

# Trajectory data available from our website

<http://www.atmo-projects.net/atlas/trajectory/>







# What you can find on the website

For every of the 1000 ensemble trajectories

- ▶ Location of the last detrainment events
- ▶ Location of last contact with boundary layer
- ▶ Values of temperature, pressure, potential temperature, PV, cloud liquid and cloud water for these locations

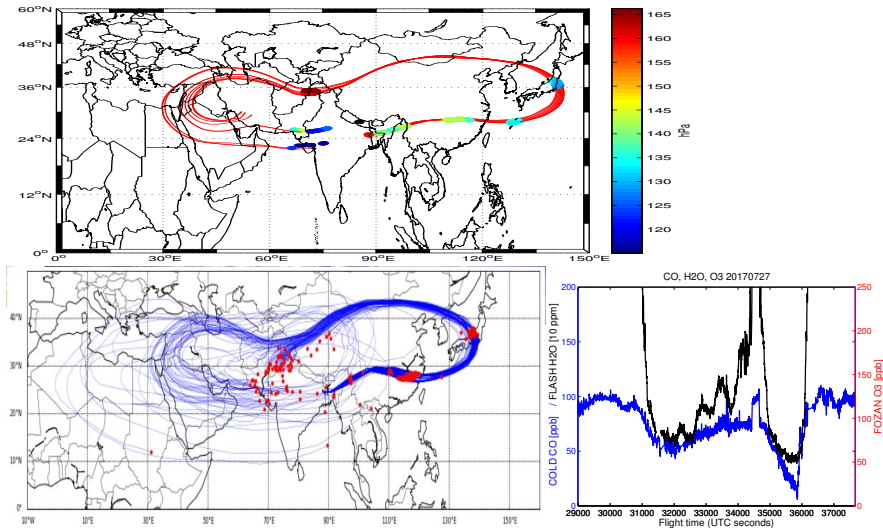


# Differences

	TRACZILLA	ATLAS	ClaMS
Analysis	ERA-I, ERA5	ERA-I	ERA-I
Vertical movement	Dia, Kin	Kin	
Convection	Observed cloud tops	ERA-I convective mass flux	No

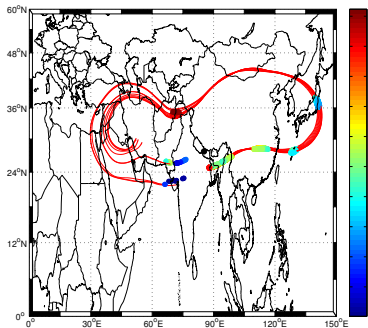
# Example: Single start point from flight track (27 Jul)

Convective events along ensemble trajectories

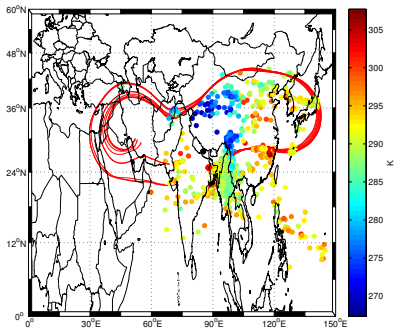


My results compare well to Bernard's results from Rome

# Example: Single start point from flight track (27 Jul)

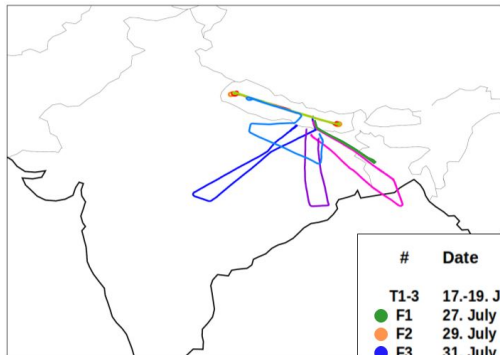


Detrainment locations



Boundary layer locations (80%  $p_{surface}$ )

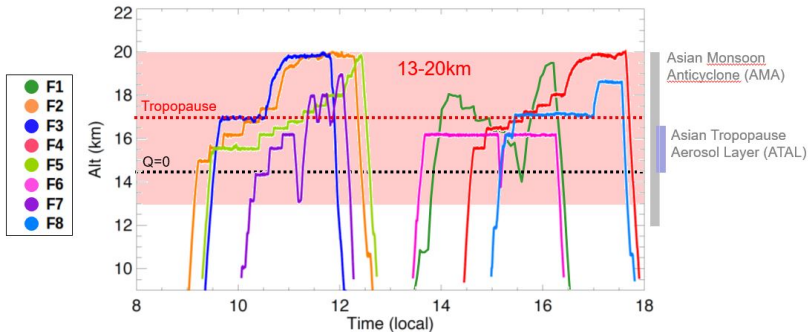
# Flight overview



#	Date	Main Science Objective
T1-3	17.-19. July	
● F1	27. July	ATAL probing
● F2	29. July	ATAL probing
● F3	31. July	AMA Horiz. Structure
● F4	02. August	Cold Tropopause Layer Structure
● F5	04. August	AMA Vertical Structure
● F6	06. August	Convective Outflow
● F7	08. August	AMA Vertical Structure
● F8	10. August	Chasing Strong Convection
T4-6	14.-15. August	

Plot: Liz Moyer

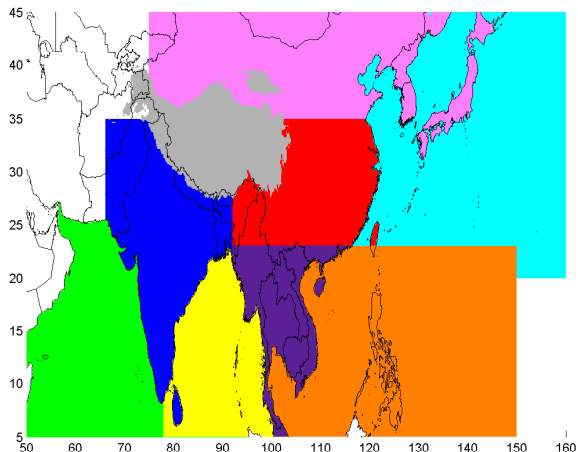
# Flight overview



Based on discussions with Stephan Borrmann, Bernard Legras, Liz Moyer

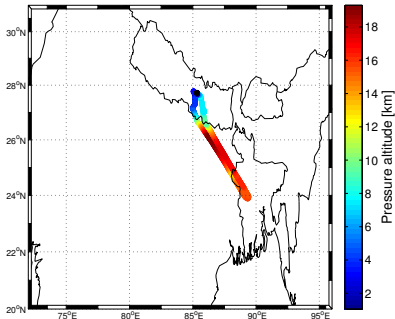
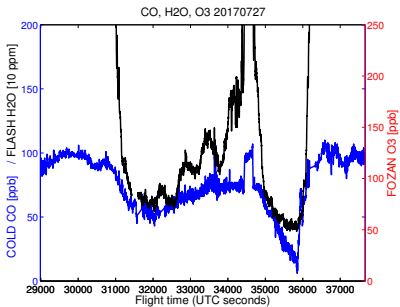
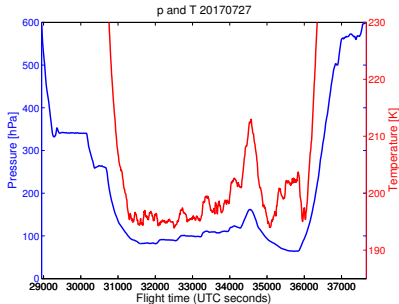
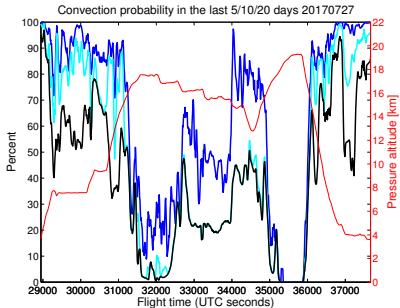


