

Supplementary Material: Online Tables

Table 1: Correlation Analysis of indices with trend component for all period data

	A_p	$E > 0.6\text{MeV}$	$E > 2\text{MeV}$	F10.7	S_p	W	Proton density	Flow speed	Flow pressure	IMF	D_{st}	L_α	TSI	TCI
A_p	1.00	-0.03	0.04	0.09	0.11	0.12	0.14	0.52	0.66	0.64	-0.68	0.09	0.01	0.19
$E > 0.6\text{MeV}$	-0.03	1.00	0.58	-0.32	-0.21	-0.33	-0.27	0.27	-0.17	-0.24	-0.18	-0.34	-0.24	-0.27
$E > 2\text{MeV}$	0.04	0.58	1.00	-0.12	-0.09	-0.09	-0.23	0.25	-0.13	-0.15	-0.22	-0.11	-0.06	-0.02
F10.7	0.09	-0.32	-0.12	1.00	0.86	0.90	0.01	-0.06	0.05	0.23	-0.08	0.93	0.46	0.82
S_p	0.11	-0.21	-0.09	0.86	1.00	0.76	-0.02	-0.03	0.03	0.18	-0.11	0.71	0.12	0.59
W	0.12	-0.33	-0.09	0.90	0.76	1.00	0.02	-0.02	0.08	0.23	-0.09	0.87	0.46	0.77
Proton density	0.14	-0.27	-0.23	0.01	-0.02	0.02	1.00	-0.45	0.67	0.42	0.27	0.02	0.01	0.04
Flow speed	0.52	0.27	0.25	-0.06	-0.03	-0.02	-0.45	1.00	0.24	0.16	-0.54	-0.06	-0.06	0.03
Flow pressure	0.66	-0.17	-0.13	0.05	0.03	0.08	0.67	0.24	1.00	0.69	-0.17	0.06	0.02	0.14
IMF	0.64	-0.24	-0.15	0.23	0.18	0.23	0.42	0.16	0.69	1.00	-0.34	0.24	0.16	0.31
D_{st}	-0.68	-0.18	-0.22	-0.08	-0.11	-0.09	0.27	-0.54	-0.17	-0.34	1.00	-0.06	-0.02	-0.15
L_α	0.09	-0.34	-0.11	0.93	0.71	0.87	0.02	-0.06	0.06	0.24	-0.06	1.00	0.67	0.90
TSI	0.01	-0.24	-0.06	0.46	0.12	0.46	0.01	-0.06	0.02	0.16	-0.02	0.67	1.00	0.65
TCI	0.19	-0.27	-0.02	0.82	0.59	0.77	0.04	0.03	0.14	0.31	-0.15	0.90	0.65	1.00

Table 2: Correlation Analysis of indexes without trend component for all period (AutoSignal)

	A_p	$E > 0.6\text{MeV}$	$E > 2\text{MeV}$	F10.7	S_p	W	Proton density	Flow speed	Flow pressure	IMF	D_{st}	L_α	TSI	TCI
A_p	1.00	-0.08	-0.08	0.07	0.09	0.04	0.16	0.48	0.63	0.63	-0.61	-0.01	-0.07	0.09
$E > 0.6\text{MeV}$	-0.08	1.00	0.66	-0.02	-0.02	-0.01	-0.29	0.20	-0.25	-0.24	-0.15	0.02	0.04	0.17
$E > 2\text{MeV}$	-0.08	0.66	1.00	-0.02	-0.03	-0.01	-0.22	0.14	-0.22	-0.20	-0.14	0.03	0.05	0.21
F10.7	0.07	-0.02	-0.02	1.00	0.83	0.73	-0.02	0.04	0.02	0.03	-0.07	0.71	-0.40	0.15
S_p	0.09	-0.02	-0.03	0.83	1.00	0.61	0.00	0.04	0.04	0.05	-0.08	0.50	-0.54	0.10
W	0.04	-0.01	-0.01	0.73	0.61	1.00	-0.02	0.06	0.03	0.01	-0.04	0.59	-0.21	0.11
Proton density	0.16	-0.29	-0.22	-0.02	0.00	-0.02	1.00	-0.45	0.70	0.44	0.26	-0.05	-0.06	-0.16
Flow speed	0.48	0.20	0.14	0.04	0.04	0.06	-0.45	1.00	0.17	0.14	-0.50	0.04	0.00	0.18
Flow pressure	0.63	-0.25	-0.22	0.02	0.04	0.03	0.70	0.17	1.00	0.69	-0.10	-0.04	-0.07	-0.07
IMF	0.63	-0.24	-0.20	0.03	0.05	0.01	0.44	0.14	0.69	1.00	-0.28	-0.03	-0.03	-0.03
D_{st}	-0.61	-0.15	-0.14	-0.07	-0.08	-0.04	0.26	-0.50	-0.10	-0.28	1.00	0.00	0.03	-0.24
L_α	-0.01	0.02	0.03	0.71	0.50	0.59	-0.05	0.04	-0.04	-0.03	0.00	1.00	0.06	0.23
TSI	-0.07	0.04	0.05	-0.40	-0.54	-0.21	-0.06	0.00	-0.07	-0.03	0.03	0.06	1.00	0.08
TCI	0.09	0.17	0.21	0.15	0.10	0.11	-0.16	0.18	-0.07	-0.03	-0.24	0.23	0.08	1.00

