climate

Supplementary Material

Appendix A

Table S1. Observational stations on the Northern Hemisphere.

No.	Station	Lat. (° ′)			Lon. (° ′)			Height (m)
01	Ostrov Dikson	73	30	N	80	24	E	47
02	Barrow	71	17	N	156	47	W	12
03	Reykjavik	64	08	N	21	54	W	54
04	Anchorage	61	09	N	149	59	W	52
05	Helsinki	60	19	N	24	58	E	51
06	Oslo	60	12	N	11	04	E	202
07	St. Petersburg	59	58	N	30	18	E	6
08	Stockholm	59	21	N	17	53	E	15
09	Moskva	55	50	N	37	37	E	156
10	Koebenhavn	55	41	N	12	32	E	7
11	Omsk	55	01	N	73	23	E	122
12	Edmonton	53	34	N	113	31	W	671
13	Dublin	53	26	N	06	15	W	68
14	Berlin	52	28	N	13	24	E	48
15	Irkutsk	52	16	N	104	19	E	469
16	Warszawa	52	09	N	20	57	E	106
17	De Bilt	52	05	N	05	10	E	1
18	London	51	28	N	00	27	W	24
19	Kiev	50	24	N	30	34	E	166
20	Praha	50	06	N	14	15	E	380
21	Winnipeg	49	55	N	97	14	W	238
22	Luxembourg	49	37	N	06	13	E	376
23	Vancouver	49	11	N	123	10	W	4
24	Muenchen	48	21	N	11	48	E	443
25	Wien	48	14	N	16	21	W	198
26	Budapest	47	26	N	19	11	E	138
27	Zuerich	47	22	N	08	33	E	555
28	Lyon	45	43	N	04	56	E	197
29	Montreal	45	28	N	73	45	W	35
30	Beograd	44	48	N	20	28	E	132
31	Bucuresti	44	30	N	26	04	E	90
32	Chang—chun	43	54	N	125	13	E	238
33	Urumchi	43	47	N	87	39	E	936
34	Vladivostok	43	07	N	131	56	E	183

35	Sapporo	43	04	N	141	20	E	17
36	Sofia	42	39	N	23	23	E	595
37	Boston	42	22	N	71	02	W	6
38	Chicago	41	59	N	87	54	W	203
39	Shenyang	41	44	N	123	31	E	49
40	Tashkent	41	20	N	69	18	E	488
41	Barcelona	41	17	N	02	04	E	4
42	Istanbul	40	54	N	29	09	E	18
43	New York	40	46	N	73	54	W	7
44	Madrid	40	24	N	03	40	W	667
45	Ankara	39	57	N	32	53	E	891
46	Denver	39	46	N	104	52	W	1611
47	Kashgar	39	28	N	75	59	E	1291
48	Dalian	38	54	N	121	38	E	97
49	Washington	38	51	N	77	02	W	5
50	Lisboa	38	43	N	09	09	W	77
51	Ashgabat	37	55	N	58	08	E	312
52	Athinai	37	44	N	23	44	E	28
53	San Francisco	37	37	N	122	23	W	6
54	Tunis	36	50	N	10	14	E	4
55	Dar-El-Beida	36	41	N	03	13	E	25
56	Gibraltar	36	09	N	05	20	W	5
57	Las Vegas	36	05	N	115	10	W	662
58	Tehran	35	41	N	51	19	E	1204
59	Tokyo	35	41	N	139	46	E	6
60	Osaka	34	41	N	135	31	E	23
61	Peshawar	34	01	N	71	35	E	359
62	Atlanta	33	39	N	84	25	W	312
63	Fukuoka	33	35	N	130	23	E	3
64	Damascus	33	25	N	36	31	E	608
65	Amman	31	59	N	35	59	E	778
66	Shanghai	31	25	N	121	27	E	9
67	Wuhan	30	36	N	114	03	E	24
68	Cairo	30	06	N	31	24	E	116
69	New Orleans	29	59	N	90	15	W	1
70	Lhasa	29	40	N	91	08	E	3650
71	New Delhi	28	35	N	77	12	E	211
72	Naze	28	23	N	129	30	E	3
73	Miami	25	45	N	80	23	W	4
74	Taipei	25	02	N	121	31	E	9
75	Kunming	25	01	N	102	41	E	1892
76	Karachi	24	54	N	67	08	E	21
77	Riyadh	24	42	N	46	44	E	635

