



Supplementary Materials

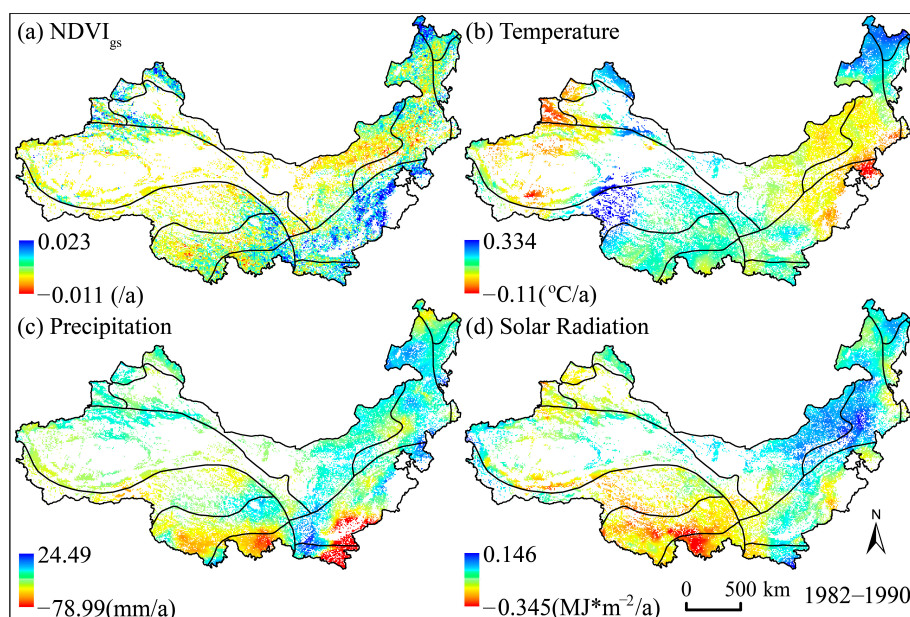


Figure S1. Spatial distribution of the slopes of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 1982–1990.

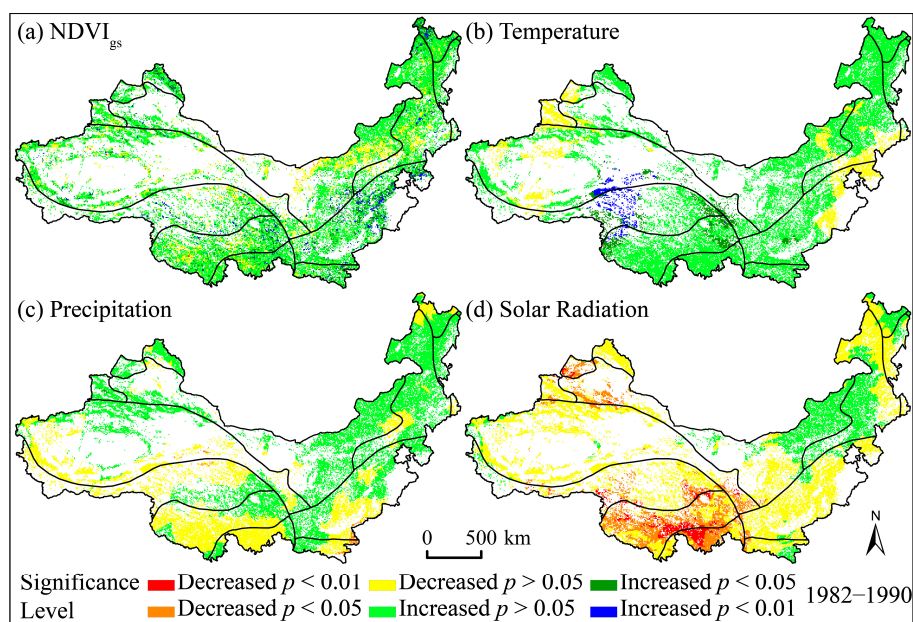


Figure S2. Spatial distribution of the significant levels of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 1982–1990.