Table 3: Regression models equations for A) circular orbit satellites and B) elliptical orbit satellite without trend component for all observation period (AutoSignal)

	B0	A_p	$E > 0.6\text{MeV}$	$E > 2\text{MeV}$	F10.7	S_p	W	Proton density	Flow speed	Flow pressure	IMF	D_{st}	L_α	TSI	TCI
A) Best Models		B													
04922	-0.35		0.036							0.019		-0.06	0.72		
00063	-0.23			0.069						-0.02		-0.05	0.54		
B) Best Models		B													
00746	0.087								-0.01	0.014		-0.04	0.35		

Table 4: Parameters for regression models equations of A) circular orbit satellites and B) elliptical orbit satellite without trend component for all observation period (AutoSignal)

A) Best Models	Multiple R	Multiple R^2	Adjusted R^2	F	p	Standard Error of Estimate
04922	0.7471	0.5581	0.5575	937.7218	0.0000	0.0151
00063	0.5039	0.2539	0.2530	277.1776	0.0000	0.0235
B) Best Models						
00746	0.26895	0.07233	0.07148	84.89448	0.00000	0.03186

Table 5: The main periods from the cospectral density for the studied satellites and the selected indices

Between 04922 satellite's drag and:														
L_α	26,3d	25d	45d	21d	30d	33,1d	58,7d	70d	13,4d					
Flow pressure	27,5d	13,1d	45d	16,8d	51,5d	67,8d	8d	negative	26,3d	9d	13,4d	6d		
$E > 0.6\text{MeV}$	26,9d	13,5d	22,7d	32,5d	9d	44,4d	negative	27d	26d	13,4d	51,5d	19,8d	70d	
D_{st}	43,1d	26,3d	32,5d	51d	70d	negative	44,4d	26,8d	25d	60d	13,1d	15d		
Between 00063 satellite's drag and:														
L_α	27,4d	25d	43,9d	54,2d	69,8d	12,8d								
Flow pressure	54,1d	19d	10d	44,1d	12,8d	28,4d	67,5d	negative	9,1d	6,9d	27,5d			
$E > 2\text{MeV}$	27,5d	43,8d	13,8d	8,8d	31,3d	68,8d	50d	negative	29d	36,2d	21d	55d		
D_{st}	21,9d	108d	31,5d	12,5d	50d	negative	25,6d	43,8d	31d	54d	20,5d			
Between 00746 satellite's drag and:														
L_α	27,5d	34,4d	44,4d	13,4d	68,4d	76,9d								
Flow pressure	27,5d	35,3d	6,6d	44,7d	67,8d	negative	25,9d	38d						
Flow speed	27,5d	23,8d	21,5d	44,7d	13,5d	36,9d	76,6d	9,1d	negative	21,9d	28d	25d	16,5d	6,7d
D_{st}	34,4d	24,4d	21,6d	38,8d	13,1d	86,3d	50,9d	negative	44,4d	35,3d	21,9d	30,5d	60d	14,7d

Table 6: The main periods from the cross-amplitude for the studied satellites and the selected indices

Between 04922 satellite's drag and:														
L_α	25,9d	44,6d	33,1d	20,9d	30,3d	13,4d	58,8d	53,5d						
Flow pressure	26,1d	13,4d	44,5d	9,1d	19,9d	16,6d	30,4d	51,6d	58,1d	70,6d				
$E > 0.6\text{MeV}$	26,9d	13,4d	22,8d	32,5d	44,6d	9,1d	19,9d	36,6d	58,1d	70d	75,9d	120,5d	88,1d	6,8d
D_{st}	44,5d	25,8d	182d	120,5d	33d	54,2d	59,8d	13,4d	14,8d	70,5d				
Between 00063 satellite's drag and:														
L_α	27,5d	54,4d	43,6d	70,1d	12,6d									
Flow pressure	9,1d	27,3d	6,8d	43,2d	54,2d	33,3d								
$E > 2\text{MeV}$	27,3d	25,4d	43,6d	55,1d	14d	36,2d	30,9d	21d	9d	70,1d	105,2d	6,7d	186,8d	
D_{st}	25,6d	28,4d	55,1d	44,2d	120,2d	176,6d	19,1d	36,1d	67,3d	6,7d				
Between 00746 satellite's drag and:														
L_α	26,3d	30,4d	33,1d	44,6d	13,4d	76,8d	68,3d							
Flow pressure	27,5d	26,2d	22,6d	35,5d	16,5d	30,5d	6,8d	44,6d	55,3d	67,6d	85,3d			
Flow speed	27,4d	22,9d	35,2d	44,5d	13,9d	16,5d	6,7d	77,3d	54,6d	94,2d	170,7d			
D_{st}	28,4d	24,4d	44,7d	35,3d	181d	16,5d	18,5d	52,9d	59,7d	120d	14d	6,8d	86,2d	

