83	49
N089	2019–11–08	2021–03–04	30.07	2.42	30.19	3.23	75	30.15	2.12	30.38	2.81	72
N090	2019–03–02	2019–03–10	7.35	1.85	8.48	2.87	7	7.27	0.78	6.77	1.07	6

N090	2019–03–24	2019–06–19	−4.34	3.29	−4.41	4.05	29	−5.23	1.93	−4.7	3.48	26
N090	2019–06–21	2019–12–10	10.47	2.02	11	2.58	29	11.57	1.82	11.65	2.76	33
N090	2020–01–02	2021–03–04	1.31	1.82	1.23	3.19	63	1.68	2.56	1.35	3.47	62
N091	2019–03–02	2020–03–26	−15.08	2.48	−14.75	4.15	77	−14.8	3.27	−14.33	4.66	81
N091	2020–04–05	2021–03–04	8.66	2.32	8.44	3.32	71	8.55	2.2	8.49	3.28	70
N092	2019–03–02	2019–06–19	4.83	2.59	5	4.45	35	5.34	2.56	5.65	3.76	33
N092	2019–06–21	2019–10–29	−10.17	1.48	−10.09	2.3	28	−10.1	1.67	−10.4	2.14	27
N092	2019–11–08	2021–03–04	−14.13	2.64	−14.2	4.11	90	−14.34	2.56	−14.36	3.65	87
N093	2019–03–20	2019–11–04	−3.62	2.62	−4.01	3.56	50	−4.27	2.45	−4.18	3.64	46
N093	2019–11–08	2021–03–04	74.77	2.31	75.42	3.62	78	74.33	2.33	75.02	3.61	82
N094	2019–03–28	2019–12–10	−8.66	1.98	−8.57	3.18	53	−8.09	1.94	−8.2	2.91	50
N094	2020–01–02	2021–03–04	60.9	2.51	60.81	3.64	64	60.85	2.7	60.92	4.44	64
N095	2019–03–02	2019–12–15	−5.53	2.5	−5.69	3.45	70	−5.47	2.48	−5.48	3.68	71
N095	2020–01–02	2021–03–04	18.52	1.81	18.46	2.71	63	18.08	1.9	17.93	3.04	62
N096	2019–03–02	2019–10–31	−15.19	2.63	−15.24	3.74	63	−15.25	2.38	−14.99	3.59	61

N096	2019–11–08	2021–03–04	2.53	1.96	2.54	3.25	84	1.72	2.16	1.79	3.52	85
N097	2019–03–20	2019–11–04	−2.6	2.64	−2.96	3.78	56	−2.97	3.23	−3.12	4.11	52
N097	2019–11–06	2021–03–04	2	2.43	2.37	3.67	86	1.83	2.49	2.33	4.04	88
N098	2019–03–28	2019–11–04	−1.14	2.12	−1.21	3.49	48	−0.7	2.92	−0.96	4.04	48
N098	2019–11–08	2021–03–04	5.55	2.9	5.33	4.66	83	5.29	2.6	5.38	3.87	81
N099	2019–03–02	2019–12–15	−22.9	1.96	−22.91	3.48	69	−22.52	2.09	−22.43	3.46	70
N099	2019–12–23	2021–03–04	−2.28	2.46	−2.79	3.78	78	−2.46	2.21	−2.82	2.72	74
N100	2019–03–20	2019–07–07	11.96	3.22	11.33	4.45	29	12.7	3.58	11.29	4.76	30
N100	2020–01–07	2021–03–04	−6.39	2.79	−7.09	4.66	56	−6.05	3.66	−7.11	5.25	60
N101	2019–03–28	2020–01–07	21.92	5.45	21.18	8.15	51	21.52	4.37	20.98	7.42	51
N101	2020–01–19	2021–02–13	34.48	3.86	34.49	4.83	54	33.09	3.93	33.38	5.36	58
N102	2019–03–28	2019–12–10	0.08	2.72	−0.63	4.6	52	−0.51	3.71	−0.91	4.99	58
N102	2020–01–07	2021–02–13	11.72	3.18	11.26	4.33	61	11.98	2.47	11.48	4.12	65
N103	2019–03–20	2019–10–29	10.21	2.24	10.43	3.66	42	9.62	2.23	10.25	4.11	44
N103	2019–11–14	2020–02–13	−13.34	1.1	−12.66	1.22	7	−13.33	2.22	−14.17	3.7	7

N103	2020–02–20	2021–03–03	10.23	2.1	10.41	3.08	68	10.27	2.04	10.47	3.53	71
N104	2019–11–14	2021–03–03	–21.38	2.77	–21.04	3.93	78	–21.9	2.56	–21.72	3.98	79
N105	2019–03–24	2020–01–26	7.34	2.92	7.1	4.69	50	7.05	2.88	6.19	5.14	52
N105	2020–02–13	2021–02–13	12.14	3.48	11.84	4.15	54	12.1	3.39	11.83	4.32	56
N106	2019–03–02	2019–11–04	0.73	3.27	0.24	4.74	52	1.19	3.92	0.49	5.48	47
N106	2019–11–08	2020–01–02	–59.6	15.81	–55.54	14.5	9	–69.53	14.47	–73.96	26.72	9
N106	2020–01–07	2021–02–13	–14.33	3.71	–14.35	5.35	68	–13.3	3.49	–14.1	5.47	63
N107	2019–03–02	2021–02–13	–1.22	3.91	–1.92	5.91	107	–1.05	2.77	–1.32	4.94	100
N108	2019–03–20	2019–08–05	2.18	2.6	0.79	4.81	40	1.28	2.41	0.51	4.67	42
N108	2019–09–14	2021–02–14	9.59	4.02	9.81	5.09	78	9.73	3.79	10.11	5.38	80
N109	2019–03–06	2019–11–04	–43.23	3.16	–41.62	5.04	47	–42.01	2.75	–41.89	3.94	43
N109	2019–11–08	2020–02–13	1.63	2.23	0.7	3.9	9	0.35	4.56	1.53	7.77	12
N109	2020–03–14	2021–02–13	–18.53	3.15	–19.06	5.27	55	–18.26	2.81	–19.21	4.88	55
N110	2019–03–02	2019–10–29	–15.24	3.27	–14.86	5.44	49	–15.27	2.62	–16.23	4.74	47
N110	2019–11–08	2021–02–13	24.17	3.12	23.24	5.32	73	23.56	3.24	22.64	5.29	72