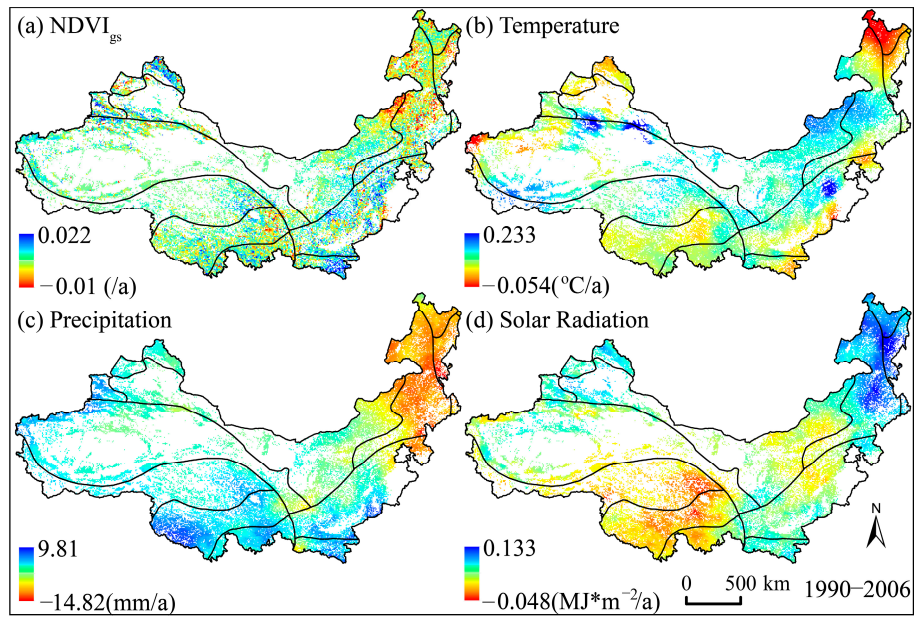


Figure S3. Spatial distribution of the slopes of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 1990–2006.

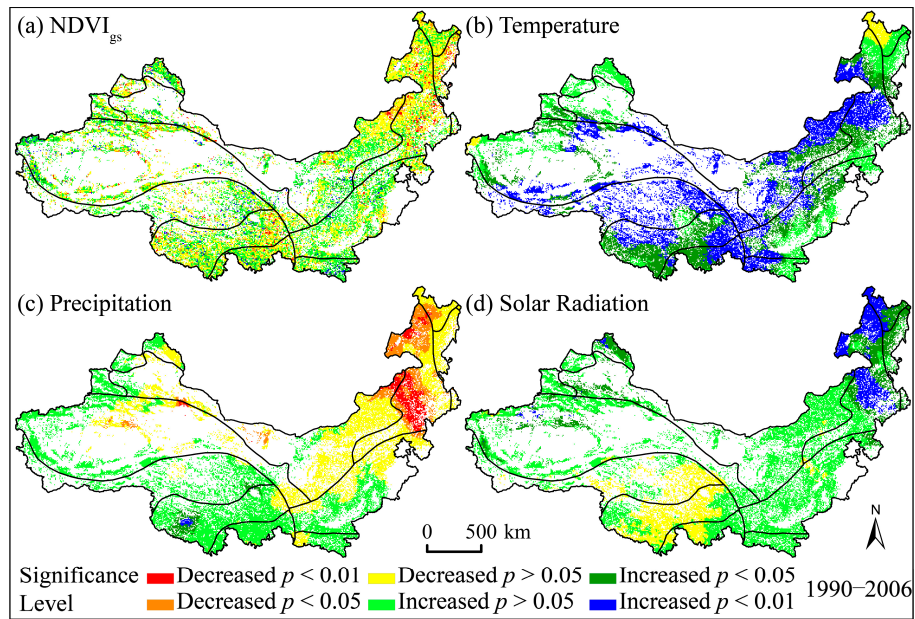


Figure S4. Spatial distribution of the significant levels of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 1990–2006.