# Source regions

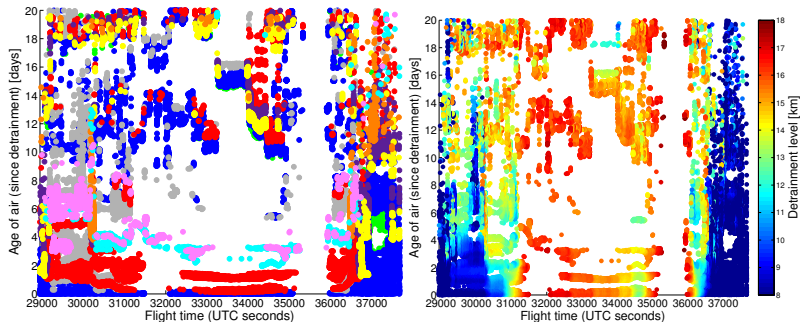


Note: Regions are rather arbitrary and results are sensitive to small changes

# Flight 1 (27 Jul): ATAL probing

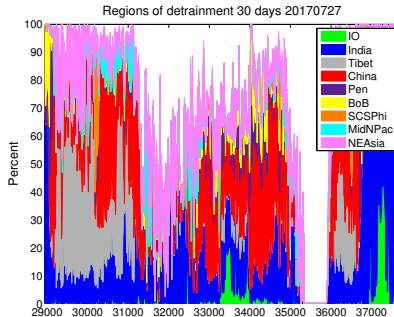
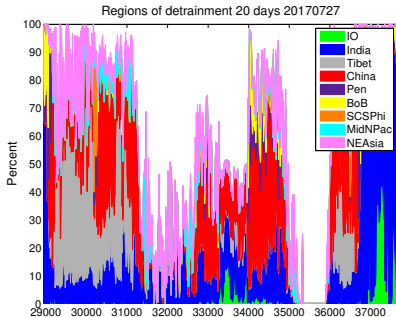
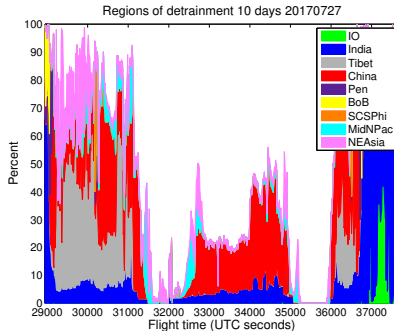
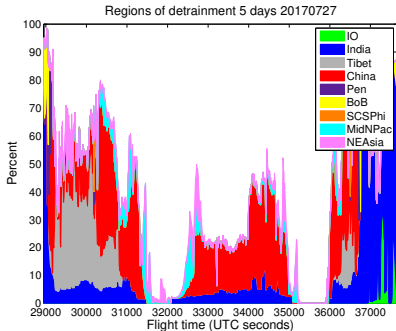


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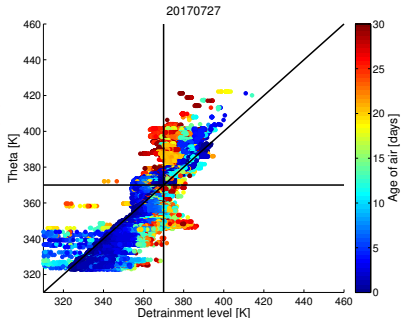
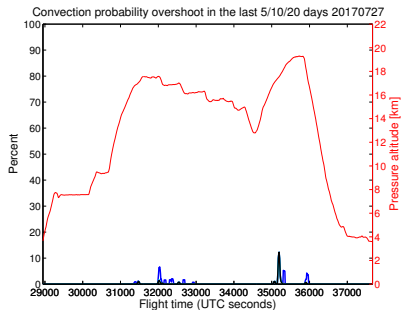
All ensemble trajectory detrainment events as a function of flight time and age of air, with additional variable color coded

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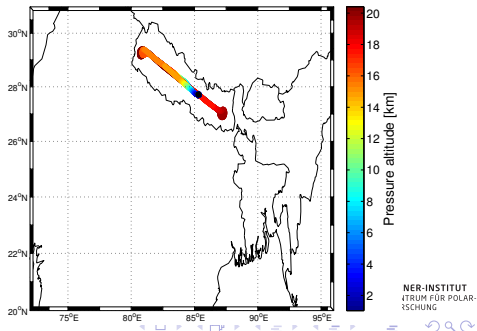
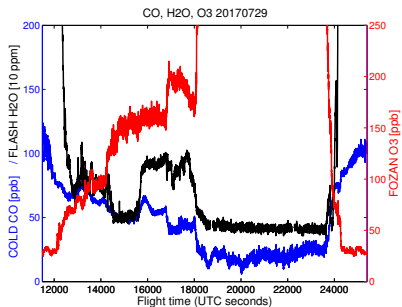
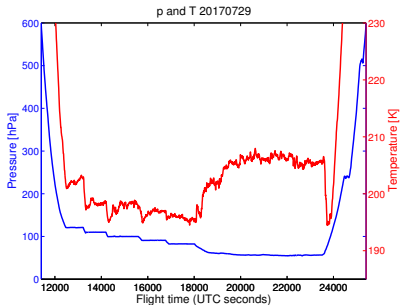
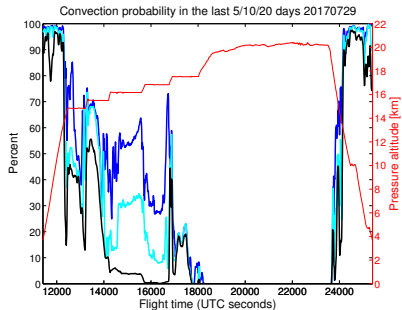


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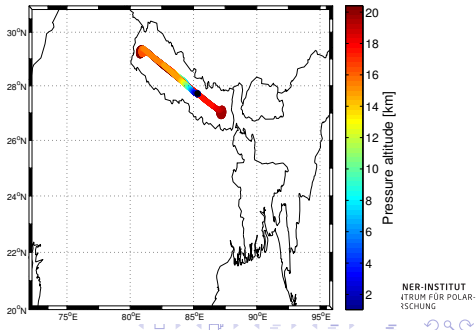
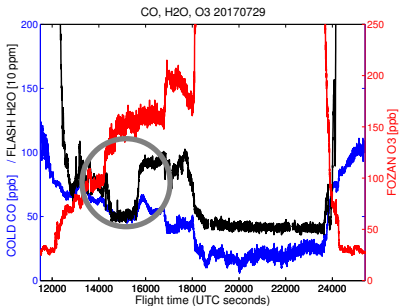
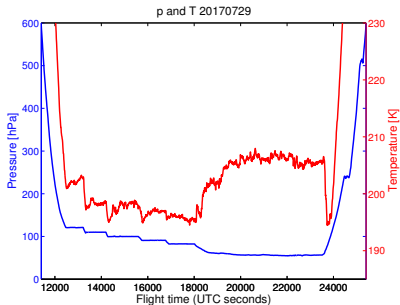
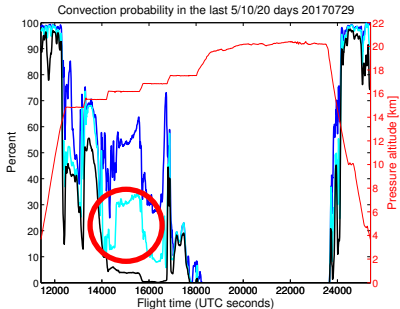
Convection above tropopause (here 17 km, 370 K)