N111	2019–03–10	2021–02–13	5.8	2.75	5.6	4.15	135	5.49	2.92	5.65	4.05	137
N112	2019–03–02	2020–01–26	–17.36	4.59	–17.84	6.4	51	–18.89	3.54	–19.65	5.74	48
N112	2020–02–13	2021–02–13	3.32	3.97	3.03	5.49	57	3.22	3.87	2.29	6	56
N113	2019–03–02	2020–01–26	–2.9	5.05	–3.2	6.55	54	–2.8	3.66	–3.26	5.98	51
N113	2020–02–13	2021–02–13	20.16	3.97	19.5	6.05	49	17.94	3.54	18.43	6.03	43
N114	2019–03–08	2019–11–08	3.96	2.03	3.68	3.03	57	4.27	2.1	3.9	2.99	57
N114	2019–11–14	2021–02–13	–3.34	2.47	–3.64	3.76	76	–3.17	2.75	–3.56	4.08	75
N115	2019–03–10	2019–10–29	–6.59	3.02	–6.89	6.18	37	–7.08	2.51	–7.22	5.59	32
N115	2019–11–08	2020–12–01	–12.34	2.09	–11.81	2.96	40	–12.51	2.95	–12.46	4.3	44
N116	2019–03–24	2019–10–21	6.56	2.22	6.36	3.23	49	6.99	2.34	6.47	3.69	47
N116	2019–11–04	2021–02–13	16.92	2.37	16.21	4.12	77	16.74	2.59	15.98	4.06	81
N117	2019–03–10	2021–02–13	9.82	4.1	9.66	5.35	78	8.97	4.29	9.1	5.26	84
N118	2019–03–02	2019–11–04	9.09	4.06	8.34	5.44	47	8.82	3.87	8.25	5.09	44
N118	2019–11–08	2021–02–13	45.91	4.63	44.77	6.09	63	44.66	4.19	44.16	6.1	66
N119	2019–03–28	2019–10–29	2.44	2.77	2.76	4.05	37	2.43	3.09	3.05	5.24	38

N119	2019–11–08	2021–02–13	16.22	2.86	15.97	4.05	67	15.77	2.49	15.17	3.48	69
N120	2019–03–28	2021–02–13	12.52	3.48	11.92	4.98	103	12.31	3.18	11.88	4.57	99
N121	2019–03–24	2020–02–05	34.82	2.31	34.44	4.18	59	35.27	2.78	34.29	4.68	60
N121	2020–02–13	2021–02–13	–2.08	2.6	–2.34	3.85	68	–2.22	2.81	–2.32	4.02	71
N122	2019–03–02	2020–01–26	–20.98	3.41	–21.65	5.58	50	–20.94	3.49	–22.04	5.68	57
N122	2020–02–13	2021–02–13	–6.72	3.91	–6.81	5.32	59	–7.72	3.82	–7.71	5.18	55
N123	2019–03–28	2021–02–13	–8.29	4.52	–8.42	6.1	105	–7.85	4.92	–8.41	6.62	107
N124	2019–03–28	2020–01–07	–0.39	3.75	–0.3	6.33	42	–1.29	3.39	–2.32	5.09	42
N124	2020–02–13	2021–02–13	–8.13	4.05	–8.72	5.12	52	–8.44	4	–9.02	5.35	52
N125	2019–03–28	2020–01–07	–15.82	8.6	–13.5	12.02	28	–13.68	5.82	–13.58	7.13	24
N125	2020–02–13	2021–02–13	6	6.74	6.62	10.77	22	4.73	5.69	4.22	9.48	21
N126	2019–07–26	2021–02–13	28.42	3.86	27.05	5.36	83	26.89	3.82	26.17	5.34	81
N127	2019–09–01	2021–02–13	5.96	4.03	5.9	5.86	69	5.93	4.18	5.27	6.22	72
N128	2019–09–01	2021–03–03	1.31	3.18	0.55	5.27	89	1.63	3.1	0.78	4.49	78
N129	2019–09–25	2021–02–13	–15.88	4.47	–16.28	7	51	–15.69	4.42	–16.45	6.62	54

N130	2019–09–14	2021–02–13	23.79	3.91	24.15	5.1	74	23.72	3.68	23.64	4.61	68
N131	2019–09–14	2021–02–13	–172.97	2.28	–173.09	3.91	80	–173.32	2.86	–173.09	4.53	80
N132	2019–09–14	2021–02–13	2.21	2.51	2.36	3.5	94	2.75	2.31	2.41	3.24	90
N133	2019–07–26	2019–08–07	16.13	0.93	16.08	1.82	7	16.94	1.47	18.02	3.56	8
N133	2020–01–02	2021–02–13	15.82	2.86	15.7	4.49	77	15.75	2.78	15.78	4.2	78
N134	2019–09–14	2021–02–13	–6.3	3.3	–6.47	5.29	73	–6.74	2.82	–7.14	4.46	67
N135	2020–06–13	2020–10–19	12.64	3.87	10.75	5.87	16	12	4.98	10.25	6.58	16
N135	2020–10–30	2021–02–13	–10.56	2.31	–10.05	4.51	9	–11.91	4.64	–11.97	7.29	7
N136	2019–07–16	2021–02–13	2.39	4.05	1.43	6.24	85	1.74	3.73	1.35	5.32	94
N137	2019–07–26	2020–01–19	–7.73	1.98	–8.13	2.9	23	–7.7	1.9	–8.1	2.87	23
N137	2020–02–13	2021–02–13	2.85	2.44	2.6	3.53	57	2.13	2.73	2.76	4.03	61
N138	2019–07–26	2021–02–13	11.95	2.45	11.64	3.41	98	11.85	2.55	11.25	3.66	100
N139	2019–07–26	2021–02–13	7.55	2.69	7.78	3.99	96	8.01	2.32	7.69	3.53	92
N140	2019–09–14	2021–02–13	15.34	3.85	15.49	6.32	60	15.51	3.63	15.43	4.55	59
N141	2019–07–26	2020–01–02	–2.97	3.53	–4.24	5.1	16	–3.83	4.09	–5.22	4.21	17