78	Asswan	23	57	N	32	49	E	201
79	Kolkata	22	32	N	88	20	E	6
80	Hong Kong	22	18	N	114	10	E	31
81	Honolulu	21	21	N	157	56	W	2
82	Bombay	18	54	N	72	49	E	9
83	Kingston	17	56	N	76	47	W	3
84	Yangon	16	46	N	96	10	E	14
85	Khartoum	15	36	N	32	33	E	382
86	Dakar	14	43	N	17	30	W	24
87	Bangkok	13	43	N	100	33	E	3
88	Niamey	13	29	N	02	10	E	223
89	Guam	13	28	N	144	47	E	75
90	Bamako	12	32	N	07	57	W	380
91	Ndjamena	12	08	N	15	02	E	295
92	Djibouti	11	33	N	43	09	E	13
93	Addis Ababa	09	02	N	38	45	E	2354
94	Colombo	06	54	N	79	52	E	7
95	Bogota	04	42	N	74	09	W	2547
96	Kuala Lumpur	03	07	N	101	33	E	27
97	Singapore	01	22	N	103	59	E	5

Table S2. Observational stations on the Southern Hemisphere.

No.	Station	Lat. (° ′)			Lon. (° ′)			Height (m)
01	Ushuaia	54	48	S	68	19	W	28
02	Christchurch	43	29	S	172	33	E	38
03	Melbourne	37	39	S	144	49	E	132
04	Auckland	37	01	S	174	48	E	7
05	Canberra	35	18	S	149	12	E	575
06	Buenos Aires	34	35	S	58	29	W	25
07	Cape Town	33	58	S	18	36	E	46
08	Sydney	33	56	S	151	10	E	6
09	Perth	31	55	S	115	58	E	20
10	Maputo	25	55	S	32	34	E	39
11	Pretoria	25	44	S	28	11	E	1308
12	Rio De Janeiro	22	55	S	43	10	W	5
13	La Paz	16	31	S	68	11	W	4058
14	Salvador	13	01	S	38	31	W	52
15	Lima	12	01	S	77	07	W	12
16	Honiara	09	25	S	160	03	E	8
17	Dar Es Salaam	06	52	S	39	12	E	55
18	Manaus	03	08	S	60	01	W	72
19	Nairobi	01	19	S	36	54	E	1624

Table S3. Top-thirty Northern Hemispheric stations in the rotation angle of the monthly distributions of precipitations from Period I (1931-1960) to II (1951-1980).

Rank	Station	Lat. (° ′)	θ (°)	ΔH (mm)
01	Asswan	23 57 N	125.37	−1.5
02	Kashgar	39 28 N	71.26	−33.9
03	Cairo	30 06 N	51.06	−3.6
04	Riyadh	24 42 N	43.83	+21.4
05	Urumchi	43 47 N	38.68	−97.4
06	Amman	31 59 N	38.01	+8.5
07	Taipei	25 02 N	36.98	−96.1
08	Damascus	33 25 N	33.09	−82.6
09	Dalian	38 54 N	32.77	+52.0
10	Luxembourg	49 37 N	29.95	+40.0
11	Ostrov Dikson	73 30 N	29.88	+77.4
12	Wuhan	30 36 N	29.71	−53.9
13	New Delhi	28 35 N	29.66	+71.9
14	Omsk	55 01 N	27.85	+29.5
15	Lisboa	38 43 N	27.56	+84.1
16	Barcelona	41 17 N	26.40	+55.6
17	London	51 28 N	25.54	+164.8
18	Chicago	41 59 N	25.50	+55.1
19	Atlanta	33 39 N	25.46	+85.7
20	Las Vegas	36 05 N	25.21	+7.3
21	Wien	48 14 N	24.56	−38.5
22	Lhasa	29 40 N	24.55	+40.6
23	Shanghai	31 25 N	24.12	−14.5
24	Dar−El−Beida	36 41 N	23.74	+55.3
25	Vladivostok	43 07 N	23.32	+76.1
26	Honolulu	21 21 N	23.21	+72.6
27	Tunis	36 50 N	22.52	+27.7
28	Peshawar	34 01 N	22.25	−5.0
29	San Francisco	37 37 N	22.22	+44.6
30	Sapporo	43 04 N	22.11	+22.0

ΔH indicates the increment of the mean annual precipitation from the former to the latter period.