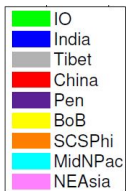
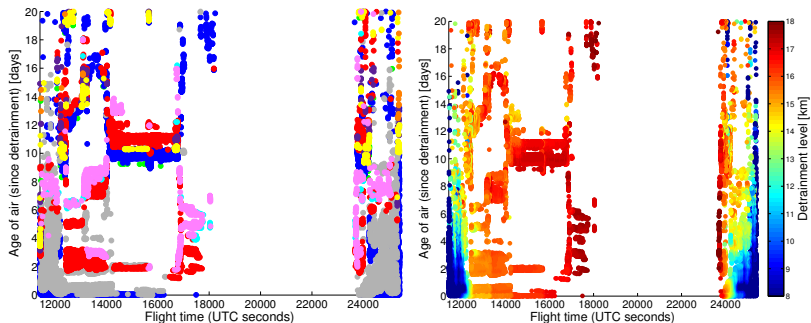
# Flight 2 (29 Jul): ATAL probing



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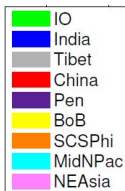
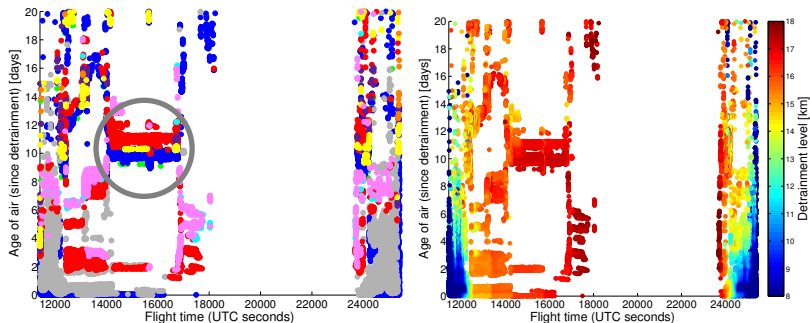


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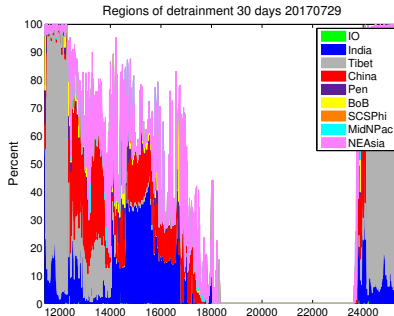
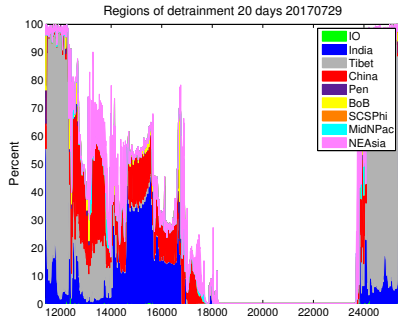
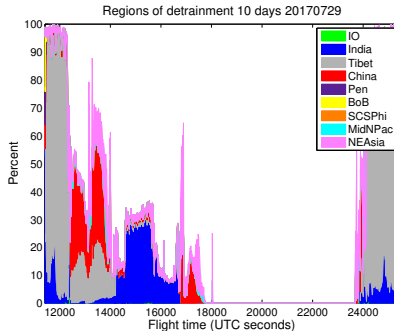
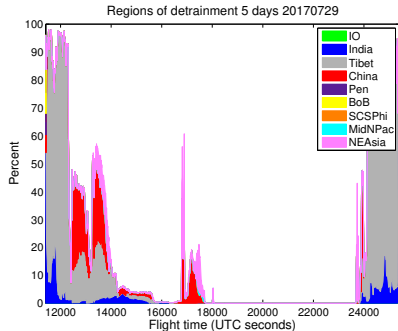




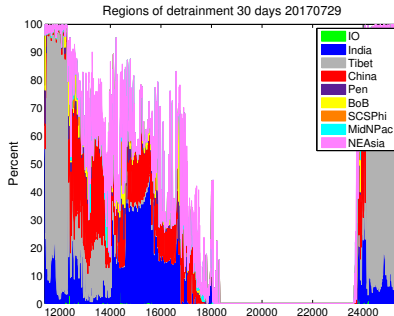
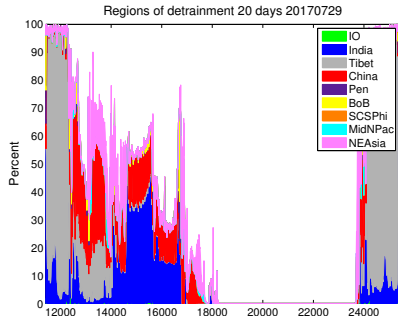
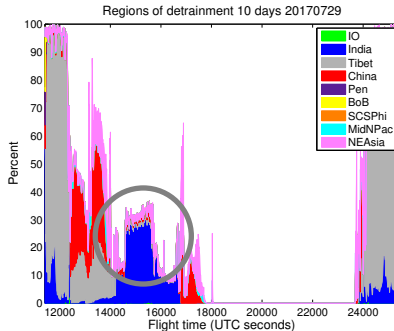
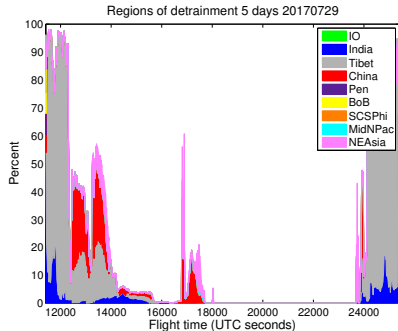
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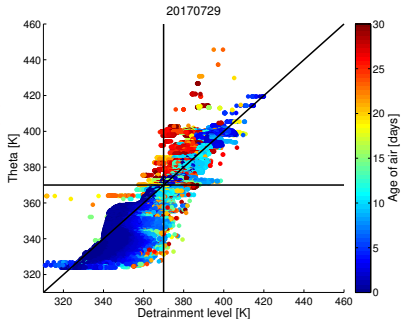
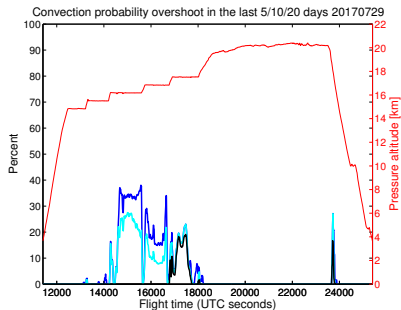