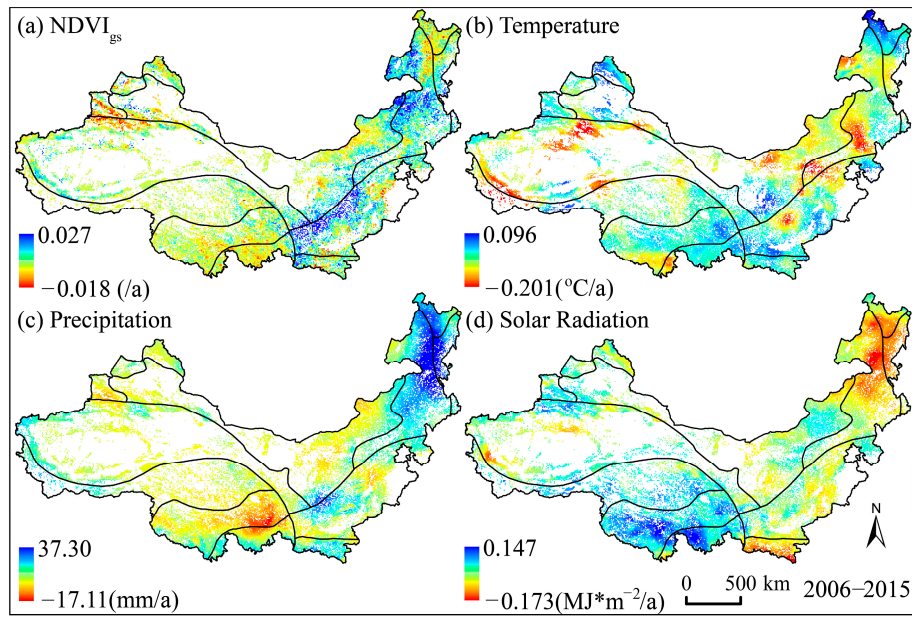


Figure S5. Spatial distribution of the slopes of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 2006–2015.

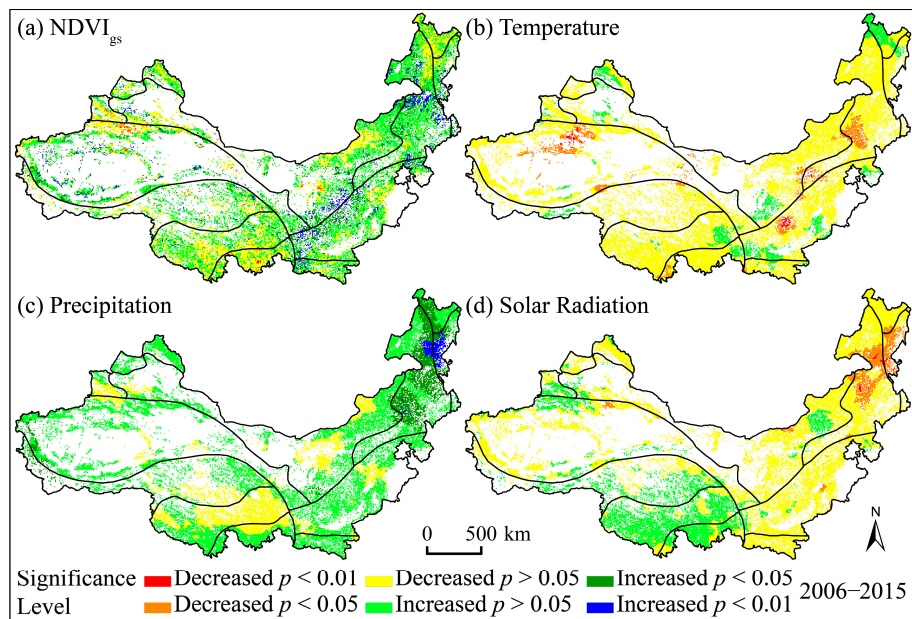


Figure S6. Spatial distribution of the significant levels of NDVI_{gs}(a), temperature(b), precipitation(c) and solar radiation(d) in the growing season of the study area during 2006–2015.

Table S1. Statistical results of NDVI_{gs} significance level of different land cover in different periods (%)

Significance Level	1982–2015				1982–1990				1990–2006				2006–2015			
	WL	HCG	MCG	LCG	WL	HCG	MCG	LCG	WL	HCG	MCG	LCG	WL	HCG	MCG	LCG
Decreased $p < 0.01$	3.70	3.97	2.59	3.18	0	0.03	0.05	0.10	3.79	3.78	1.94	2.29	0.29	0.48	0.49	0.63
Decreased $p < 0.05$	2.78	3.20	2.63	2.63	0.03	0.15	0.17	0.43	6.33	6.15	4.41	4.07	1.69	2.54	1.79	2.15
Decreased $p > 0.05$	20.07	24.16	18.49	16.11	6.74	13.62	14.74	19.29	48.84	49.23	42.55	38.67	31.55	27.80	27.73	28.31
Increased $p > 0.05$	29.50	35.74	31.17	28.01	71.85	74.06	72.82	68.87	37.04	36.30	43.49	45.16	52.98	52.37	50.96	52.30
Increased $p < 0.05$	9.89	9.74	9.56	10.86	16.41	10.01	9.82	8.83	2.66	3.19	4.76	5.91	9.81	12.05	14.17	11.10
Increased $p < 0.01$	34.06	23.18	35.55	39.21	4.98	2.13	2.39	2.47	1.35	1.36	2.85	3.90	3.68	4.76	4.86	5.51

