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Supplement of

Deep-convective influence on the upper troposphere–lower stratosphere composition in the Asian monsoon anticyclone region: 2017 StratoClim campaign results

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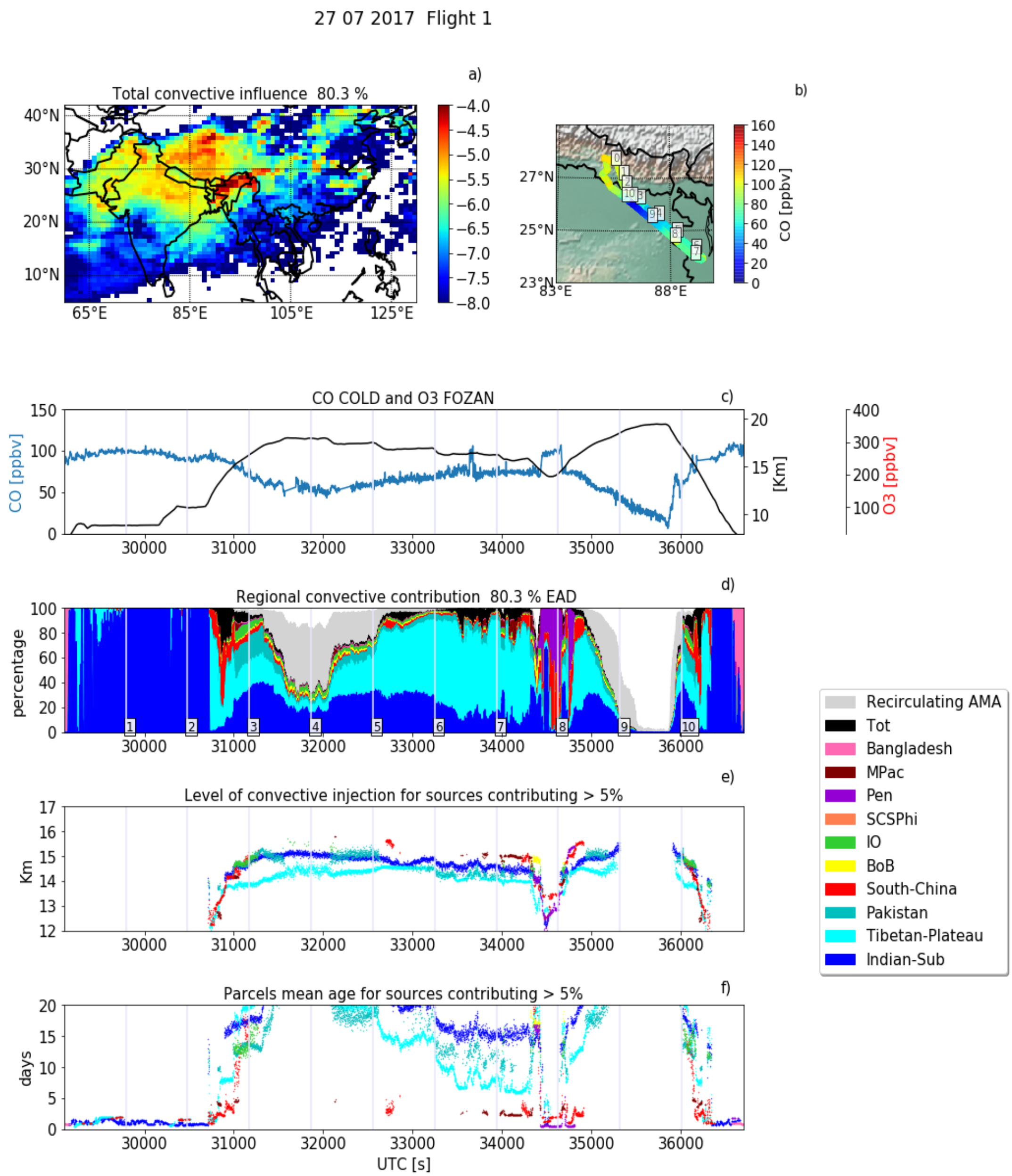
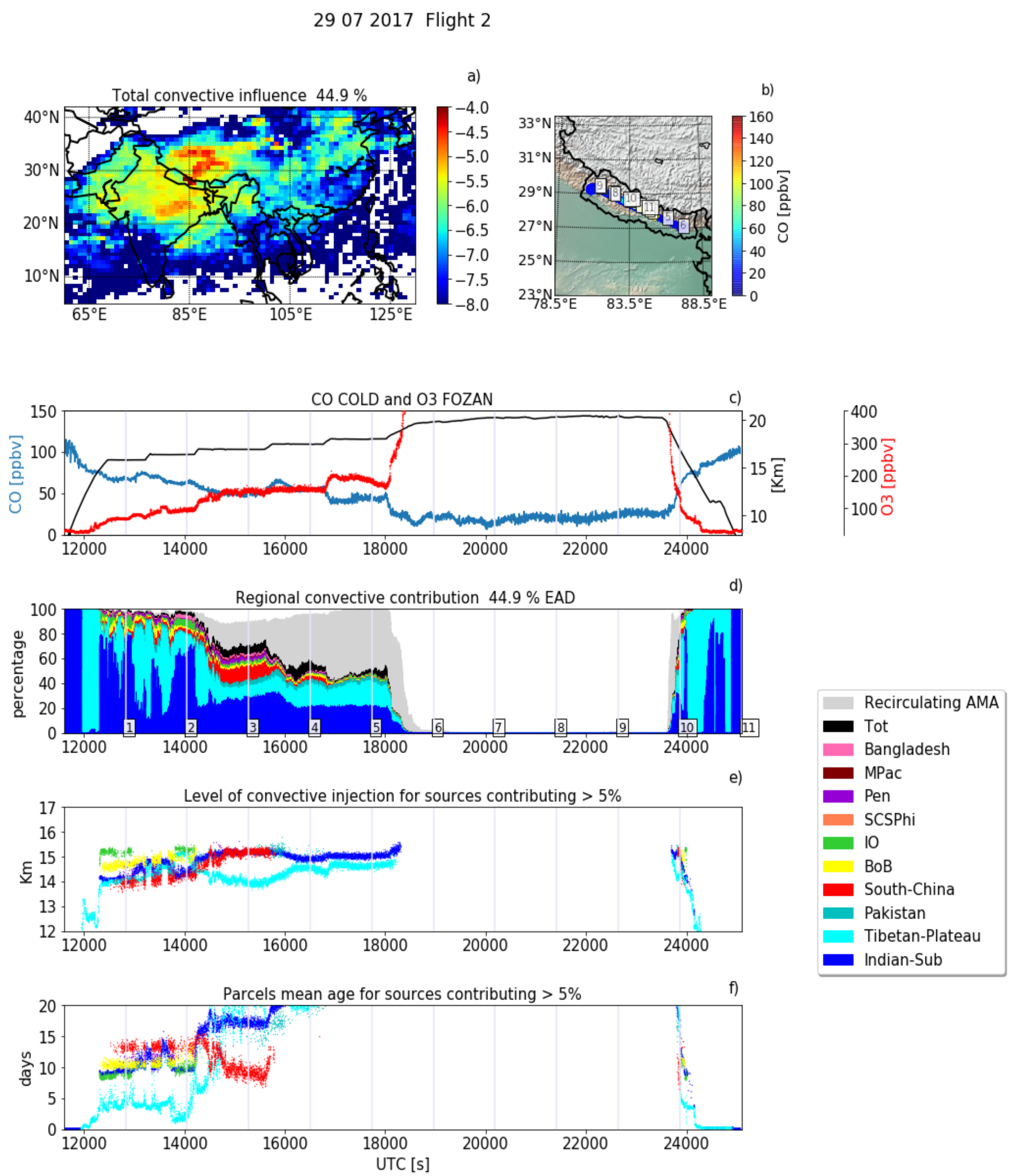