N141	2020–04–10	2021–02–13	27.29	3.86	26.86	4.9	40	27.69	3.63	27.41	4.59	42
N142	2019–07–26	2020–01–07	28.39	3.05	28.37	5.23	27	28.33	2.65	28.66	4.4	26
N142	2020–02–13	2021–02–13	7.61	4.75	7.16	6.39	58	6.58	3.6	6.56	4.99	60
N143	2019–09–01	2021–02–13	21.22	3.35	20.88	5.46	71	21.44	2.55	21.06	3.75	64
N144	2019–09–01	2021–02–13	14.82	4.36	15.23	6.44	75	15.17	4.08	15.33	5.93	78
N145	2019–07–26	2020–09–17	10.84	3.74	9.3	6.81	52	9.34	3.97	7.67	6.13	50
N146	2019–10–24	2020–03–18	−9.19	5.81	−9.46	10.42	10	−6.86	5.14	−7.44	6.06	7
N146	2020–04–10	2021–02–13	15.76	4.94	16.18	6.24	28	16.79	4.64	16.18	5.94	28
N147	2019–09–14	2019–11–08	10.44	2.24	11.32	3.06	6	10.09	2.3	10.59	2.67	6
N147	2019–11–14	2021–02–13	−4.1	2.3	−3.42	3.74	52	−4.05	2.38	−3.7	4.05	50
N148	2019–09–01	2021–02–13	21.9	1.66	21.94	2.7	81	21.66	1.83	21.93	2.72	82
N149	2019–09–14	2021–02–13	−22.95	3.66	−23.67	5.34	72	−23.35	3.03	−23.94	4.89	73
N150	2019–09–14	2021–02–13	14.73	3.81	14.33	4.68	87	14.6	3.25	14.09	4.3	84
N151	2019–09–14	2021–02–13	20.55	4.99	19.51	6.31	61	20.96	4.59	20.07	6.14	66
N152	2019–09–01	2021–02–13	−25.61	2.25	−25.23	3.42	71	−25.75	2.62	−25.72	4.15	71

N153	2019–09–01	2021–02–13	−44.63	3.48	−45.8	6.22	66	−45.06	3.6	−45.73	5.78	69
N154	2019–09–14	2021–02–13	40.12	4.19	39.13	5.96	57	40.45	4.16	39.56	6.61	67
N155	2019–09–14	2020–03–26	−5.41	1.33	−5.49	2.59	25	−6.07	1.39	−5.86	2.68	24
N155	2020–04–10	2021–02–14	1.66	2	1.54	3.08	54	1.4	2.03	1.49	3.22	56
N156	2019–09–14	2021–02–13	30.3	4.87	31.43	6.08	53	30.71	5.51	31.44	6.77	52
N157	2019–09–25	2021–02–13	−38.41	3.19	−38.61	5.14	65	−38.81	3.92	−39.1	5.92	71
N158	2019–09–01	2021–02–14	−25.83	2.76	−26.45	4.09	93	−25.92	2.72	−26.04	3.88	92
N159	2019–09–14	2021–02–13	−10.42	2.7	−10.32	4.02	103	−10.99	2.57	−11.11	4.09	96
N160	2019–09–01	2020–10–30	164.79	2.35	165.1	3.46	55	164.7	2.36	165.17	3.91	57
N160	2020–11–06	2021–02–13	10.36	3.13	12.11	3.65	13	11.1	3.82	10.93	5.99	13
N161	2019–09–01	2021–02–13	−24.84	3.73	−26	5.17	60	−25.6	3.66	−25.86	5.29	65
N162	2019–09–14	2021–02–13	20.22	2.08	19.86	3.07	67	20.4	2.22	20.12	3.4	70
N163	2019–09–14	2021–03–03	4.83	2.29	5.09	3.2	92	4.72	2.32	4.84	3.02	90
N164	2019–09–01	2021–02–13	35.4	5.87	34.83	6.4	47	34.13	4.96	33.44	6.93	50
N165	2019–09–01	2021–02–13	−4.48	4.47	−5.58	5.88	64	−4.46	3.97	−5.53	5.77	63

N166	2019–09–14	2019–12–02	13.69	2.42	13.72	3.71	16	12.49	2.99	13.06	4.35	14
N166	2020–01–02	2021–03–03	4.63	2.25	4.84	3.3	74	4.69	1.77	4.89	2.33	77
N167	2019–09–01	2021–02–13	5.54	2.65	5.47	4.08	74	5.81	2.5	5.87	3.86	75
N168	2019–09–01	2021–02–13	–30.86	4.01	–31.38	6.2	52	–31.69	3.8	–31.66	6.52	54
N169	2019–09–01	2021–02–13	20.71	5.2	20.03	6.45	80	20.17	4.64	19.64	5.96	78
N170	2019–07–26	2021–02–13	–3.56	2.83	–3.87	4.44	88	–3.8	2.69	–4.29	4.07	85
N171	2019–09–14	2021–02–13	–9.03	4.52	–9.37	6.63	81	–9.78	4.47	–9.67	6.25	84
N172	2019–09–14	2021–02–13	–29.17	3.96	–29.68	5.35	79	–30.16	3.76	–30.21	5.47	82
N173	2019–09–14	2021–02–13	–2.18	2.08	–1.74	3.56	73	–2	2.18	–1.79	3.52	69
N174	2019–07–26	2021–02–13	–70.88	2.28	–70.71	3.5	89	–70.68	2.38	–70.89	3.73	94
N175	2019–07–26	2021–02–13	3.92	2.99	3.33	4.99	71	3.2	3.01	2.46	4.96	76
N176	2019–09–14	2021–02–13	–3.17	2.99	–3.83	4.78	77	–2.58	2.77	–3.1	3.93	70
N177	2019–09–01	2021–02–13	20.76	4.75	22.05	7.34	44	19.54	3.44	21.2	6.58	30
N178	2019–07–26	2019–09–01	10.13	1.84	10.83	2.77	12	10.63	1.97	10.81	2.37	11
N178	2019–09–14	2021–02–13	–1.35	2.93	–1.28	4.1	74	–1.35	2.93	–1.14	4.14	77