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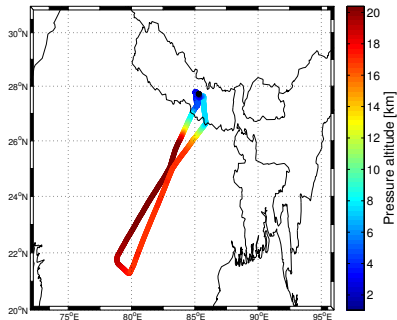
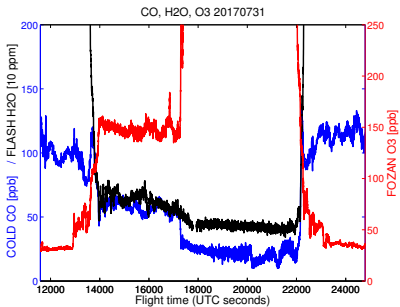
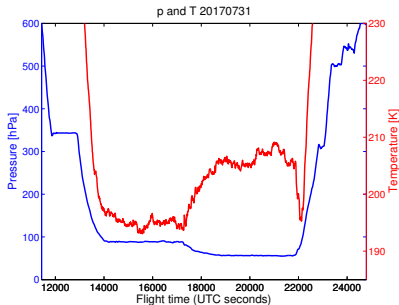
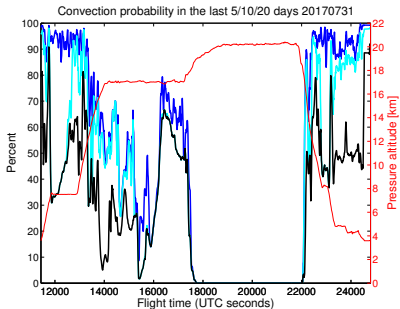


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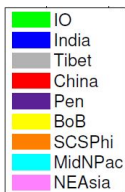
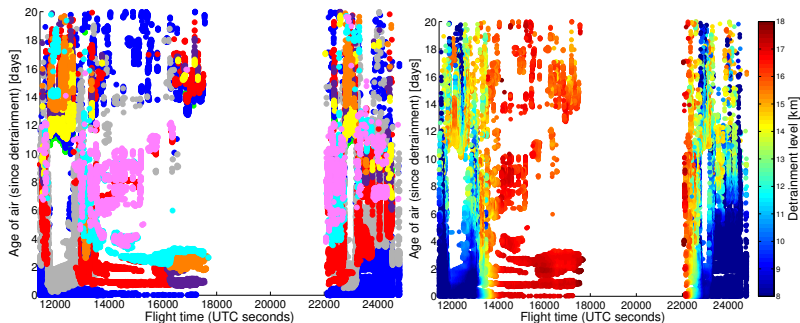
## Convection above tropopause (here 17 km, 370 K)



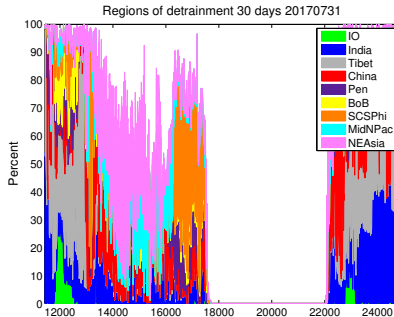
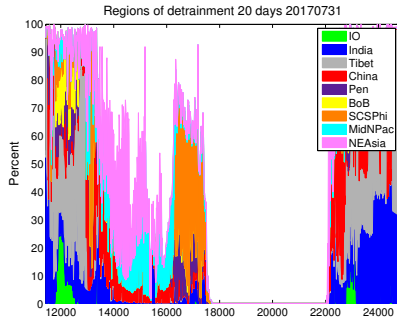
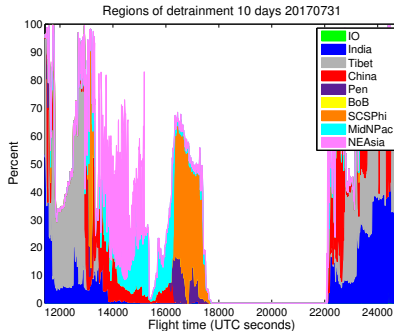
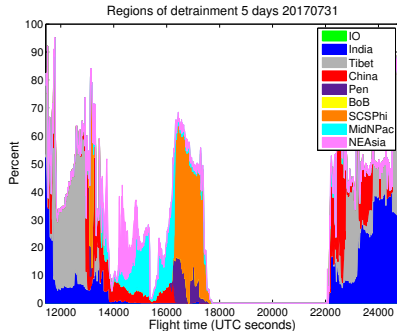
# Flight 3 (31 Jul): AMA horizontal structure



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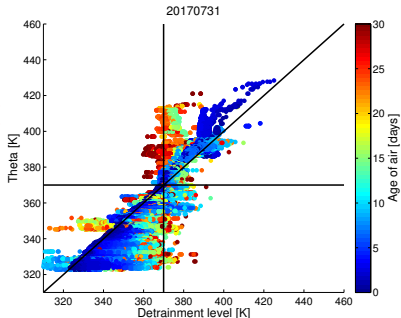
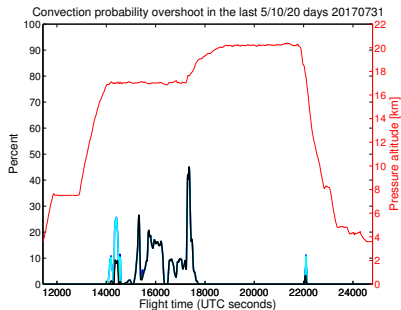


# Flight 3 (31 Jul): AMA horizontal structure



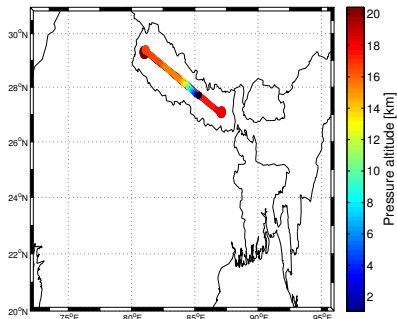
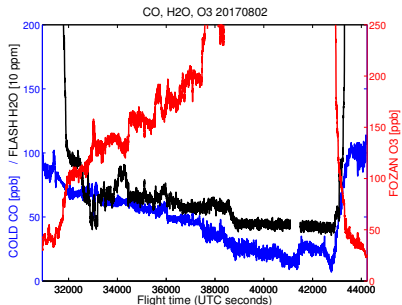
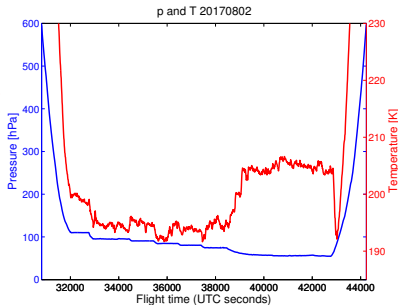
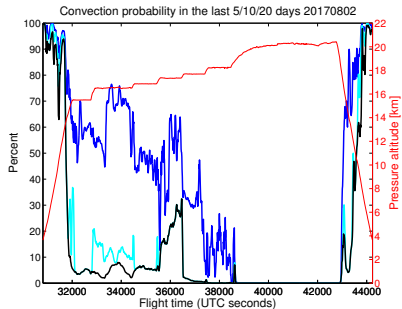
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Convection above tropopause (here 17 km, 370 K)

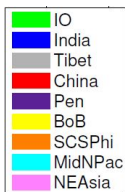
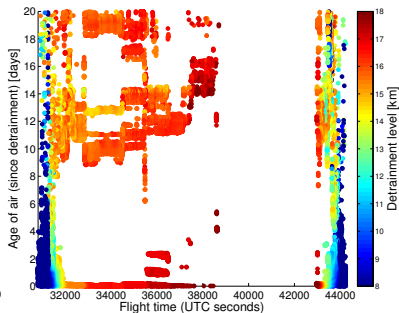
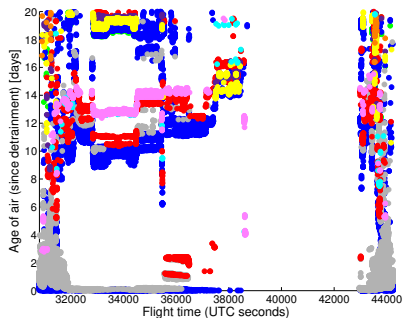