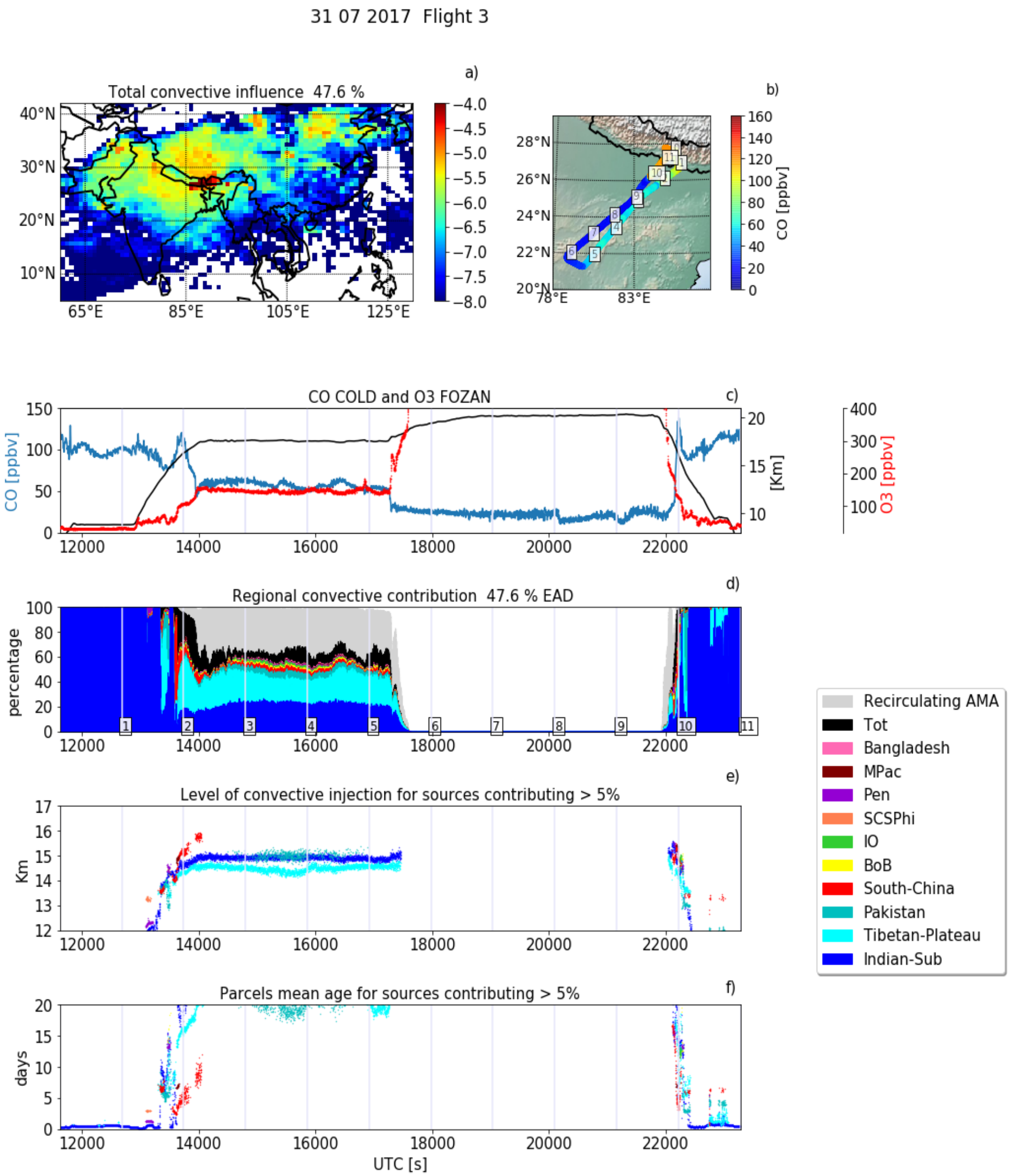


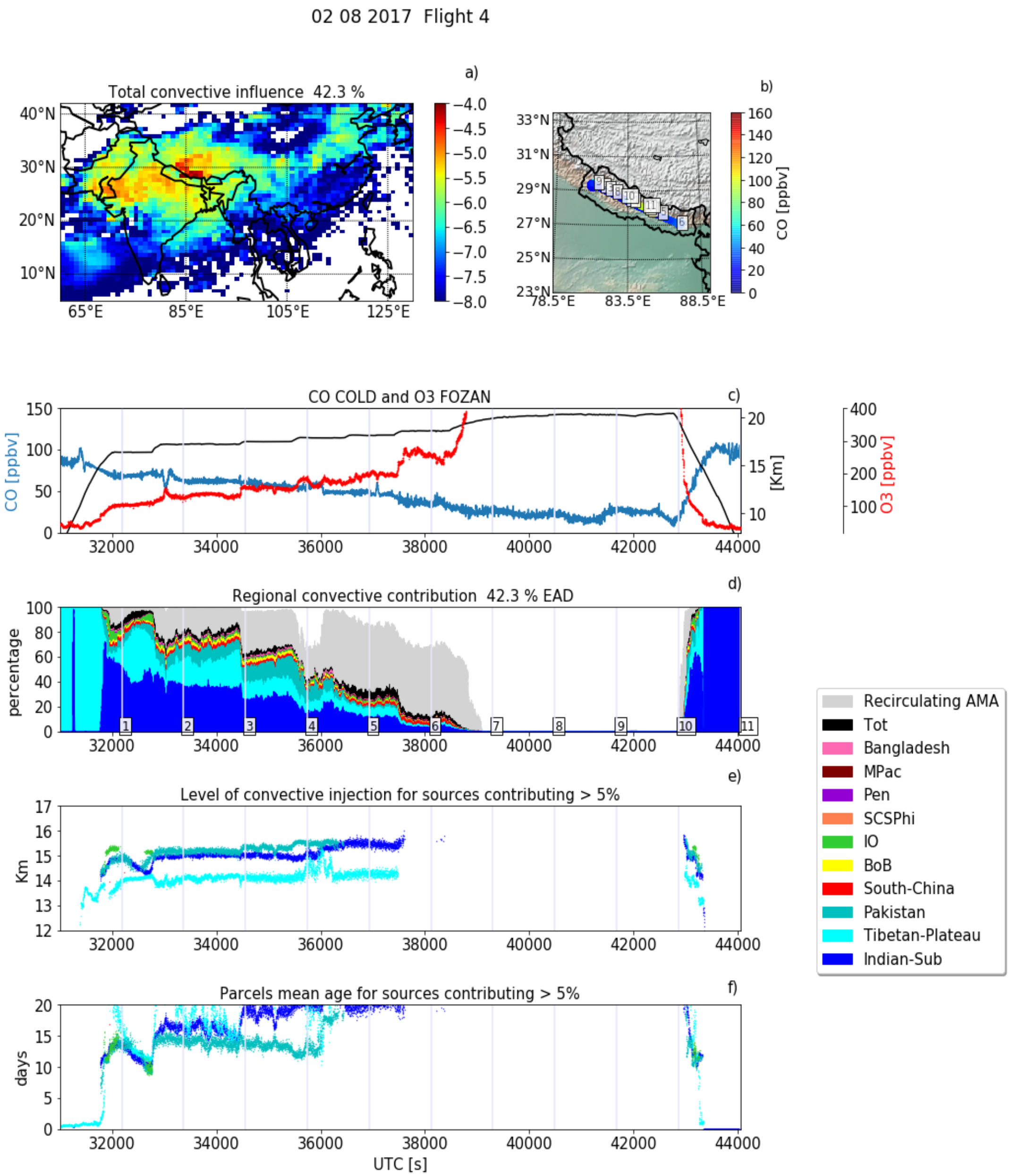
. Figure S1. Back-trajectories analysis of convective sources for the flight 1 (27th of July 2017). Panel a) Convective source regions distribution (in Logarithmic scale); Panel b) CO concentration along the position of the flight. Numbers along the position