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N179	2019–07–26	2021–02–13	–15.43	2.71	–15.42	3.83	99	–14.94	2.53	–15.13	3.97	102
N180	2019–09–14	2020–01–07	28.64	4.64	28.64	6.69	18	27.75	5.18	28.45	7.66	16
N180	2020–03–14	2021–02–13	11.47	4.04	11.5	5.97	50	10.38	3.58	11.22	5.63	51
N181	2019–07–26	2021–02–13	–22.13	4.03	–23.24	6.2	71	–22.17	3.78	–23.6	5.83	69
N182	2019–07–21	2021–02–13	–7.6	4.3	–8.52	6.01	85	–7.73	3.91	–8.58	6.03	92
N183	2019–07–21	2021–02–13	10.99	3.79	11.17	5.08	75	10.78	2.99	11.56	3.9	78
N184	2019–07–26	2021–02–13	50.63	2.93	49.71	4.8	90	50.38	2.47	49.42	4.17	92
N185	2019–07–26	2021–02–13	–24	3.56	–24.43	5.2	69	–25.07	3.85	–24.84	5.51	75
N186	2019–09–14	2020–03–25	–45.41	1.83	–45.26	3.16	19	–47.43	4.75	–49.29	6.98	23
N186	2020–04–10	2021–02–13	13.25	4.08	13.16	5.78	54	12.94	4.46	12.97	6.12	63
N187	2019–09–01	2021–02–13	–51.9	2.07	–51.71	3.5	77	–51.89	2.66	–52.11	4.05	82
N188	2019–09–27	2021–02–13	5.44	4.31	3.88	6.43	59	5.72	3.82	4.52	5.83	61
N189	2019–10–16	2021–02–13	–28.1	4.87	–28.84	8.27	34	–28.42	5.04	–28.01	8.49	33
N190	2019–09–14	2020–03–26	–5.76	2.5	–5.9	4.15	28	–6.16	2.35	–5.55	4.03	25
N190	2020–04–10	2021–02–14	4.47	2.41	4.87	3.56	63	4.66	2.28	4.79	3.17	63

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N191	2019–09–01	2021–02–13	22.18	4.88	23.15	6.83	50	22.76	4.54	23.07	6.19	58
N192	2019–09–14	2021–02–13	8.92	2.53	8.72	3.62	85	8.66	2.56	8.52	3.78	89
N193	2019–09–01	2021–02–13	−7.47	2.42	−7.46	3.25	94	−7.65	2.1	−7.57	3.19	101
N194	2019–09–01	2021–02–13	−14.2	4	−15.04	5.95	66	−13.93	4.06	−14.41	5.4	61
N195	2019–09–01	2021–02–13	14.53	2.28	14.58	3.45	92	14.96	2.47	14.58	3.33	94
N196	2019–09–01	2021–02–13	29.65	2.55	29.58	4	70	29.64	2.67	29.57	4.19	71
N197	2019–09–01	2021–02–13	12.33	4.55	11.8	6.25	74	12.46	4.05	11.87	5.81	74
N198	2019–09–14	2020–01–07	−13.61	2.74	−13.25	3.43	19	−12.94	2.04	−12.76	2.7	16
N198	2020–01–19	2021–02–13	−20.81	2.31	−20.44	3.08	71	−20.98	2.65	−20.3	3.5	78
N199	2019–09–01	2020–01–07	−153.97	2.15	−153.63	4.18	17	−154.3	2.23	−154.91	3.95	15
N199	2020–02–13	2021–02–13	9.94	3.12	9.79	4.08	61	10.03	3.41	9.89	4.72	67
N200	2019–09–14	2021–02–13	−0.97	4.61	−1.16	7.06	62	−0.05	4.35	−0.55	6.49	61

Table S2. List of significant data gaps (≥ 1 month) from June 2018 to March 2021

Station	Start date (UTC)	End date (UTC)
N001	2018-02-15	2018-05-16
N001	2019-12-06	2020-04-30
N001	2020-06-01	2020-08-31
N002	2018-02-15	2018-04-22
N002	2019-12-07	2020-04-30
N002	2020-06-01	2020-08-14
N003	2018-02-15	2018-04-30
N003	2019-12-07	2020-01-20
N003	2020-01-23	2020-04-30
N003	2020-06-01	2020-08-14
N004	2018-02-15	2018-04-22
N004	2019-12-07	2020-04-30
N004	2020-06-01	2020-08-14
N005	2018-02-05	2018-05-15
N005	2019-12-06	2020-04-30
N005	2020-06-01	2020-09-04
N005	2020-09-06	2020-10-21
N006	2018-01-19	2018-05-15
N006	2019-12-07	2020-04-30
N006	2020-06-01	2020-08-14
N007	2018-01-19	2018-05-16
N007	2019-12-07	2020-04-30
N007	2020-06-01	2020-09-04
N021	2019-04-01	2019-04-30
N026	2020-02-01	2020-03-25
N064	2019-05-11	2019-07-24
N085	2019-04-01	2020-01-14
N100	2019-07-08	2019-12-31
N133	2019-08-18	2019-12-08
N141	2020-02-19	2020-03-29

Table S3. List of man-made operations coincident with significant change in misorientation

Station	Date (KST)	Operation type
N003	2020-03-27	Type I
N007	2020-01-16	Type III
N009	2019-11-04	Type II
N010	2019-11-13	Type II
N011	2019-11-13	Type II
N012	2019-11-01	Type II
N014	2019-11-08	Type II
N020	2019-12-20	Type II
N021	2019-11-27	Type II
N022	2019-12-20	Type II
N023	2019-11-08	Type II
N025	2019-11-07	Type II
N029	2019-11-14	Type II
N031	2019-11-08	Type II
N032	2019-11-07	Type II
N034	2019-11-07	Type II
N036	2020-06-10	Type III
N037	2019-12-19	Type II
N039	2019-11-07	Type II
N040	2019-12-24	Type II
N046	2019-12-19	Type II
N048	2020-02-06	Type II
N049	2019-11-06	Type II
N050	2019-11-05	Type II
N052	2020-01-29	Type II
N053	2019-11-05	Type II
N054	2019-11-04	Type II
N055	2019-11-05	Type II
N056	2019-11-01	Type II
N061	2020-02-05	Type II
N062	2019-11-06	Type II
N063	2019-12-24	Type II
N064	2019-12-20	Type II
N065	2019-11-06	Type II
N066	2020-02-06	Type II
N069	2019-12-16	Type II
N071	2019-11-05	Type II
N072	2020-02-04	Type II
N076	2020-02-04	Type II
N077	2020-02-13	Type II
N082	2019-11-05	Type II
N083	2019-11-06	Type II
N084	2019-11-06	Type II

