Deep convective influence on the UTLS composition in the Asian Monsoon Anticyclone region: 2017 StratoClim campaign results

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• Figure S1. Backtrajectories analysis of convective sources for the flight 1 (27th of July 2017). Panel a) Convective source regions distribution; Panel b) CO concentration along the position of the flight. Numbers along the position of the flight corresponds to numbers along the timeseries of panel d). Panel c) CO concentration along the path of flight (in blue) and altitude of the flight (black). Panel d) Convective sources contributions along the flight. The color is referring to the region color code of figure 6 plus the non-convective air recirculating inside the AMA (grey shade) and the remaining sources not included in the mask but still contributing to the total convective air composition (black). Panel e) Level of injection for convective sources contributing for 5% of the total convective air. This level is computed as the height of the point of trajectory crossing below the convective cloud. Panel f) age of the convective air for convective sources contributing for 5% of the total convective air. This level is computed as the number of days between the trajectory release and the encountering of a convective cloud. **2**

29 07 2017 Flight 2



. Figure S2. As in figure S2 but relatively to flight 2 (29th of July 2017)





. Figure S3. As in figure S2 but relatively to flight 3 (31st of July 2017)

02 08 2017 Flight 4



. Figure S4. As in figure S2 but relatively to flight 4 (2nd of August 2017)

04 08 2017 Flight 5



. Figure S5. As in figure S2 but relatively to flight 5 (4th of August 2017)





. Figure S6. As in figure S2 but relatively to flight 7 (8th of August 2017)



Brightness Temperature IR 10.8 μ m and geopotential contour at 100 hPa

. Figure S7. 10.8 μm Brightness Temperature from MSG1/Himawari and winds and geopotential contours at 100 hPa from ERA5. Maps are produced every 2 days for the whole period of the campaing (27t of June - 10th of August).

	F1: 27 July			F2: 29 July			F3: 31 July			F4: 2 August		
	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias
EIZ	39	6,8	3,6	73,4	5,4	3,3	60,4	10,5	3,8	64,7	6,5	4,9
EID	56,3	5,7	2,9	78,8	4,9	3,1	63,8	10	3,4	64,8	6	4,2
EAZ	47,8	6,3	3	75,2	5	2,7	72,5	8	3,1	61,9	6,3	4,5
EAD	45,8	6,5	2,8	77	5	2,8	73,7	7,8	3	68,3	6	4,4
		F5: 4 August			F6: 6 August			F7: 8 August		-	8: 10 Augus	t
	Correlation	F5: 4 August RMSE	Mean Bias	Correlation	F6: 6 August RMSE	Mean Bias	Correlation	F7: 8 August RMSE	Mean Bias	l Correlation	F8: 10 Augus RMSE	t Mean Bias
EIZ	Correlation 50,2	F5: 4 August RMSE 15,5	Mean Bias 7,3	Correlation 49,4	F6: 6 August RMSE 18,5	Mean Bias 2,7	Correlation 39,6	F7: 8 August RMSE 19,6	Mean Bias 3,9	Correlation 33	F8: 10 Augus RMSE 20,8	t Mean Bias 5,2
EIZ EID	Correlation 50,2 50,8	F5: 4 August RMSE 15,5 15,7	Mean Bias 7,3 7,5	Correlation 49,4 56,4	F6: 6 August RMSE 18,5 17,3	Mean Bias 2,7 2,8	Correlation 39,6 16,1	F7: 8 August RMSE 19,6 52,4	Mean Bias 3,9 4,9	Correlation 33 33,6	F8: 10 Augus RMSE 20,8 18,9	t Mean Bias 5,2 5,1
EIZ EID EAZ	Correlation 50,2 50,8 58,9	F5: 4 August RMSE 15,5 15,7 15,8	Mean Bias 7,3 7,5 6,1	Correlation 49,4 56,4 65,7	F6: 6 August RMSE 18,5 17,3 14,4	Mean Bias 2,7 2,8 2,7	Correlation 39,6 16,1 53,8	F7: 8 August RMSE 19,6 52,4 14,7	Mean Bias 3,9 4,9 3,7	Correlation 33 33,6 34,6	F8: 10 Augus RMSE 20,8 18,9 17,4	t Mean Bias 5,2 5,1 3,6

. Table ST1. Correlation statistics (R coefficient, Root Mean Square Error (RMSE) and Mean Bias) for the whole ensamble of the flights between the δCO_{proxy} and COLD measured CO anomaly respect to the CO_{base} baseline



. Figure S8. Vertical distribution of samples collected during the whole StratoClim campaign