of the flight corresponds to numbers along 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 (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. The age is computed as the number of days between the trajectory release and the encountering of a convective cloud.



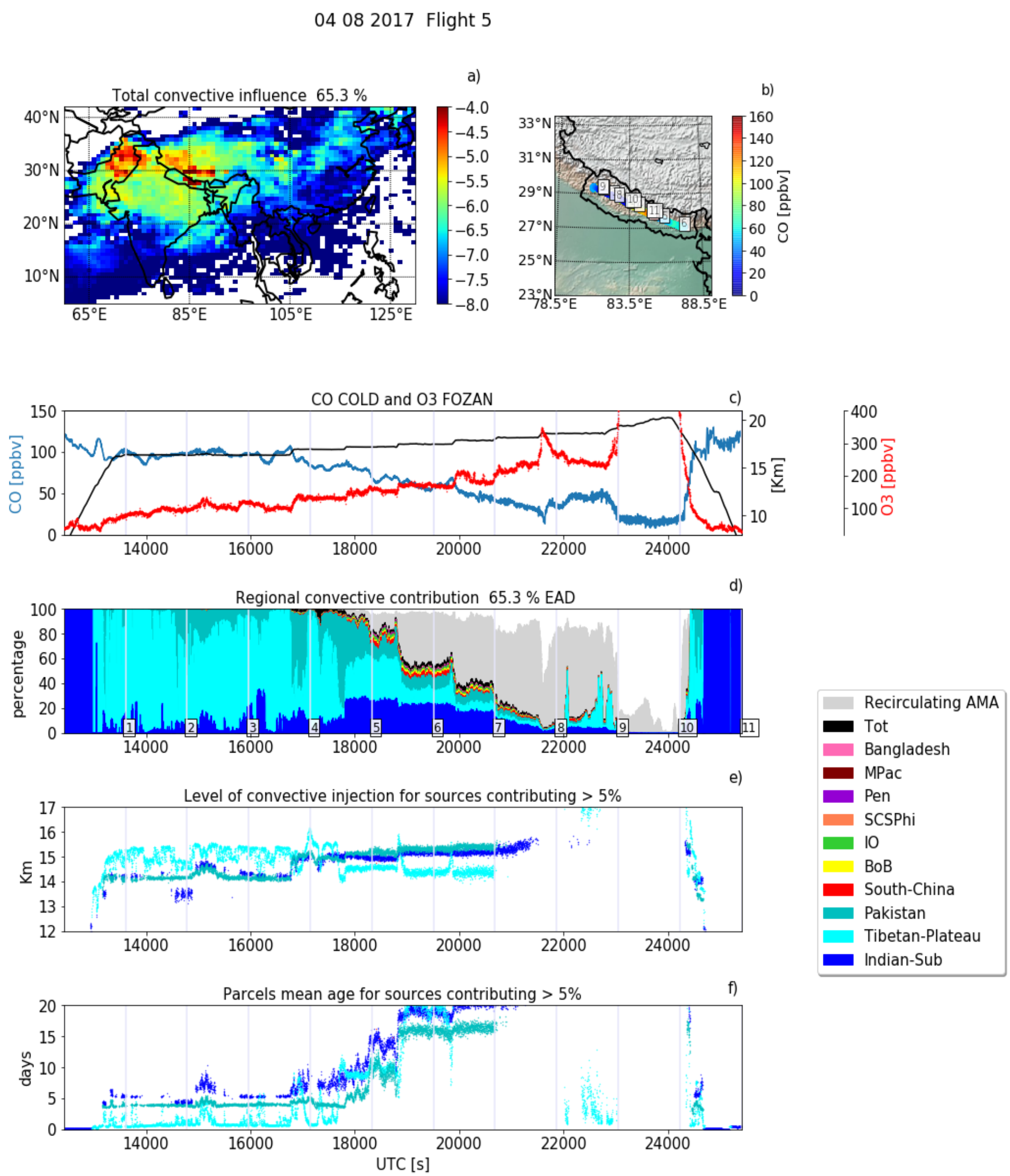
