Supplementary material for statistical tests.

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This document contains the tables displaying the p-values of the t-tests computed for each variable and for each couple of clusters.

These tests were made to insure statistical difference between clusters. The tables display the p-values which are equal to 1 when two identical datasets are compared and indicates the probability of two data sets being equivalent.

T-Tests were conducted for the 23 variables driving the hierarchical clustering and for the 6 studied chemical species.

P−Value CO2

	C1	C2	C3	C4	C5	C6
C1	1					
C2	6.4e−12	1				
C3	1e−20	0.00042	1			
C4	0.32	0.21	0.017	1		
C5	0.003	0.32	0.78	0.1	1	
C6	0.087	0.63	0.09	0.55	0.28	1

P−Value CO

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1.3e−05	1				
C3	1.9e−20	4.4e−10	1			
C4	0.36	0.96	0.098	1		
C5	0.71	0.13	0.0011	0.34	1	
C6	0.68	0.13	0.003	0.32	0.97	1

P−Value CH4

	C1	C2	C3	C4	C5	C6
C1	1					
C2	6.9e−17	1				
C3	1.2e−53	7.1e−22	1			
C4	0.83	0.15	0.0013	1		
C5	0.99	0.016	7.3e−07	0.86	1	
C6	0.23	0.19	0.00018	0.61	0.38	1

P−Value O3

	C1	C2	C3	C4	C5	C6
C1	1					
C2	3e−07	1				
C3	7.7e−14	0.0054	1			
C4	0.015	0.14	0.37	1		
C5	0.46	0.51	0.17	0.11	1	
C6	7.1e−05	0.035	0.44	0.59	0.11	1

P−Value Radon

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1e−04	1				
C3	2.6e−08	0.018	1			
C4	0.02	0.00018	6.1e−06	1		
C5	0.00034	6.5e−07	5.7e−09	0.29	1	
C6	2.7e−05	6e−07	7.7e−09	0.025	0.16	1

P−Value Particle Numbers

	C1	C2	C3	C4	C5	C6
C1	1					
C2	2.8e−07	1				
C3	1.6e−05	0.68	1			
C4	1.5e−05	0.0018	0.0038	1		
C5	7.3e−08	0.00031	0.0015	0.8	1	
C6	5.4e−06	0.00012	9.5e−05	0.14	0.067	1

P−Value PDM Pressure

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1.3e−60	1				
C3	1.4e−93	2.5e−21	1			
C4	0.002	0.83	0.034	1		
C5	5.9e−10	0.0089	0.17	0.22	1	
C6	1.2e−06	0.00035	0.074	0.0045	0.021	1

P−Value PDM Temperature

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.8e−68	1				
C3	4.6e−158	2.5e−69	1			
C4	0.0068	0.011	5.3e−10	1		
C5	3.9e−06	0.015	2.1e−16	0.45	1	
C6	0.011	0.072	9.4e−07	0.76	0.75	1

P−Value CRA Temperature

	C1	C2	C3	C4	C5	C6
C1	1					
C2	6.4e−46	1				
C3	1.1e−102	9.1e−35	1			
C4	0.0062	8.4e−08	2.5e−11	1		
C5	0.1	4.4e−07	4.9e−12	0.42	1	
C6	0.00017	1.6e−07	1.1e−09	0.13	0.027	1

P−Value PDM Relative Humidity

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.7e−98	1				
C3	8.6e−89	0.038	1			
C4	1.2e−20	1.8e−09	3.8e−08	1		
C5	3.8e−14	0.34	0.97	1.9e−05	1	
C6	2.7e−07	0.022	0.075	0.14	0.1	1

P−Value CRA Relative Humidity

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1e−112	1				
C3	4.3e−160	1.1e−13	1			
C4	1.1e−10	0.0086	0.53	1		
C5	0.085	0.00015	1.4e−06	3.1e−06	1	
C6	0.17	2.4e−06	2.9e−07	1.3e−08	0.026	1

P−Value PDM Specific Humidity

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.4e−27	1				
C3	0.0011	4e−51	1			
C4	3.1e−10	1.1e−05	2.7e−11	1		
C5	5.3e−11	0.0038	1.7e−13	0.014	1	
C6	8e−08	0.00035	1.4e−08	0.4	0.11	1

P−Value CRA Specific Humidity

	C1	C2	C3	C4	C5	C6
C1	1					
C2	4.1e−16	1				
C3	0.0033	8.3e−30	1			
C4	8.4e−09	2.5e−06	1.3e−09	1		
C5	0.021	0.75	0.0013	1.2e−05	1	
C6	0.53	0.077	0.12	2e−06	0.23	1

P−Value Cloud Cover

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.1e−106	1				
C3	7e−118	0.0012	1			
C4	8.5e−10	0.013	0.16	1		
C5	3.9e−11	0.5	0.57	0.14	1	
C6	7.4e−05	0.51	0.84	0.32	0.87	1

P−Value Shortwave downward irradiance

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1.6e−07	1				
C3	9.5e−11	0.023	1			
C4	0.0036	0.038	0.13	1		
C5	0.012	0.33	0.94	0.21	1	
C6	0.027	0.0034	0.0011	0.00022	0.001	1