N087	2019–11–08	Type II
N089	2019–11–05	Type II
N090	2019–12–18	Type II
N093	2019–11–05	Type II
N094	2019–12–19	Type II
N095	2019–12–17	Type II
N096	2019–11–05	Type II
N099	2019–12–18	Type II
N100	2019–11–07	Type II
N102	2019–12–20	Type II
N103	2019–11–13	Type II
N103	2020–02–19	Type I
N106	2019–11–06	Type II
N109	2019–11–07	Type II
N110	2019–11–08	Type II
N112	2020–02–03	Type II
N113	2020–02–13	Type II
N114	2019–11–14	Type II
N118	2019–11–06	Type II
N119	2019–11–07	Type II
N121	2020–02–07	Type II
N122	2020–02–06	Type II
N135	2020–10–20	Type III
N141	2020–04–09	Type III
N147	2019–11–12	Type I
N160	2020–11–09	Type I
N178	2019–09–07	Type I

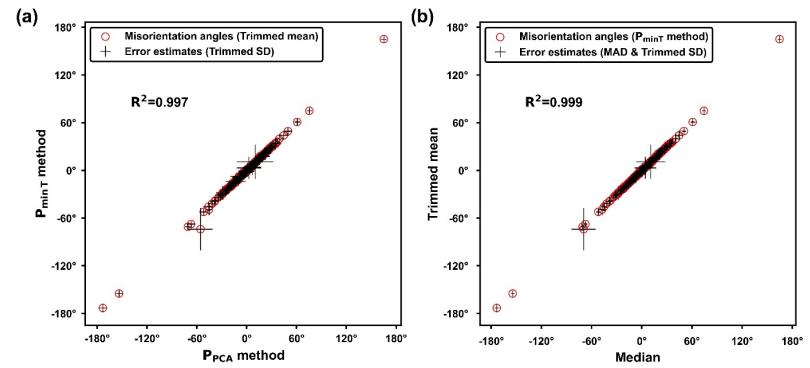


Fig. S1. (a) Comparison of trimmed mean estimates for each validation period from the P_{PCA} and $P_{min\ T}$ methods. Red circles are estimated misorientations for each validation period. (b) Comparison of median and trimmed mean estimates calculated from the $P_{min\ T}$ method.

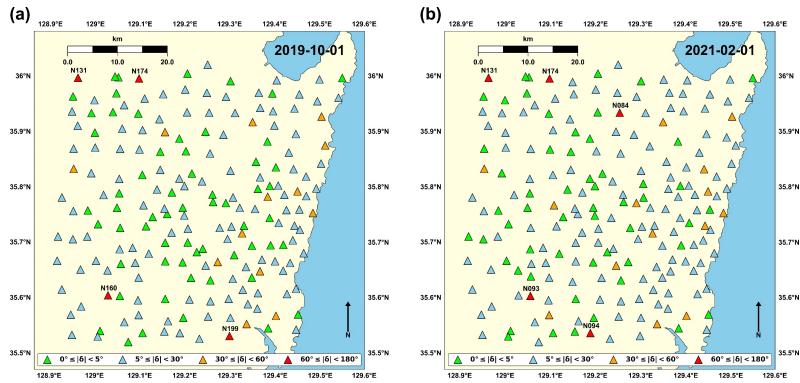


Fig. S2. Misorientation angles for GHBSN stations for two selected periods: (a) October 1st, 2019 and (b) February 1st, 2021. 191 and 197 stations whose data were available at each period are plotted in (a) and (b), respectively. Each station is colored based on the absolute value of misorientation angle ($|\delta|$). The severely rotated ($60^\circ \leq |\delta| < 180^\circ$) stations are marked in red and annotated with their station names.

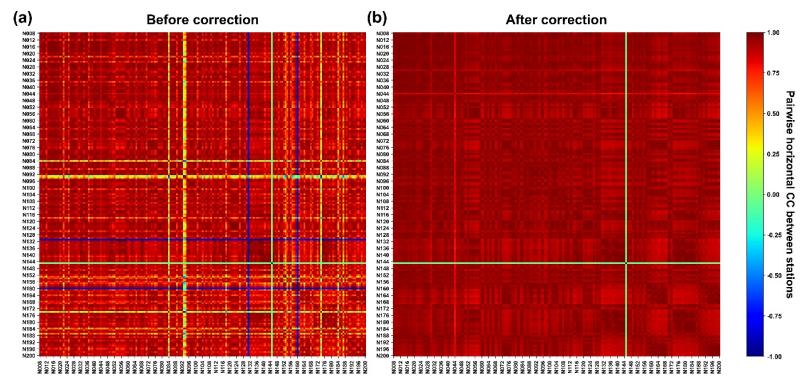


Fig. S3. Pairwise horizontal CC between 193 stations calculated (a) before misorientation correction and (b) after misorientation correction. Event 1 in Table 1 was used for CC calculation. The CCs of station N044 and N145 are still low after correction because of low SNR of horizontal seismograms.

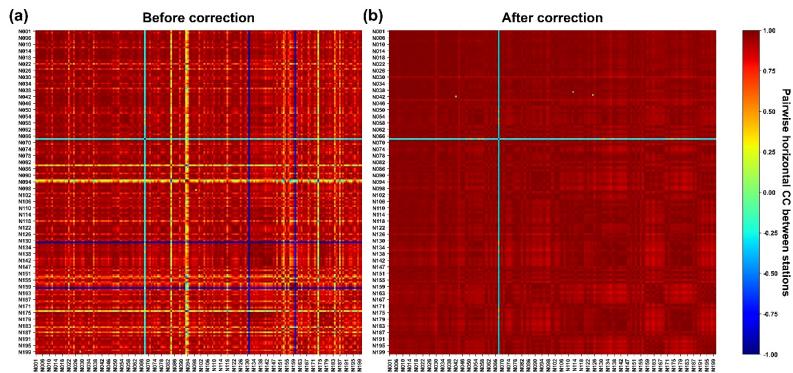


Fig. S4. Pairwise horizontal CC between 198 stations calculated (a) before misorientation correction and (b) after misorientation correction. Event 2 in Table 1 was used for CC calculation. The CC of station N068 is still low after correction because of low SNR of horizontal seismograms.