. **Figure S2.** As in figure S2 but relatively to flight 2 (29th of July 2017)



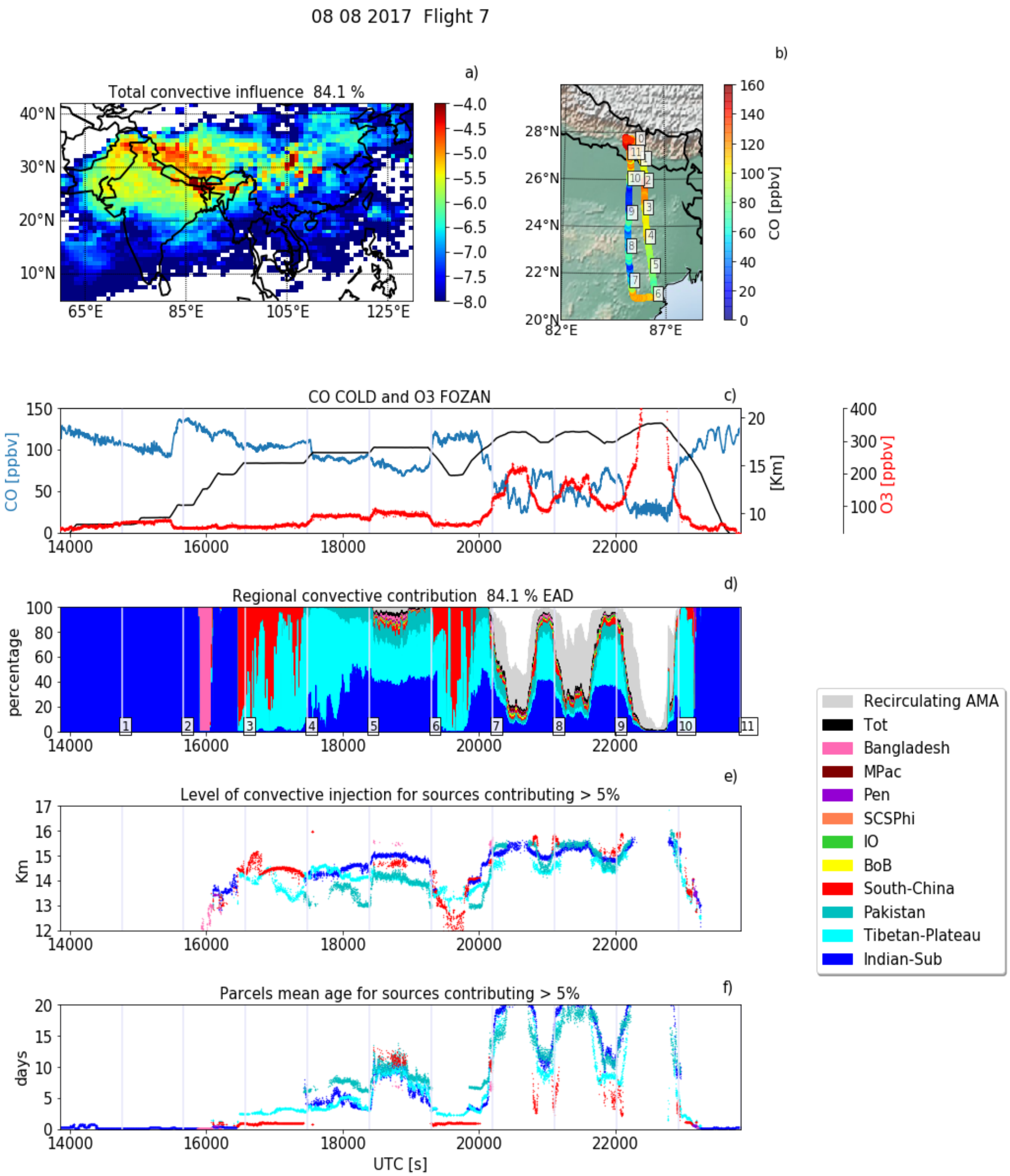
. **Figure S3.** As in figure S2 but relatively to flight 3 (31st of July 2017)



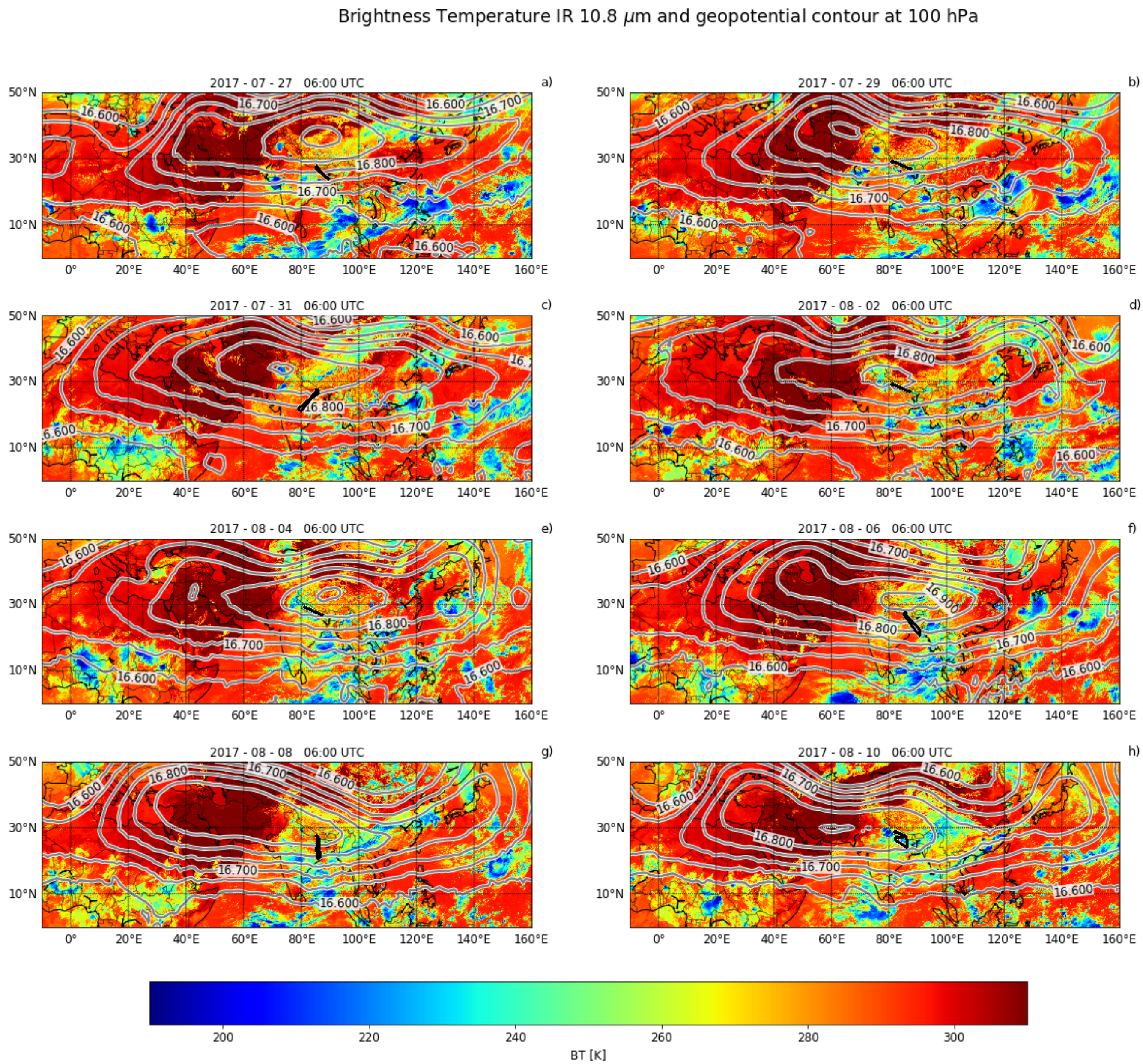
. **Figure S4.** As in figure S2 but relatively to flight 4 (2nd of August 2017)



. **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)