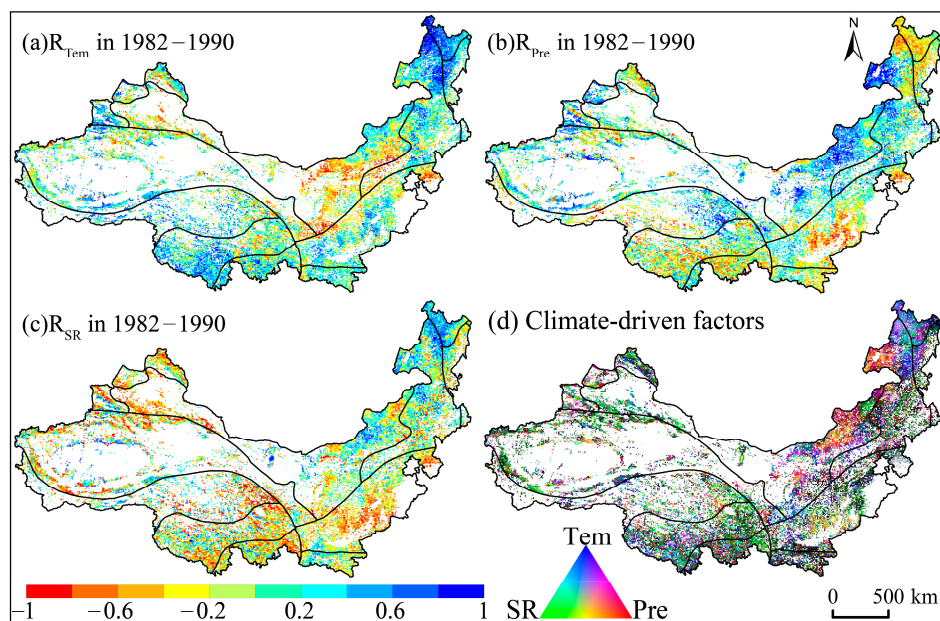


Figure S7. Spatial distributions of the PCCs between NDVI_{gs} and temperature (a), precipitation (b) and solar radiation (c) and spatial pattern of dominant climate factors (d) in the study area from 1982 to 1990. Note: Tem, Pre and SR refer to temperature, precipitation and solar radiation, respectively.