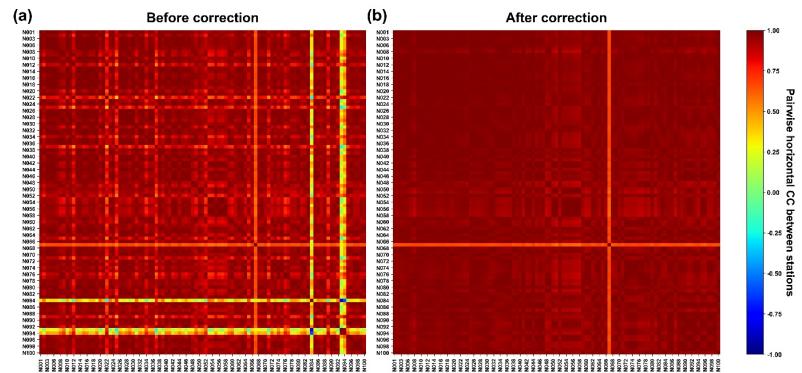


Fig. S5. Pairwise horizontal CC between 99 stations calculated (a) before misorientation correction and (b) after misorientation correction. Event 4 in Table 1 was used for CC calculation. The CC of station N067 is still low after correction because of low SNR of horizontal seismograms.

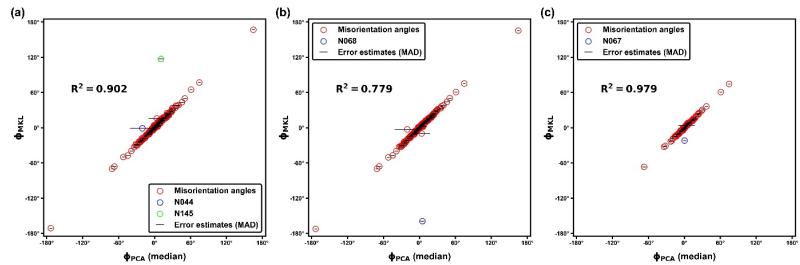


Fig. S6. Comparison of the median misorientation estimates from the P_{PCA} method and the misorientation estimates from the correlation-based method applied with MKL station of KG network (Figure 1) and for (a) event 1, (b) event 2, and (c) event 3 (Table 1). In panel (a), stations N044 and N145 marked by blue and green empty circles, in panel (b), station N068 marked by blue empty circle, and in panel (c), station N067 marked by blue empty circle deviate from the linear trend. These 4 stations which deviate from linear trend are all characterized by low horizontal CC due to low SNR of horizontal seismograms. Except for these stations, correlation between estimates from two different methods are very high.