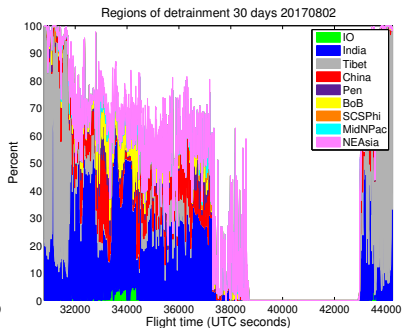
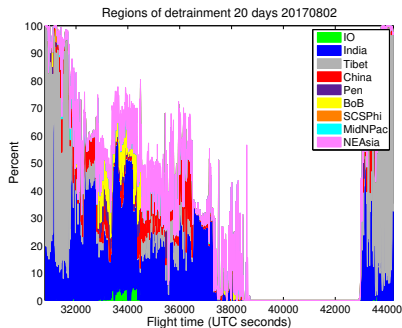
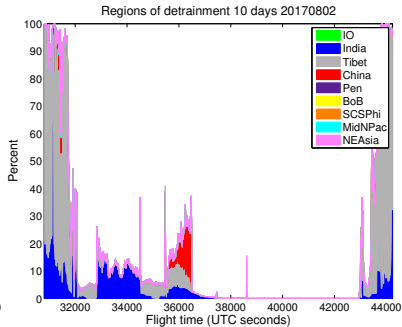
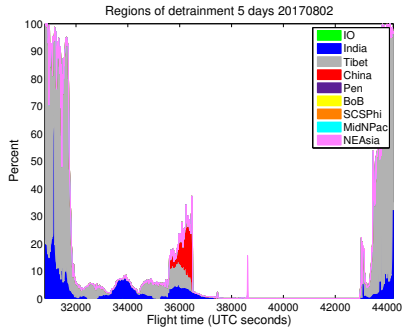
# Flight 4 (2 Aug): Cold tropopause structure



# Flight 4 (2 Aug): Cold tropopause layer structure

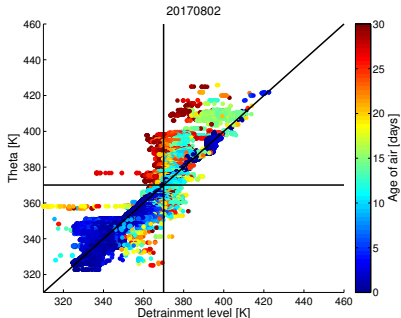
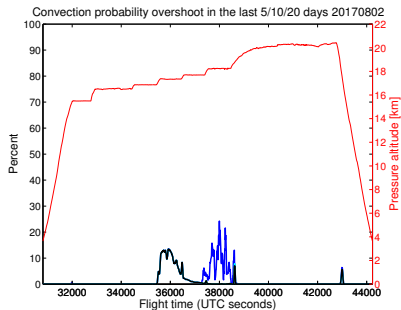


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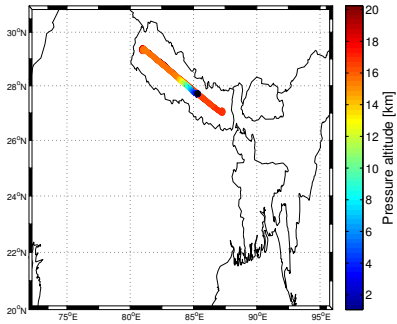
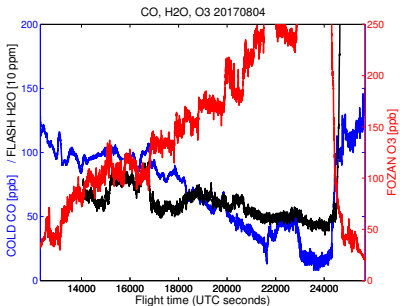
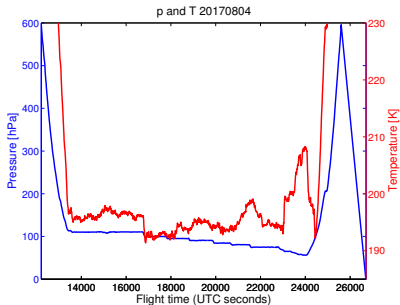
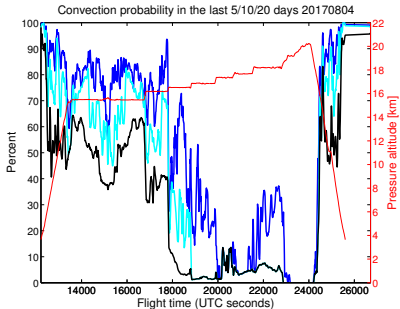


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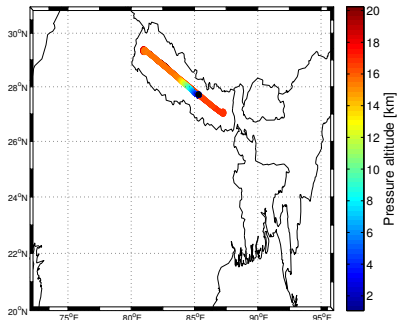
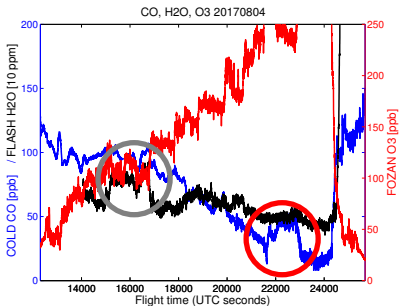
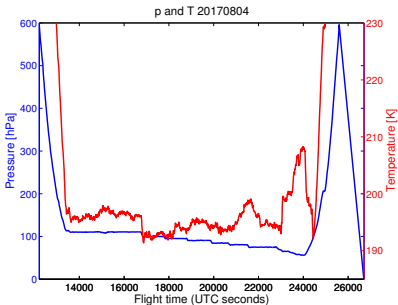
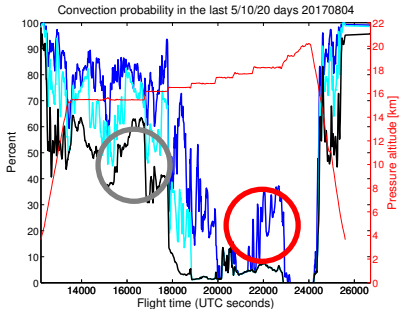
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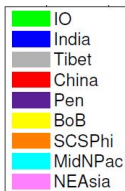
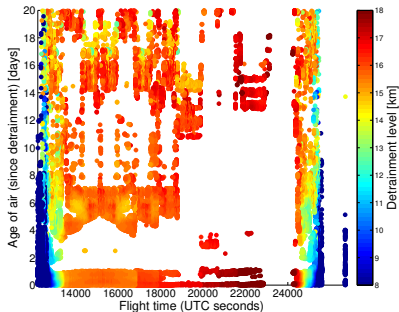
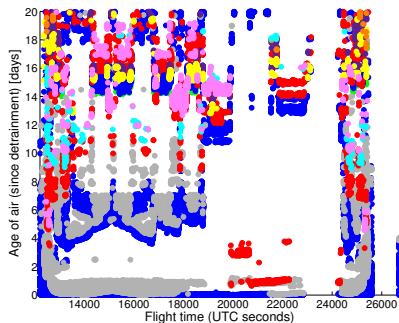
# Flight 5 (4 Aug): AMA vertical structure