Table S4. Top-thirty Northern Hemispheric stations in the rotation angle of the monthly distributions of precipitations from Period II (1951-1980) to III (1981-2010).

Rank	Station	Lat. (° ′)	θ (°)	ΔH (mm)
01	Asswan	23 57 N	81.95	+2.6
02	Urumchi	43 47 N	49.28	+110.6
03	Kashgar	39 28 N	48.86	+19.4
04	Amman	31 59 N	48.41	−13.0
05	Dar−El−Beida	36 41 N	46.74	−148.4
06	**Kingston**	17 56 N	46.41	+12.7
07	Cairo	30 06 N	43.70	+13.2
08	**Karachi**	24 54 N	43.24	−57.6
09	**Athinai**	37 44 N	42.45	−12.8
10	**Lyon**	45 43 N	41.83	+24.4
11	Shanghai	31 25 N	41.59	+36.5
12	**New Orleans**	29 59 N	38.97	+20.7
13	**Sofia**	42 39 N	35.50	−67.0
14	**Hong Kong**	22 18 N	34.90	+28.0
15	Las Vegas	36 05 N	34.16	+1.9
16	Chicago	41 59 N	33.28	+29.4
17	Tunis	36 50 N	32.45	−26.8
18	**Koebenhavn**	55 41 N	31.02	−60.6
19	Peshawar	34 01 N	30.00	+112.1
20	**Anchorage**	61 09 N	29.94	+21.0
21	**Gibraltar**	36 09 N	29.91	+23.2
22	Kiev	50 24 N	29.18	−5.2
23	London	51 28 N	28.98	−118.5
24	Wien	48 14 N	28.48	+38.5
25	Lisboa	38 43 N	28.32	−39.0
26	**Madrid**	40 24 N	27.92	−41.8
27	Riyadh	24 42 N	27.51	+37.1
28	**Ankara**	39 57 N	26.68	+1.3
29	Wuhan	30 36 N	26.51	+148.2
30	Atlanta	33 39 N	26.35	−15.9

Table S5. The Ranking of Southern Hemispheric stations in the rotation angle of the monthly distributions of precipitations from Period I (1931-1960) to II (1951-1980).

Rank	Station	Lat. (° ′)			θ (°)	ΔH (mm)
01	Melbourne	37	39	S	26.75	+29.5
02	Buenos Aires	34	35	S	25.54	+122.9
03	Pretoria	25	44	S	24.63	−10.0
04	Cape Town	33	58	S	23.02	−3.3
05	Sydney	33	56	S	22.57	+40.4
06	Auckland	37	01	S	21.25	−131.3
07	Dar Es Salaam	06	52	S	21.23	+87.5
08	Ushuaia	54	48	S	19.76	−24.7
09	Christchurch	43	29	S	17.48	−10.0
10	Nairobi	01	19	S	15.39	+103.4
11	Canberra	35	18	S	14.20	−12.1
12	Salvador	13	01	S	12.81	−211.3
13	Rio De Janeiro	22	55	S	11.19	+103.2
14	Perth	31	55	S	8.27	−83.2
15	Manaus	03	08	S	6.28	+133.6

With their precipitation data unavailable, Maputo, La Paz, Lima, and Honiara are excluded.

Table S6. The Ranking of Southern Hemispheric stations in the rotation angle of the monthly distributions of precipitations from Period II (1951-1980) to III (1981-2010).

Rank	Ｓｔａｔｉｏｎ	Ｌａｔ．(° ′)	θ (°)	ΔH (mm)
０１	Ｓｙｄｎｅｙ	３３　５６　Ｓ	４９．２７	－２１２．９
０２	Ｍｅｌｂｏｕｒｎｅ	３７　３９　Ｓ	３５．５８	－２３９．７
０３	**Ｃａｎｂｅｒｒａ**	３５　１８　Ｓ	３３．７６	－５２．１
０４	**Ｓａｌｖａｄｏｒ**	１３　０１　Ｓ	３３．７０	＋３１７．４
０５	**Ｒｉｏ　Ｄｅ　Ｊａｎｅｉｒｏ**	２２　５５　Ｓ	３３．６２	＋４５．４
０６	Ｐｒｅｔｏｒｉａ	２５　４４　Ｓ	２８．４４	－６９．８
０７	Ｕｓｈｕａｉａ	５４　４８　Ｓ	２８．１１	＋１３．２
０８	Ａｕｃｋｌａｎｄ	３７　０１　Ｓ	２４．８２	－３８．８
０９	Ｎａｉｒｏｂｉ	０１　１９　Ｓ	２０．４０	－２６０．５
１０	Ｂｕｅｎｏｓ　Ａｉｒｅｓ	３４　３５　Ｓ	１９．６９	＋１７４．９
１１	Ｃｈｒｉｓｔｃｈｕｒｃｈ	４３　２９　Ｓ	１８．８９	－３５．２
１２	Ｐｅｒｔｈ	３１　５５　Ｓ	１８．７６	－７９．４
１３	Ｃａｐｅ　Ｔｏｗｎ	３３　５８　Ｓ	１７．４１	＋２３．１
１４	Ｄａｒ　Ｅｓ　Ｓａｌａａｍ	０６　５２　Ｓ	１３．６４	－３７．５
１５	Ｍａｎａｕｓ	０３　０８　Ｓ	１０．９０	＋９５．０