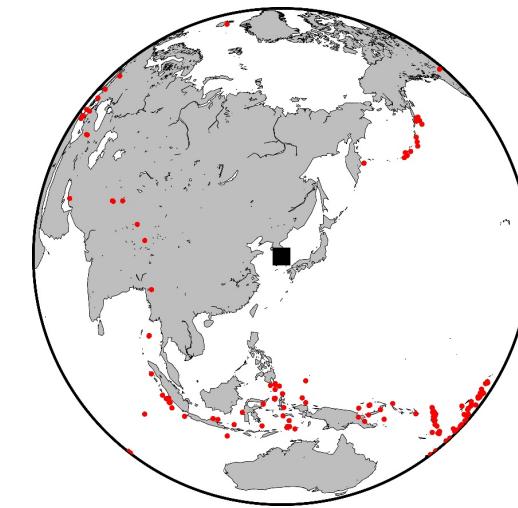
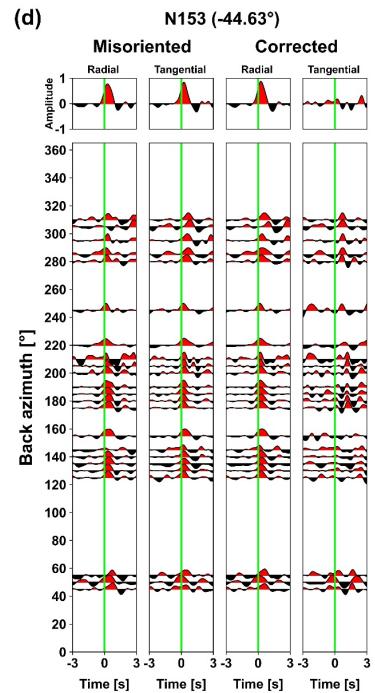
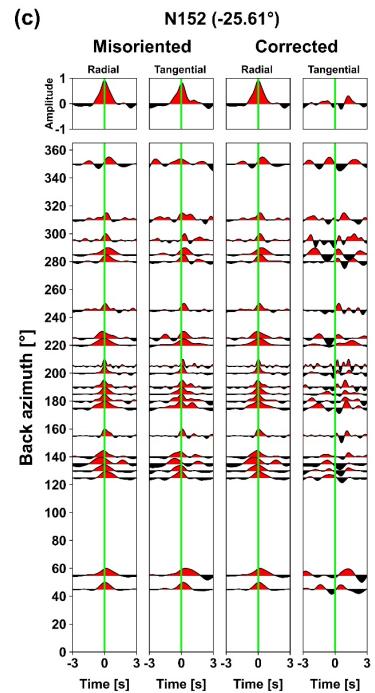
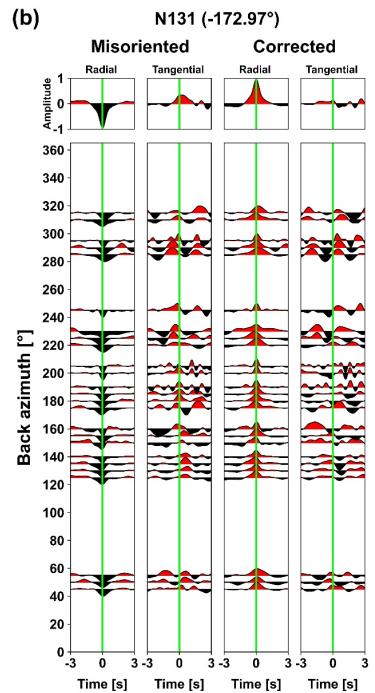
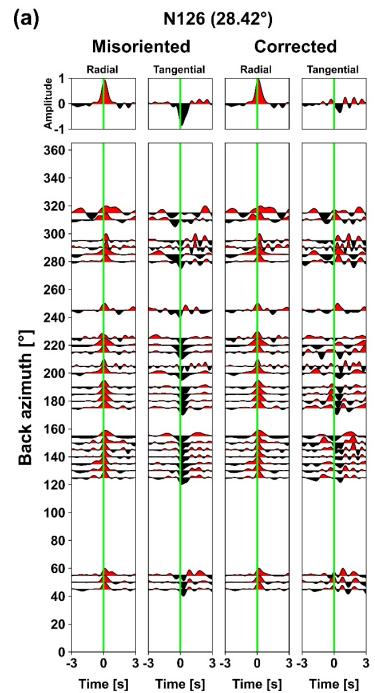
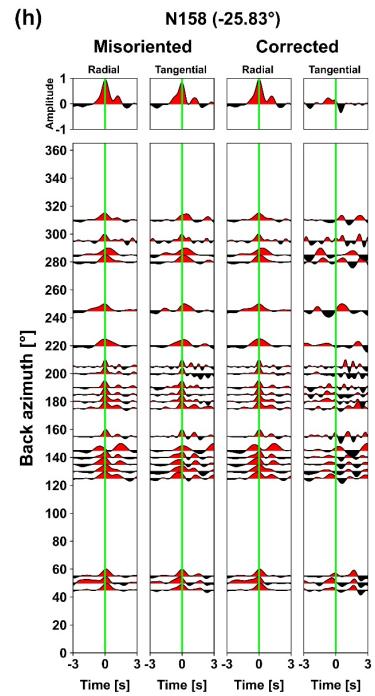
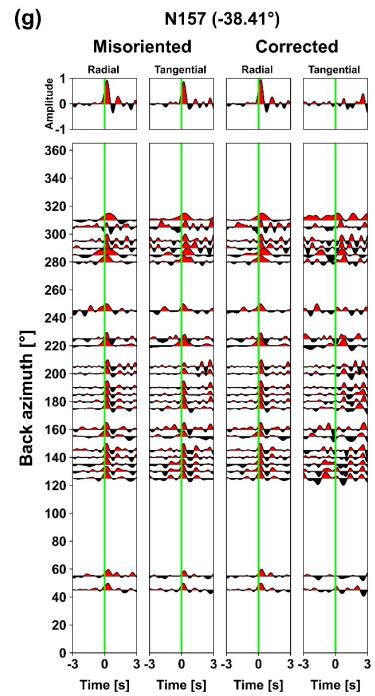
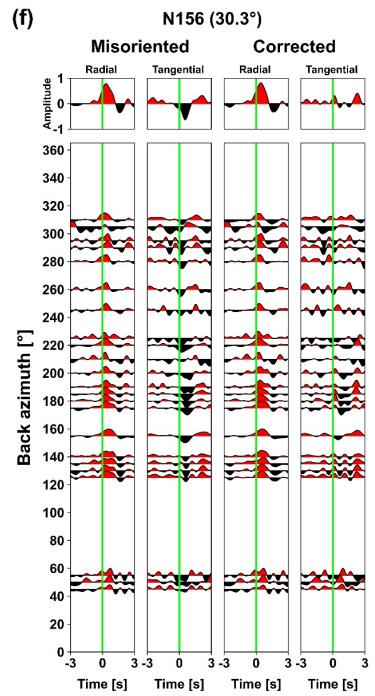
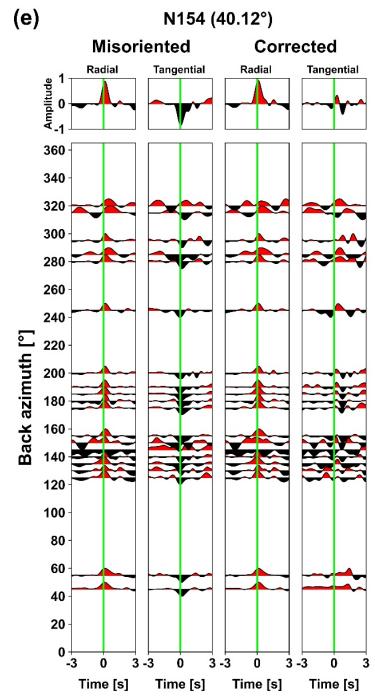
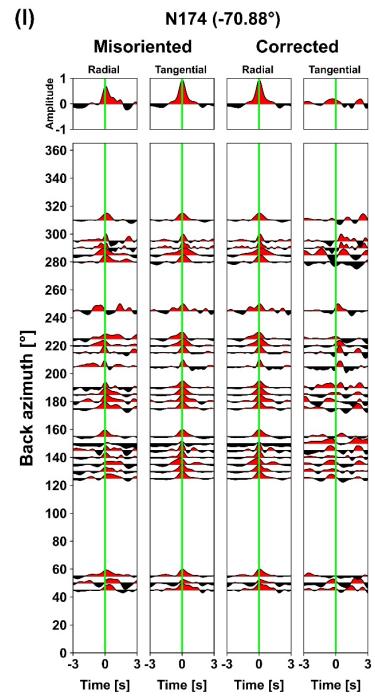
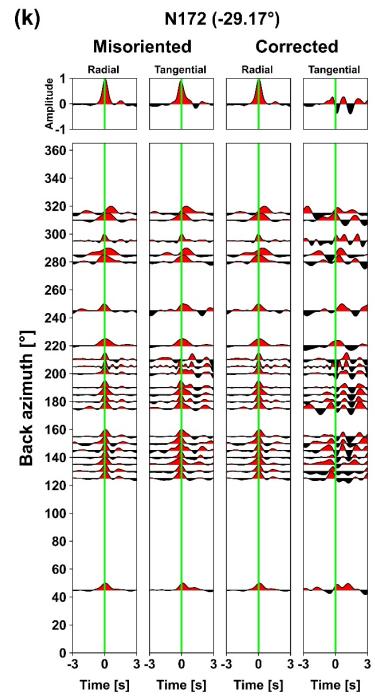
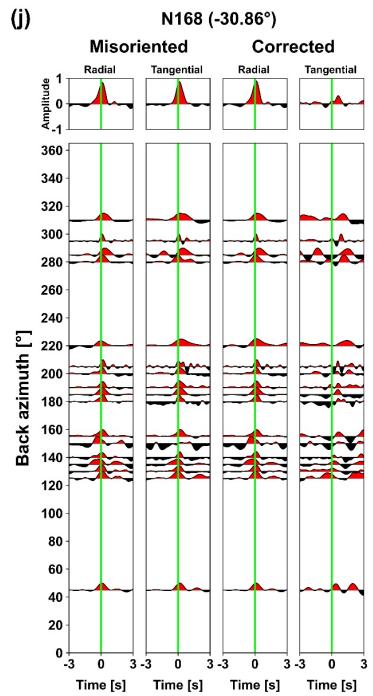
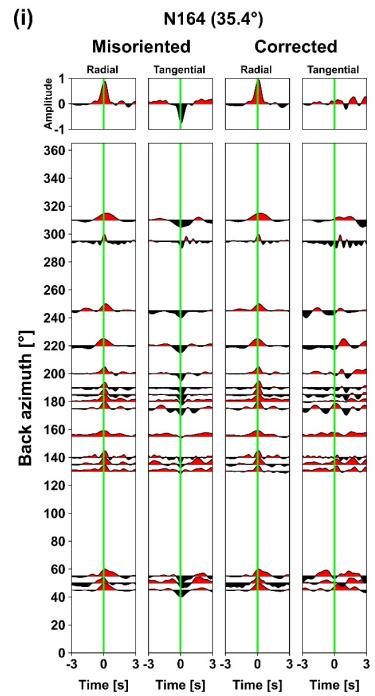