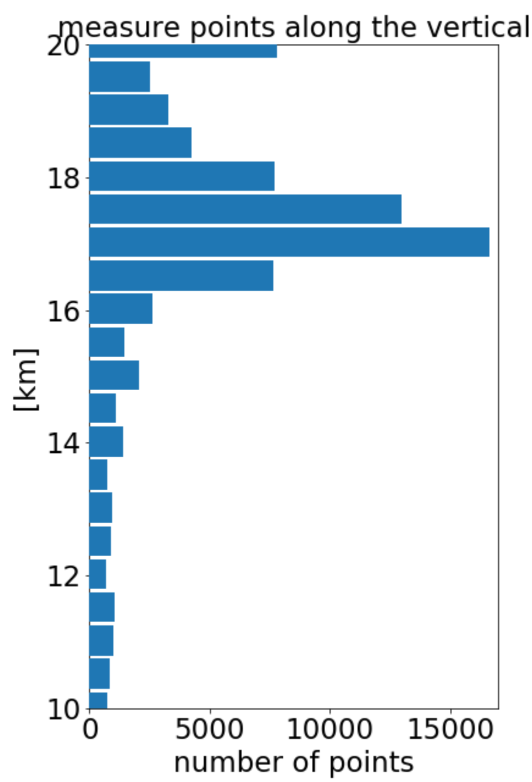


. Figure S7. 10.8 μm Brightness Temperature from MSG1/Himawari and winds and geopotential contours at 100 hPa from ERA5 (in grey). Maps are produced every 2 days for the whole period of the campaign (27th of June - 10th of August). In black is reported the the also the flight track

	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			F8: 10 August		
	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias	Correlation	RMSE	Mean Bias
EIZ	50,2	15,5	7,3	49,4	18,5	2,7	39,6	19,6	3,9	33	20,8	5,2
EID	50,8	15,7	7,5	56,4	17,3	2,8	16,1	52,4	4,9	33,6	18,9	5,1
EAZ	58,9	15,8	6,1	65,7	14,4	2,7	53,8	14,7	3,7	34,6	17,4	3,6
EAD	65,7	13,8	5,4	67,7	13,8	2,8	53,7	14,5	3,7	35,1	17,6	4,8

. **Table ST1.** Correlation statistics (R coefficient, Root Mean Square Error (RMSE) and Mean Bias) for the whole ensemble of the flights between the $\delta \mathrm{CO}_{\mathrm{proxy}}$ and COLD2 measured CO anomaly respect to the $\mathrm{CO}_{\mathrm{base}}$ baseline



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