With their precipitation data unavailable, Maputo, La Paz, Lima, and Honiara are excluded.

Appendix B

Table S7. Observational stations in Japan.

No.	Station	Lat. (° ′)			Lon. (° ′)			Height (m)
01	Wakkanai	45	25	N	141	41	E	3
02	Abashiri	44	01	N	144	17	E	38
03	Asahikawa	43	46	N	142	22	E	120
04	Nemuro	43	20	N	145	35	E	25
05	Sapporo	43	04	N	141	20	E	17
06	Kushiro	42	59	N	144	23	E	5
07	Obihiro	42	55	N	143	13	E	38
08	Suttsu	42	48	N	140	13	E	33
09	Urakawa	42	10	N	142	47	E	37
10	Hakodate	41	49	N	140	45	E	35
11	Aomori	40	49	N	140	46	E	3
12	Akita	39	43	N	140	06	E	6
13	Morioka	39	42	N	141	10	E	155
14	Miyako	39	39	N	141	58	E	43
15	Sakata	38	55	N	139	51	E	3
16	Sendai	38	16	N	140	54	E	39
17	Yamagata	38	15	N	140	21	E	153
18	Aikawa	38	02	N	138	14	E	6
19	Nigata	37	54	N	139	01	E	4
20	Fukushima	37	46	N	140	28	E	67
21	Wajima	37	23	N	136	54	E	5
22	Takada	37	06	N	138	15	E	13
23	Onahama	36	57	N	140	54	E	3
24	Toyama	36	43	N	137	12	E	9
25	Nagano	36	40	N	138	12	E	418
26	Kanazawa	36	35	N	136	38	E	6
27	Utsumomiya	36	33	N	139	52	E	119
28	Maebashi	36	24	N	139	23	E	112
29	Mito	36	23	N	140	28	E	29
30	Karuizawa	36	21	N	138	33	E	999
31	Matsumoto	36	15	N	137	58	E	610
32	Saigo	36	12	N	133	20	E	27
33	Kumagaya	36	09	N	139	23	E	30
34	Takayama	36	09	N	137	15	E	560
35	Fukui	36	03	N	136	13	E	9
36	Choshi	35	44	N	140	51	E	20

37	Tokyo	35	41	N	139	46	E	6
38	Kofu	35	40	N	138	33	E	273
39	Tsuruga	35	39	N	136	04	E	2
40	Ida	35	31	N	137	49	E	516
41	Tottori	35	29	N	134	14	E	7
42	Yokohama	35	26	N	139	39	E	39
43	Gifu	35	24	N	136	46	E	13
44	Hikone	35	17	N	136	15	E	87
45	Nagoya	35	10	N	136	58	E	51
46	Kyoto	35	01	N	135	44	E	41
47	Shizuoka	34	59	N	138	24	E	14
48	Hamada	34	54	N	132	04	E	19
49	Oshima	34	45	N	139	22	E	74
50	Hamamatsu	34	45	N	137	43	E	46
51	Tsu	34	44	N	136	31	E	3
52	Kobe	34	42	N	135	13	E	5
53	Osaka	34	41	N	135	31	E	23
54	Okayama	34	40	N	133	55	E	3
55	Hiroshima	34	24	N	132	28	E	4
56	Takamatsu	34	19	N	134	03	E	9
57	Wakayama	34	14	N	135	10	E	14
58	Izuhara	34	12	N	129	18	E	4
59	Owase	34	04	N	136	12	E	15
60	Tokushima	34	04	N	134	34	E	2
61	Shimonoseki	33	57	N	130	56	E	3
62	Matsuyama	33	51	N	132	47	E	32
63	Fukuoka	33	35	N	130	23	E	3
64	Kochi	33	34	N	133	33	E	1
65	Ushiomisaki	33	27	N	135	45	E	68
66	Saga	33	16	N	130	18	E	6
67	Murotomisaki	33	15	N	134	11	E	185
68	Oita	33	14	N	131	37	E	5
69	Hachijojima	33	07	N	139	47	E	151
70	Kumamoto	32	49	N	130	42	E	38
71	Nagasaki	32	44	N	129	52	E	27
72	Shimizu	32	43	N	133	01	E	31
73	Miyazaki	31	56	N	131	25	E	9
74	Kagoshima	31	33	N	130	33	E	4
75	Naze	28	23	N	129	30	E	3