P−Value Shortwave upward irradiance

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.2e−07	1				
C3	2.2e−09	0.04	1			
C4	0.0036	0.032	0.096	1		
C5	0.016	0.35	0.92	0.16	1	
C6	0.036	0.0075	0.0034	0.00042	0.0029	1

P−Value Longward downward irradiance

	C1	C2	C3	C4	C5	C6
C1	1					
C2	3.2e−11	1				
C3	2.1e−06	0.47	1			
C4	0.00065	0.012	0.0085	1		
C5	0.0059	0.53	0.38	0.042	1	
C6	0.96	0.23	0.29	0.012	0.17	1

P−Value Longward upward irradiance

	C1	C2	C3	C4	C5	C6
C1	1					
C2	0.94	1				
C3	0.00012	5.1e−05	1			
C4	0.24	0.25	0.024	1		
C5	0.88	0.9	0.16	0.44	1	
C6	0.13	0.13	0.037	0.47	0.2	1

P−Value u−component of wind by VHF at 2850m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	4.6e−15	1				
C3	1.5e−35	2.9e−11	1			
C4	7.5e−14	8e−13	9.6e−12	1		
C5	0.043	0.8	0.0079	5.7e−15	1	
C6	0.0035	0.13	0.57	1.4e−09	0.16	1

P−Value v−component of wind by VHF at 2850m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	0.00032	1				
C3	1.9e−73	4.6e−87	1			
C4	2.1e−09	3.5e−10	0.0026	1		
C5	1.4e−10	1.8e−09	4.3e−17	4.2e−18	1	
C6	1.3e−05	2.8e−05	1.3e−07	4.9e−10	0.13	1

P−Value w−component of wind by VHF at 2850m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	4.5e−07	1				
C3	6.2e−61	2.1e−46	1			
C4	4.9e−10	9.9e−10	1.3e−07	1		
C5	1.5e−07	4.1e−07	0.00027	0.096	1	
C6	0.00052	0.00034	3.5e−05	8.7e−09	2.8e−08	1

P−Value u−component of wind by UHF at 750m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	5.7e−36	1				
C3	1.9e−125	2.6e−82	1			
C4	9.1e−11	1.4e−09	2.2e−05	1		
C5	0.9	2.4e−05	2.9e−18	5.3e−12	1	
C6	0.41	0.0054	5.4e−07	1.6e−11	0.49	1

P−Value v−component of wind by UHF at 750m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	0.0085	1				
C3	2.5e−24	5.5e−17	1			
C4	9.9e−05	0.00068	0.33	1		
C5	7.7e−06	3.1e−06	1.4e−07	4.1e−08	1	
C6	0.00053	4e−04	0.00014	8.5e−05	0.13	1

P−Value u−component of wind by UHF at 1600m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	1.9e−18	1				
C3	2e−93	1.6e−63	1			
C4	2.4e−11	1.1e−10	1.4e−07	1		
C5	0.38	5.4e−05	1.4e−19	1.3e−12	1	
C6	0.38	0.19	1.1e−06	3e−12	0.22	1

P−Value v−component of wind by UHF at 1600m a.s.l

	C1	C2	C3	C4	C5	C6
C1	1					
C2	0.012	1				
C3	5.5e−60	8.4e−51	1			
C4	1.7e−06	4.2e−06	0.11	1		
C5	1.1e−06	3.1e−07	3.2e−12	1e−11	1	
C6	2.6e−05	1.5e−05	1.3e−07	4.2e−10	0.17	1

P−Value u−component of wind at CRA

	C1	C2	C3	C4	C5	C6
C1	1					
C2	2.8e−62	1				
C3	5.7e−177	6.7e−108	1			
C4	4.3e−10	1e−08	6e−05	1		
C5	0.36	3.4e−06	7.4e−23	2.1e−10	1	
C6	0.054	1.1e−05	5.4e−11	1.6e−11	0.03	1

P−Value v−component of wind at CRA

	C1	C2	C3	C4	C5	C6
C1	1					
C2	8.6e−28	1				
C3	3e−71	1e−23	1			
C4	3.6e−06	0.00038	0.038	1		
C5	0.037	0.00023	8.1e−07	2.4e−07	1	
C6	0.0012	4.8e−05	3.1e−06	4.2e−08	0.14	1

P−Value u−component of wind at PDM

	C1	C2	C3	C4	C5	C6
C1	1					
C2	2e−10	1				
C3	4e−05	0.035	1			
C4	0.00021	0.026	0.0055	1		
C5	6.8e−05	0.04	0.006	0.72	1	
C6	0.016	0.13	0.067	0.79	0.62	1

P−Value v−component of wind at PDM

	C1	C2	C3	C4	C5	C6
C1	1					
C2	7.7e−06	1				
C3	9.7e−68	2.1e−88	1			
C4	2.3e−07	2.5e−08	0.0053	1		
C5	8.5e−11	2.7e−09	6.5e−16	7.5e−16	1	
C6	1.4e−08	3.8e−08	3.2e−10	9.9e−15	0.0044	1