Table 7: The main periods from the squared coherency for the studied satellites and the selected indices

Between 04922 satellite's drag and:							
L_α	26 d	34 d	44,4 d	53,4 d	59,7 d		
Flow pressure	26,3 d	31,3 d	44,4 d	58,1 d			
$E > 0.6\text{MeV}$	12 d	58,1 d	89 d				
D_{st}	26,3 d	44,7 d	55 d	60 d	71 d	124,1 d	
Between 00063 satellite's drag and:							
L_α	12,5 d	25,9 d	43,8 d	55 d	70,6 d		
Flow pressure	27,5 d	55 d					
$E > 2\text{MeV}$	9 d	13,8 d	55 d				
D_{st}	28,8 d	45 d	55,3 d	124 d			
Between 00746 satellite's drag and:							
L_α	26 d	30 d	45,9 d	68 d	75 d		
Flow pressure	26,3 d	31 d	44,5 d	84,4 d			
Flow speed	22,8 d	35 d	76,9 d	94,1 d			
D_{st}	24,4 d	28,5 d	35 d	44,4 d	60 d	86,6 d	121,9 d

Table 8: The main periods from the transfer function magnitude for the studied satellites and the selected indices

Between 04922 satellite's drag and:										
L_α	28,2 d	13,5 d	2,1 d	38 d	8,9 d	53,2 d	234,1 d	63 d	160,6 d	
Flow pressure	3,7 d	8,9 d	6,7 d	2 d	5,7 d					
$E > 0.6\text{MeV}$	6,7 d	5,9 d	9,5 d	14 d	2,1 d	25,4 d	41,4 d	93,1 d		
D_{st}	2,1 d	6,9 d	240,8 d	160,7 d	8,9 d	95,4 d	81,1 d	63,5 d		
Between 00063 satellite's drag and:										
L_α	27,5 d	4,8 d	2,7 d	38,7 d	13,8 d	30,3 d	34,7 d	6,8 d	76,3 d	61,1 d
Flow pressure	2,5 d	4,8 d	6,8 d	9 d						
$E > 2\text{MeV}$	4,8 d	2,7 d	8,3 d	13,9 d	41,1 d	76,4 d	32,7 d			
D_{st}	2,1 d	4,8 d	280 d	6,2 d	9,1 d	83,9 d	39,1 d			
Between 00746 satellite's drag and:										
L_α	13,9 d	26,8 d	6,9 d	63 d	215,7 d	2,8 d	102,1 d	20,2 d	53,6 d	43 d
Flow pressure	2,6 d	4,5 d	7,2 d	8,9 d						
Flow speed	7,2 d	13,3 d	4,5 d	2,6 d	63,1 d	1022 d(2,8 y)	26,4 d	630,1 d		
D_{st}	6 d	2,2 d	3 d	4,5 d	63,5 d	234 d	90 d	81,9 d		

Table 9: The main periods from the phase spectrum for the studied satellites and the selected indices

Between 04922 satellite's drag and:					
L_α	25,3 d	45,9 d	57,9 d		
Flow pressure	44,4 d	50,9 d	58,2 d		
$E > 0.6\text{MeV}$	55,3 d	73,9 d			
D_{st}	32,9 d	76,8 d			
Between 00063 satellite's drag and:					
L_α	25,6 d	40,9 d	52,6 d		
Flow pressure	33,1 d	45,1 d	53,2 d		
$E > 2\text{MeV}$	22,7 d	27,9 d	30,5 d	55,2 d	71,2 d
D_{st}	33,7 d	52,6 d			
Between 00746 satellite's drag and:					
L_α	31,7 d	33,8 d	43,5 d	65,3 d	75,3 d
Flow pressure	29,1 d	44,4 d			
Flow speed	36,7 d	74,4 d	99 d		
D_{st}	62,9 d	130 d			

Table 10: The periods in which there is a delay in the reaction of the drag coefficient from the real and imaginary parts of cross-spectrum for the studied satellites and the selected indices

Between 04922 satellite's drag and:					
L_α	21,1 d	58 d			
Flow pressure	13 d	43,8 d	51,5 d		
$E > 0.6\text{MeV}$	9 d	13,4 d	26,8 d		
D_{st}	9 d	43,3 d	54,2 d	59,8 d	
Between 00063 satellite's drag and:					
L_α	12,5 d	13,6 d			
Flow pressure	14,5 d	28,5 d			
$E > 2\text{MeV}$	9 d	21,9 d	30,8 d	43,7 d	
D_{st}	6,7 d	9,1 d	26 d		
Between 00746 satellite's drag and:					
L_α	14 d	27,3 d	42,5d		
Flow pressure	6,7 d	16,5 d	27,5 d	35,9 d	67,7 d
Flow speed	6,7 d	27,4 d	94,2 d		
D_{st}	6,9 d	14, d	18,5 d	24,6 d	182 d