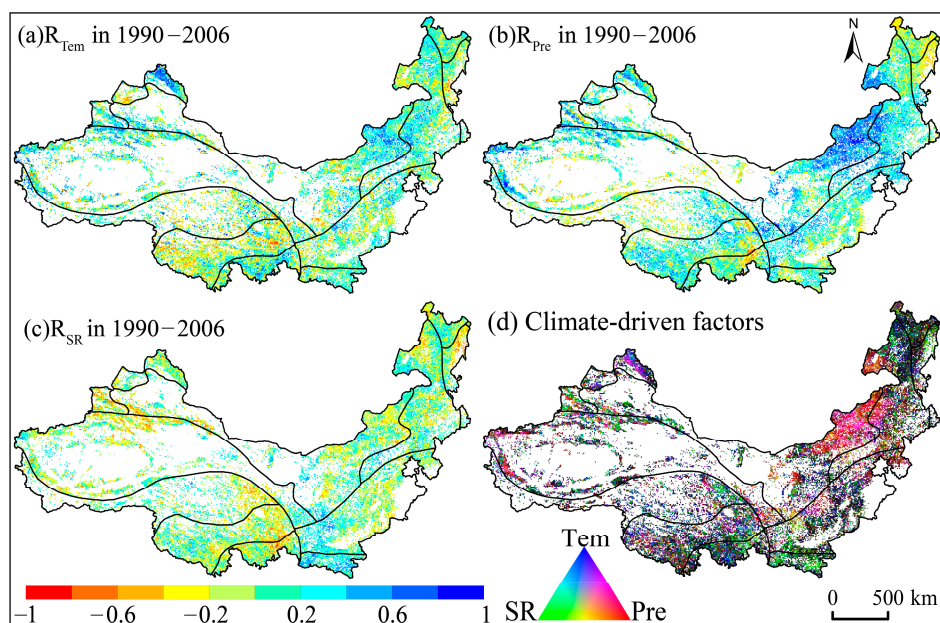


Figure S8. Spatial distributions of the PCCs between NDVI_{gs} and temperature (a), precipitation (b) and solar radiation (c) and spatial pattern of dominant climate factors (d) in the study area from 1990 to 2006. Note: Tem, Pre and SR refer to temperature, precipitation and solar radiation, respectively.

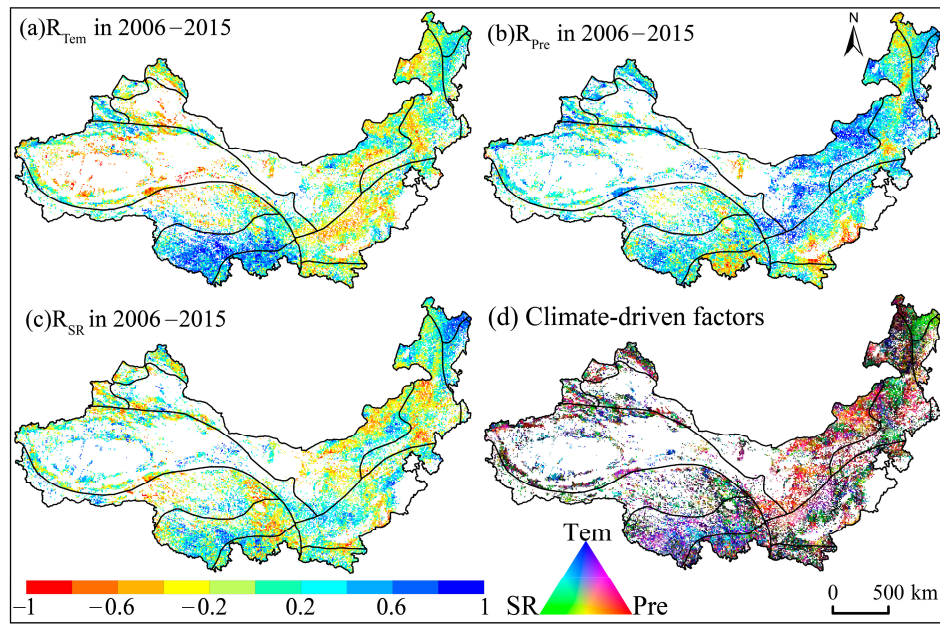


Figure S9. Spatial distributions of the PCCs between NDVI_{gs} and temperature (a), precipitation (b) and solar radiation (c) and spatial pattern of dominant climate factors (d) in the study area from 2006 to 2015. Note: Tem, Pre and SR refer to temperature, precipitation and solar radiation, respectively.