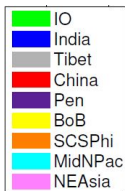
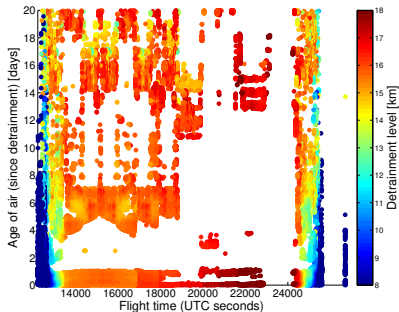
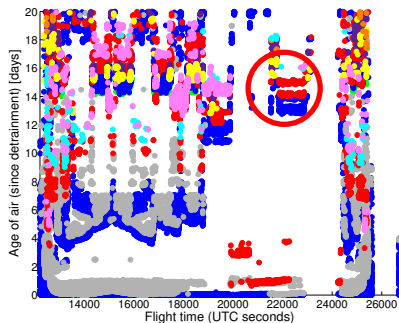
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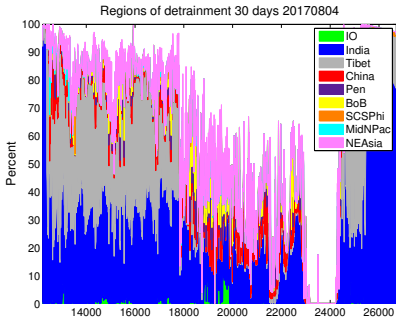
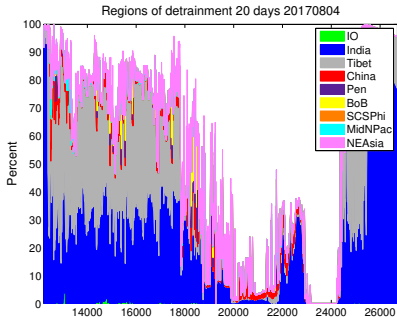
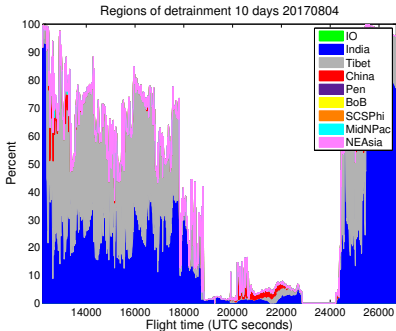
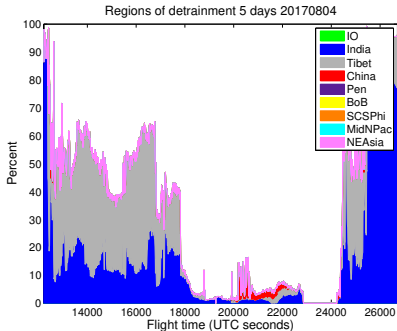


# Flight 5 (4 Aug): AMA vertical structure

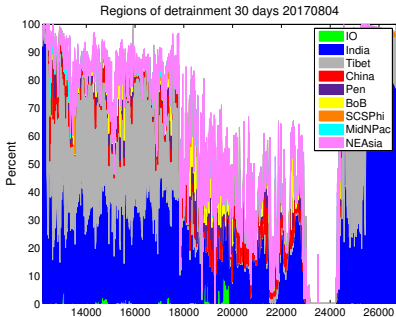
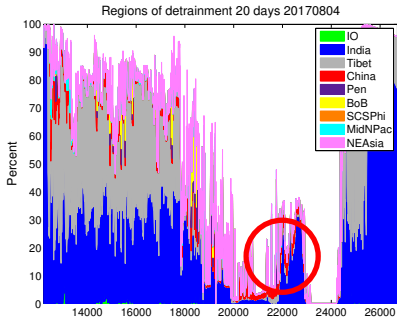
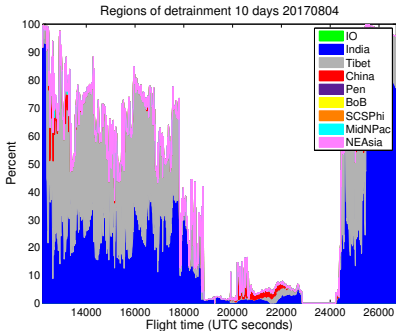
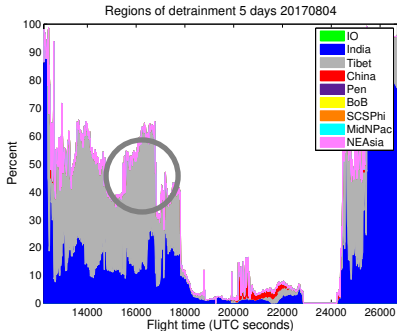




# Flight 5 (4 Aug): AMA vertical structure

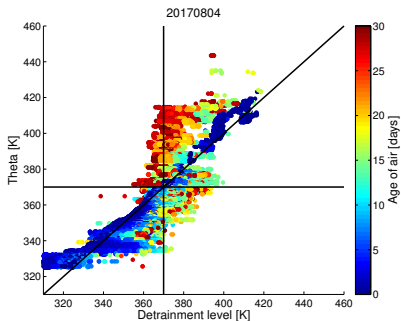
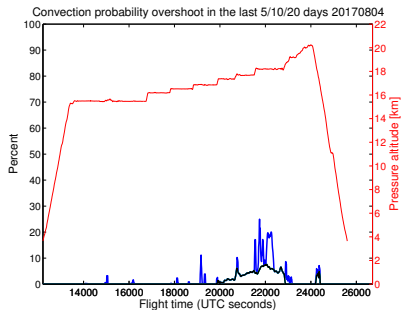


# Flight 5 (4 Aug): AMA vertical structure

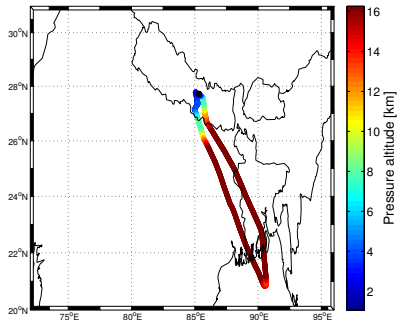
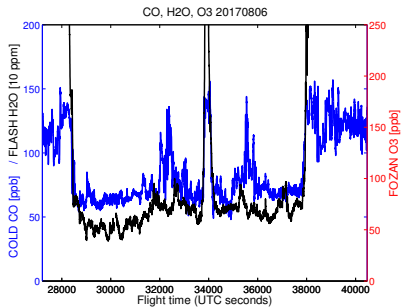
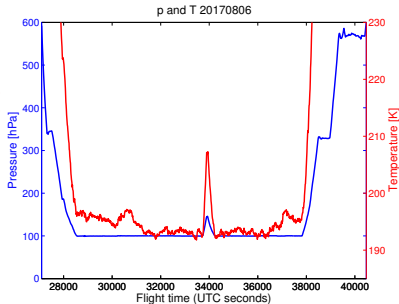
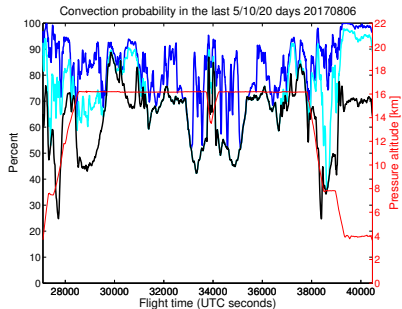