Table S8. Top-twenty Japanese stations in the rotation angle of the monthly distributions of precipitations from Period I (1931-1960) to II (1951-1980).

Rank	Ｓｔａｔｉｏｎ	Ｌａｔ．（°　′）	θ （°）	ΔH （mm）
０１	Ｋａｒｕｉｚａｗａ	３６　２１　Ｎ	３０．８０	－４１
０２	Ａｂａｓｈｉｒｉ	４４　０１　Ｎ	２５．９７	－６
０３	Ｏｂｉｈｉｒｏ	４２　５５　Ｎ	２５．７１	＋９
０４	Ｕｒａｋａｗａ	４２　１０　Ｎ	２５．６０	＋７１
０５	Ｉｚｕｈａｒａ	３４　１２　Ｎ	２３．４２	＋５０
０６	Ｔｏｋｕｓｈｉｍａ	３４　０４　Ｎ	２３．４０	＋１１８
０７	Ｈａｋｏｄａｔｅ	４１　４９　Ｎ	２２．６７	－２１
０８	Ｓａｋａｔａ	３８　５５　Ｎ	２２．３２	－３３
０９	Ｓａｐｐｏｒｏ	４３　０４　Ｎ	２２．１１	＋２２
１０	Ｋｕｓｈｉｒｏ	４２　５９　Ｎ	２１．１１	－１８
１１	Ｋｏｃｈｉ	３３　３４　Ｎ	２０．６３	＋２０
１２	Ｍｉｙａｋｏ	３９　３９　Ｎ	２０．５１	－１０
１３	Ｈａｍａｄａ	３４　５４　Ｎ	１９．３６	＋８５
１４	Ｎｉｇａｔａ	３７　５４　Ｎ	１８．８４	－１９
１５	Ｏｗａｓｅ	３４　０４　Ｎ	１８．７７	－６８
１６	Ｓｕｔｔｓｕ	４２　４８　Ｎ	１８．７５	－３１
１７	Ａｉｋａｗａ	３８　０２　Ｎ	１７．６４	＋１７
１８	Ｔａｋａｍａｔｓｕ	３４　１９　Ｎ	１７．４０	－４３
１９	Ｈａｍａｍａｔｓｕ	３４　４５　Ｎ	１７．１４	－５
２０	Ｋｕｍａｇａｙａ	３６　０９　Ｎ	１７．１２	－８７

Table S9. Top-twenty Japanese stations in the rotation angle of the monthly distributions of precipitations from Period II (1951-1980) to III (1981-2010).

Rank	Station	Lat. (° ′)	θ (°)	ΔH (mm)
01	Tokushima	34 04 N	30.55	−289
02	Urakawa	42 10 N	30.09	−110
03	**Nemuro**	43 20 N	28.76	−51
04	Abashiri	44 01 N	27.71	−51
05	Owase	34 04 N	25.18	−269
06	**Murotomisaki**	33 15 N	24.41	−198
07	Obihiro	42 55 N	24.17	−64
08	**Matsumoto**	36 15 N	23.87	−36
09	Sakata	38 55 N	23.51	+9
10	Hamamatsu	34 45 N	22.83	−119
11	Miyako	39 39 N	22.45	+50
12	**Ida**	35 31 N	22.33	−70
13	Kushiro	42 59 N	22.19	−61
14	**Tsu**	34 44 N	22.00	−127
15	**Kobe**	34 42 N	21.88	−169
16	**Aomori**	40 49 N	20.89	−107
17	Kochi	33 34 N	20.80	−119
18	Hakodate	41 49 N	20.54	−5
19	**Naze**	28 23 N	20.00	−213
20	Takamatsu	34 19 N	19.96	−117

Appendix C: An example of derivation of the rotation angle.