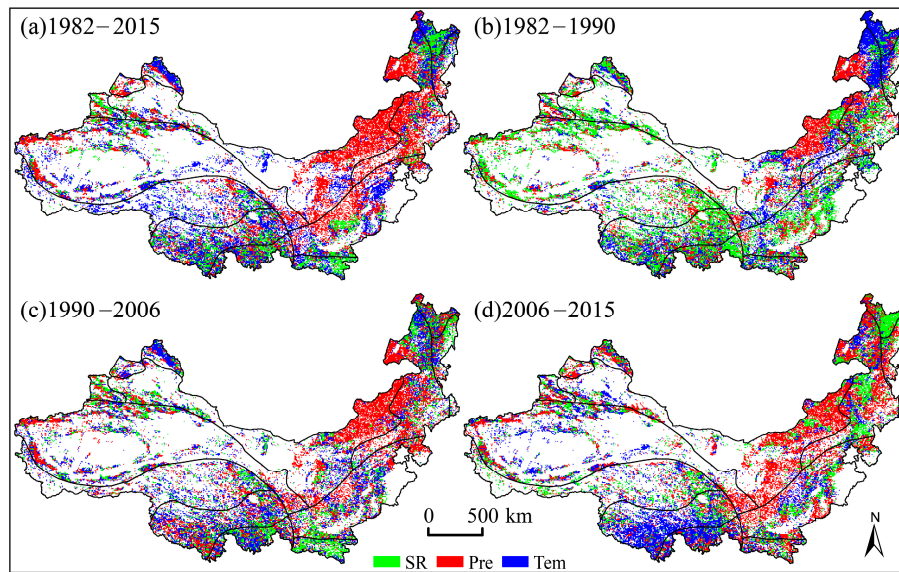


Figure S10. The spatial distribution of the main control areas of three climate factors in different periods. Note: Tem, Pre and SR refer to temperature, precipitation and solar radiation, respectively.

Table S2. Statistics results of climatic factors for different vegetation in different climatic zones (%).