# Flight 5 (4 Aug): AMA vertical structure

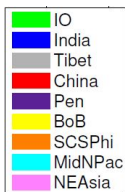
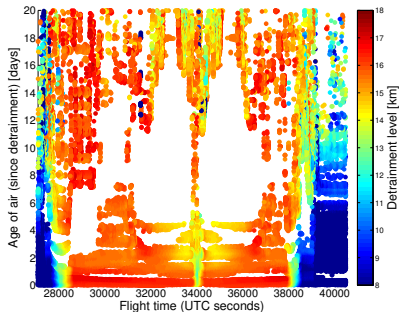
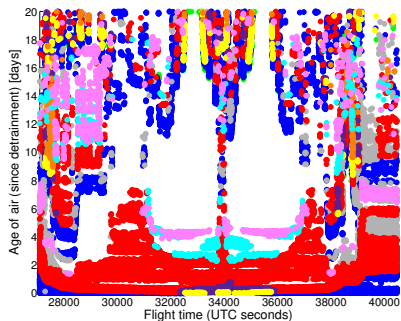
## Convection above tropopause (here 17 km, 370 K)



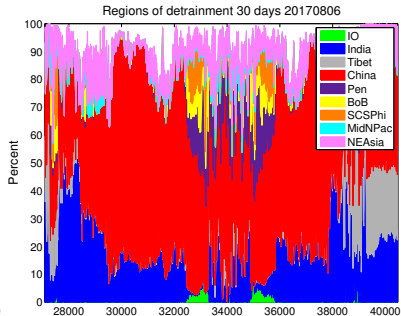
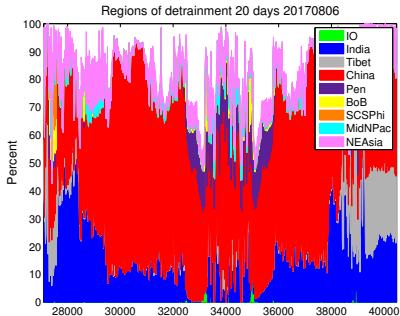
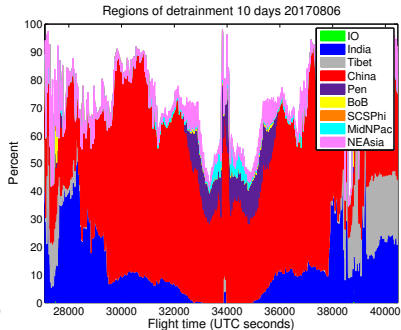
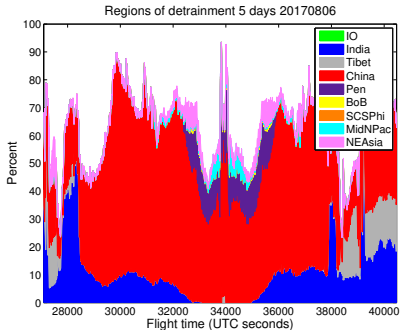
# Flight 6 (6 Aug): Convective outflow



# Flight 6 (6 Aug): Convective outflow

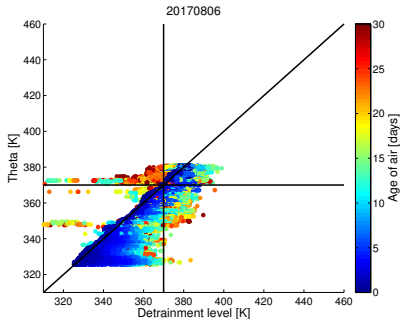
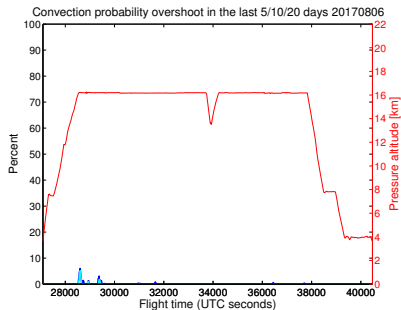


# Flight 6 (6 Aug): Convective outflow

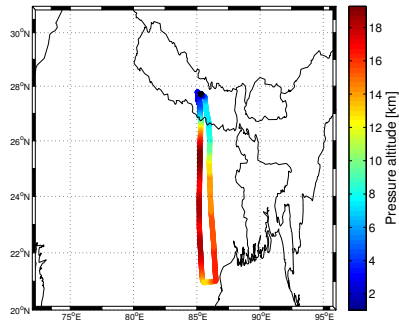
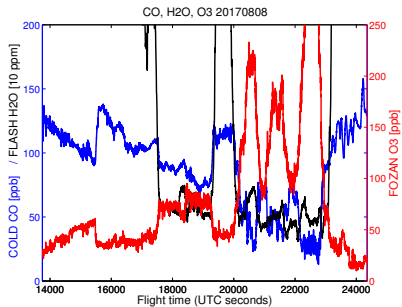
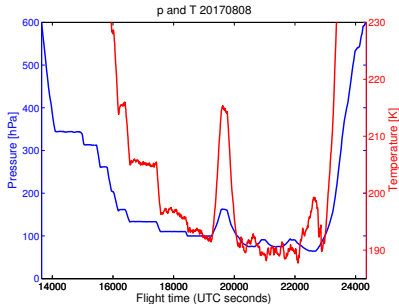
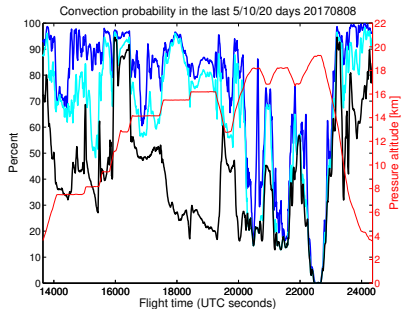


# Flight 6 (6 Aug): Convective outflow

Convection above tropopause (here 17 km, 370 K)

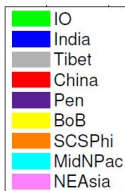
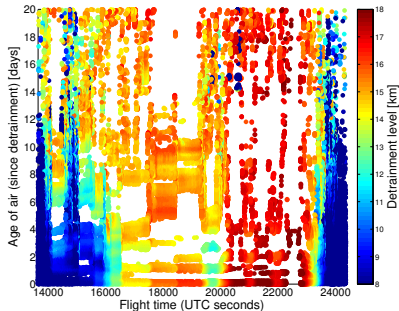
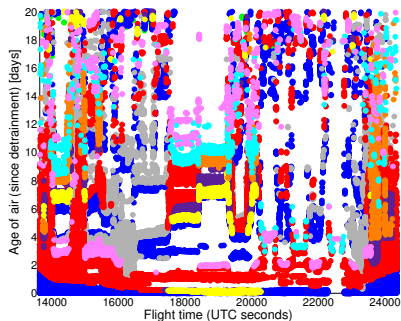