For instance, for Sapporo (vector ***p***) and Chicago (vector ***q***) in Period III the computational details of Equations (3)–(7) are given as follows: first the original data [68] of the monthly average temperatures with the Celsius scale should be written explicitly. For Sapporo

$\langle u_1 \rangle$ = -3.6, $\langle u_2 \rangle$ = -3.1, $\langle u_3 \rangle$ = 0.6, $\langle u_4 \rangle$ = 7.1, $\langle u_5 \rangle$ = 12.4, $\langle u_6 \rangle$ = 16.7,
$\langle u_7 \rangle$ = 20.5, $\langle u_8 \rangle$ = 22.3, $\langle u_9 \rangle$ = 18.1, $\langle u_{10} \rangle$ = 11.8, $\langle u_{11} \rangle$ = 4.9, $\langle u_{12} \rangle$ = -0.9.

(Equation S1)

For Chicago

$\langle x_1 \rangle$ = -4.6, $\langle x_2 \rangle$ = -2.4, $\langle x_3 \rangle$ = 3.2, $\langle x_4 \rangle$ = 9.3, $\langle x_5 \rangle$ = 15.0, $\langle x_6 \rangle$ = 20.5,
$\langle x_7 \rangle$ = 23.3, $\langle x_8 \rangle$ = 22.4, $\langle x_9 \rangle$ = 18.2, $\langle x_{10} \rangle$ = 11.4, $\langle x_{11} \rangle$ = 4.6, $\langle x_{12} \rangle$ = -2.3.

(Equation S2)

For Sapporo, substitution of Equation (C1) for Equation (6) yields

$\langle v_1 \rangle$ = 0.5, $\langle v_2 \rangle$ = 3.7, $\langle v_3 \rangle$ = 6.5, $\langle v_4 \rangle$ = 5.3, $\langle v_5 \rangle$ = 4.3, $\langle v_6 \rangle$ = 3.8,
$\langle v_7 \rangle$ = 1.8, $\langle v_8 \rangle$ = -4.2, $\langle v_9 \rangle$ = -6.3, $\langle v_{10} \rangle$ = -6.9, $\langle v_{11} \rangle$ = -5.8;
$\langle w_1 \rangle$ = 3.2, $\langle w_2 \rangle$ = 2.8, $\langle w_3 \rangle$ = -1.2, $\langle w_4 \rangle$ = -1.0, $\langle w_5 \rangle$ = -0.5, $\langle w_6 \rangle$ = -2.0,
$\langle w_7 \rangle$ = -6.0, $\langle w_8 \rangle$ = -2.1, $\langle w_9 \rangle$ = -0.6, $\langle w_{10} \rangle$ = 1.1. (Equation S3)

With Equations (C1) and (C3) the 33-dimensional vector ***p*** in Equation (4) has been determined. Subsequently, for Chicago, substituting Equation (C2) for Equation (7) yields

$\langle y_1 \rangle$ = 2.2, $\langle y_2 \rangle$ = 5.6, $\langle y_3 \rangle$ = 6.1, $\langle y_4 \rangle$ = 5.7, $\langle y_5 \rangle$ = 5.5, $\langle y_6 \rangle$ = 2.8,
$\langle y_7 \rangle$ = -0.9, $\langle y_8 \rangle$ = -4.2, $\langle y_9 \rangle$ = -6.8, $\langle y_{10} \rangle$ = -6.8, $\langle y_{11} \rangle$ = -6.9;
$\langle z_1 \rangle$ = 3.4, $\langle z_2 \rangle$ = 0.5, $\langle z_3 \rangle$ = -0.4, $\langle z_4 \rangle$ = -0.2, $\langle z_5 \rangle$ = -2.7, $\langle z_6 \rangle$ = -3.7,
$\langle z_7 \rangle$ = -3.3, $\langle z_8 \rangle$ = -2.6, $\langle z_9 \rangle$ = 0.0, $\langle z_{10} \rangle$ = -0.1. (Equation S4)

With Equations (C2) and (C4) the vector ***q*** in Equation (5) has been specified. Finally, using Equation (3) we obtain θ = 9.6 degrees as given in Table 7.