		1982–2015			1982–1990			1990–2006			2006–2015			Proportion (%)
		Tem	Pre	SR	Tem	Pre	SR	Tem	Pre	SR	Tem	Pre	SR	
A1	WL	44.00	12.98	43.02	80.68	6.77	12.55	31.03	38.08	30.89	8.46	26.38	65.16	80.11
	HCG	44.83	10.92	44.25	75.29	5.17	19.54	33.33	36.78	29.89	8.62	25.29	66.09	19.66
	MCG	0.00	0.00	100	100	0	0	50.00	50.00	0	0	50.00	50.00	0.23
	LCG	0	0	0	0	0	0	0	0	0	0	0	0	0
	ALL	44.07	12.54	43.39	79.66	6.44	13.90	31.53	37.85	30.62	8.48	26.21	65.31	100
B1	WL	71.43	14.28	14.29	85.71	0	14.29	35.71	42.86	21.43	0	7.14	92.86	73.68
	HCG	80.00	0	20.00	100	0	0	20.00	40.00	40.00	0	20.00	80.00	26.32
	MCG	0	0	0	0	0	0	0	0	0	0	0	0	0
	LCG	0	0	0	0	0	0	0	0	0	0	0	0	0
	ALL	73.68	10.53	15.79	89.47	0	10.53	31.58	42.10	26.32	0	10.53	89.47	100
B2	WL	44.30	32.35	23.35	54.23	19.30	26.47	33.09	30.33	36.58	12.68	50.74	36.58	66.02
	HCG	35.56	46.22	18.22	35.56	23.55	40.89	24.00	33.78	42.22	10.67	56.89	32.44	27.31
	MCG	50.00	43.48	6.52	17.39	43.48	39.13	41.30	36.96	21.74	21.73	58.70	19.57	5.58
	LCG	55.56	44.44	0	22.22	55.56	22.22	0	44.44	55.56	11.11	55.56	33.33	1.09
	ALL	42.36	36.89	20.75	46.72	22.21	31.07	30.70	31.80	37.50	12.62	52.91	34.47	100
B3	WL	36.16	39.52	24.32	50.11	20.95	28.94	38.47	36.23	25.30	21.65	48.29	30.06	24.09
	HCG	24.28	61.33	14.39	32.47	37.06	30.47	29.24	49.82	20.94	21.95	47.68	30.37	40.89
	MCG	15.59	72.88	11.53	26.80	51.68	21.52	27.26	52.81	19.93	24.91	55.73	19.36	24.04
	LCG	22.07	66.51	11.42	31.64	42.75	25.61	34.41	46.92	18.67	25.31	52.93	21.76	10.98
	ALL	24.84	59.37	15.79	35.31	37.26	27.43	31.58	46.91	21.51	22.95	50.33	26.72	100
B4	WL	31.71	51.22	17.07	24.39	24.39	51.22	37.20	32.32	30.49	21.95	57.93	20.12	3.25
	HCG	10.93	83.41	5.66	24.69	47.94	27.37	14.76	70.41	14.83	13.69	69.19	17.13	25.99
	MCG	15.08	82.19	2.74	29.59	49.75	20.66	20.38	68.84	10.78	11.00	77.22	11.78	35.55
	LCG	33.67	57.92	8.40	30.68	32.71	36.61	30.23	48.17	21.60	22.28	61.87	15.85	35.21
	ALL	21.09	72.95	5.96	28.53	42.45	29.02	22.93	60.78	16.28	16.02	69.10	14.87	100
C2	WL	37.55	43.24	19.21	25.09	30.72	44.19	33.97	41.88	24.15	28.72	44.91	26.37	40.70
	HCG	43.85	35.60	20.55	24.11	23.79	52.10	27.02	43.69	29.29	20.39	48.22	31.39	15.54
	MCG	30.05	57.23	12.72	34.20	22.93	42.87	33.53	46.24	20.23	28.03	51.54	20.42	26.12
	LCG	32.91	56.12	10.97	24.22	26.21	49.57	35.76	41.03	23.21	33.76	49.00	17.24	17.64
	ALL	35.76	47.98	16.26	27.16	26.81	46.03	33.09	43.15	23.76	28.14	47.88	23.99	100
C4	WL	45.82	30.77	23.41	16.05	32.44	51.51	38.80	36.45	24.75	42.47	35.45	22.08	6.35
	HCG	37.86	35.33	26.81	12.25	26.04	61.71	32.71	39.39	27.90	35.23	33.59	31.18	19.63
	MCG	38.91	43.47	17.62	18.71	32.57	48.72	33.27	45.05	21.68	32.97	45.74	21.29	21.59
	LCG	49.47	35.42	15.11	25.75	30.83	43.42	39.56	40.13	20.31	43.22	37.57	19.21	52.43
	ALL	44.70	36.84	18.46	20.98	30.37	48.65	36.82	40.81	22.37	39.40	38.42	22.18	100
D2	WL	38.18	31.64	30.18	17.82	16.36	65.82	37.09	37.82	25.09	44.73	34.91	20.36	18.54
	HCG	34.04	25.61	40.35	21.05	18.95	60.00	31.93	29.47	38.60	55.09	27.37	17.54	19.22
	MCG	42.57	26.34	31.09	28.32	28.51	43.17	44.16	22.97	32.87	59.01	27.92	13.07	34.05
	LCG	40.67	31.10	28.23	29.42	32.54	38.04	45.45	26.32	28.23	55.02	31.82	13.16	28.19
	ALL	39.58	28.53	31.89	25.29	25.55	49.16	40.86	27.92	31.22	54.48	30.21	15.31	100
D3	WL	41.46	25.78	32.76	17.42	20.21	62.37	41.81	26.83	31.36	48.78	25.78	25.44	7.26
	HCG	40.91	25.65	33.44	25.97	16.24	57.79	44.48	28.90	26.62	55.52	16.23	28.25	7.81
	MCG	50.04	26.08	23.88	29.32	22.63	48.05	43.79	34.02	22.19	66.72	17.19	16.09	34.54
	LCG	51.14	24.28	24.58	36.05	22.46	41.49	42.91	37.50	19.59	66.43	17.62	15.95	50.39
	ALL	49.25	25.12	25.63	31.57	21.87	46.56	43.26	34.85	21.89	64.39	17.96	17.65	100
D4	WL	49.66	24.16	26.17	16.78	18.79	64.43	41.61	24.83	33.56	33.56	30.87	35.57	5.68
	HCG	55.56	18.36	26.09	20.29	28.50	51.21	41.54	22.71	35.75	31.40	27.54	41.06	7.98
	MCG	55.96	27.48	16.56	21.69	29.47	48.84	45.70	33.77	20.53	32.95	31.12	35.93	23.39
	LCG	65.84	20.92	13.24	29.08	29.58	41.34	44.99	32.98	22.03	35.89	30.88	33.23	62.95

	ALL	61.76	22.44	15.80	25.93	28.84	45.23	44.68	31.87	23.45	34.71	30.66	34.63	100
	WL	39.43	12.00	48.57	35.71	27.15	37.14	24.57	13.14	62.29	29.14	40.00	30.86	41.67
	HCG	30.97	12.90	56.13	40.00	28.39	31.61	23.23	18.71	58.06	30.32	41.29	28.39	18.45
E1	MCG	43.43	6.42	50.15	38.23	28.13	33.64	22.02	14.07	63.91	31.50	42.81	25.69	38.93
	LCG	25.00	0	75.00	62.50	25.00	12.50	0	37.50	62.50	25.00	62.50	12.50	0.95
	ALL	39.29	9.88	50.83	37.74	27.74	34.52	23.10	14.76	62.14	30.24	41.55	28.21	100