Fig. S7. The map showing 517 teleseismic earthquakes for the receiver function (RF) analysis. Each event is marked as a red dot. Black square marks the reference location of 36.5 °N, 128 °E.







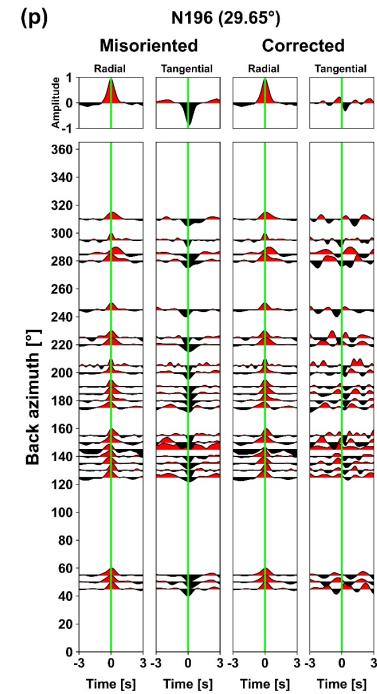
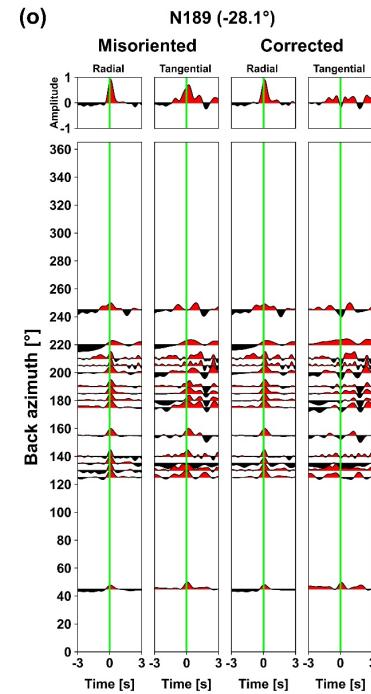
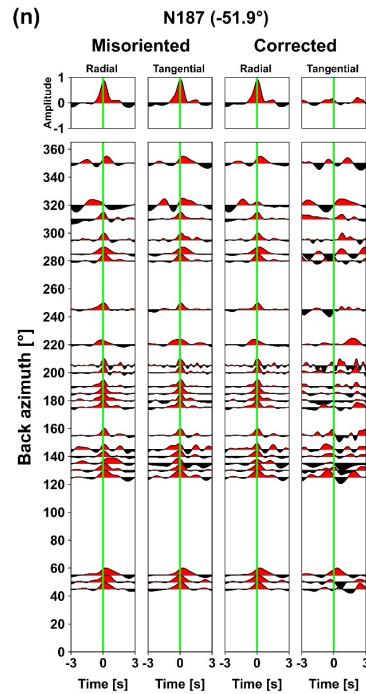
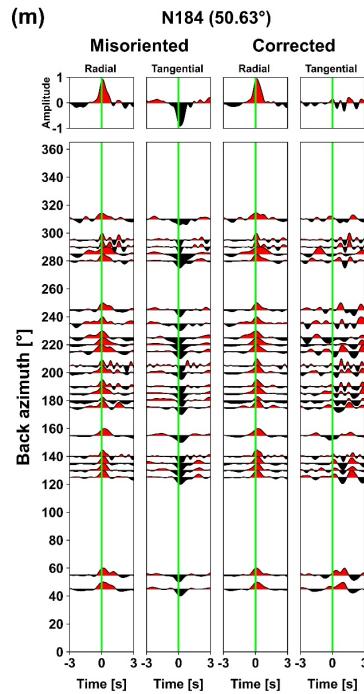


Fig. S8. The back-azimuthal record section plots of R-RFs and T-RFs before and after correcting for misorientation ((a)–(p)) for the 16 stations. The stacked traces displayed at the top are the same as ones shown in Figure 10. Misorientation angle corresponding to each station is annotated inside the parentheses beside the station name. Calculated RFs were normalized and stacked over 5° interval. Green vertical lines mark 0 s. All analyzed record sections show that the amplitude level of T-RFs at/near 0 s is substantially decreased after the correction.