# Flight 7 (8 Aug): AMA vertical structure

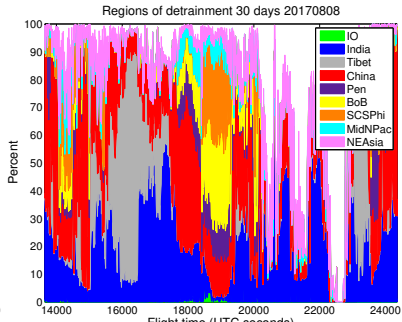
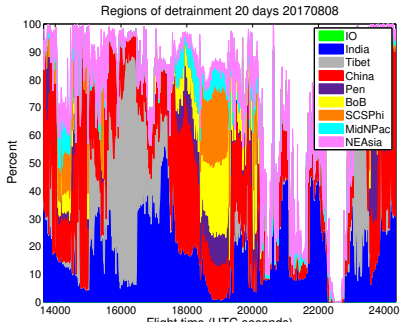
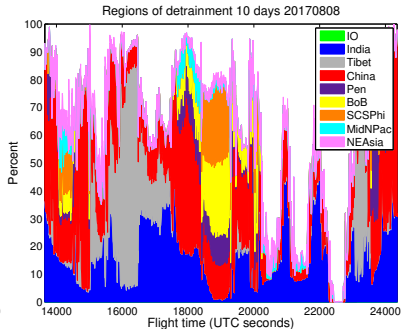
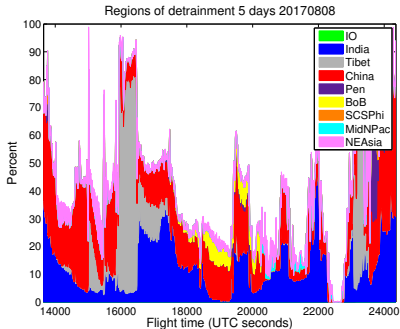




# Flight 7 (8 Aug): AMA vertical structure

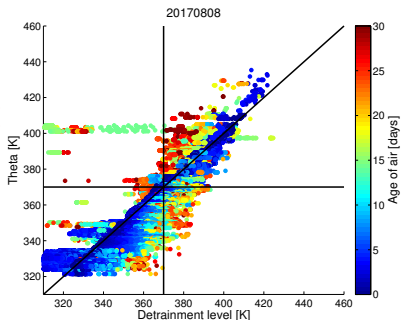
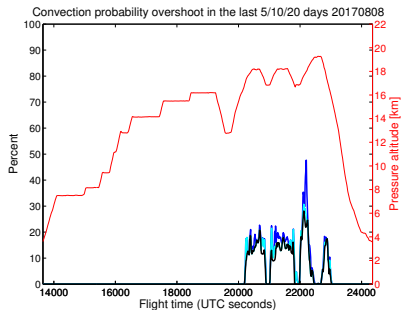


# Flight 7 (8 Aug): AMA vertical structure

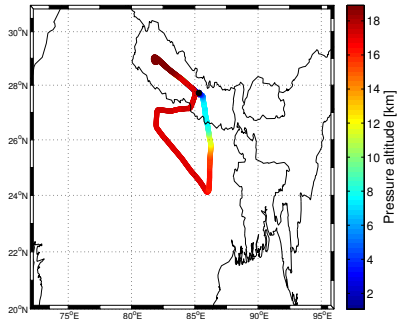
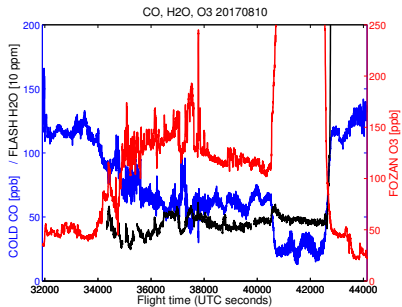
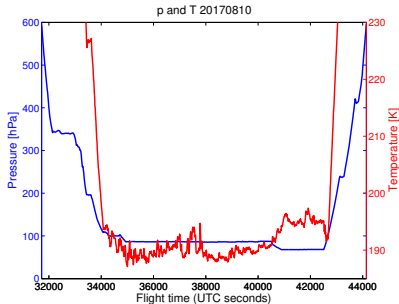
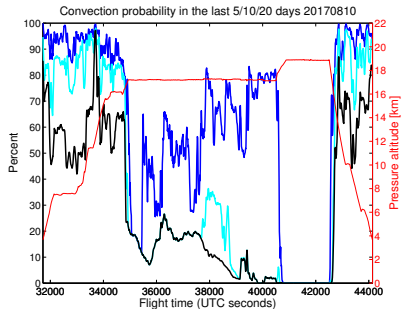


# Flight 7 (8 Aug): AMA vertical structure

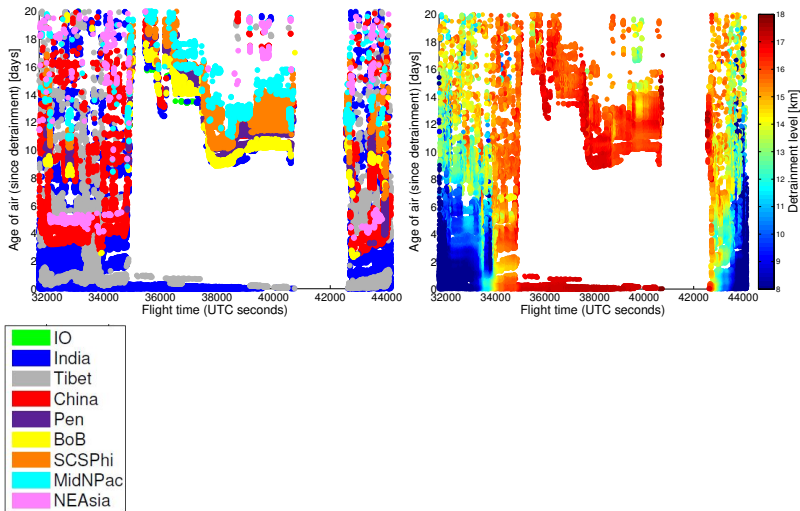
Convection above tropopause (here 17 km, 370 K)



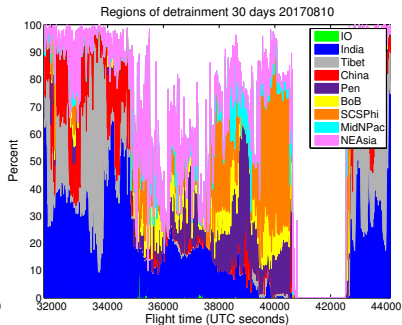
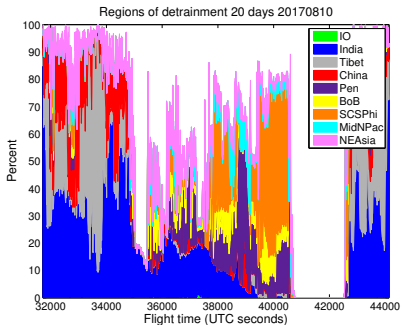
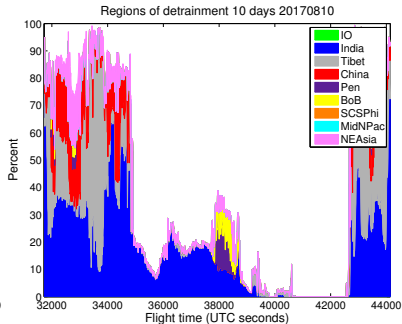
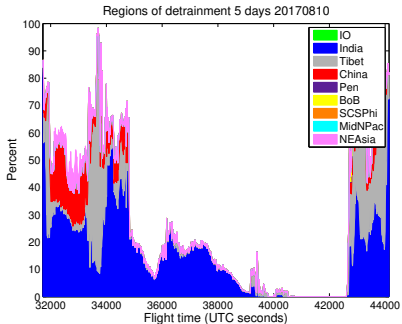
# Flight 8 (10 Aug): Chasing strong convection



# Flight 8 (10 Aug): Chasing strong convection



# Flight 8 (10 Aug): Chasing strong convection



# Flight 8 (10 Aug): Chasing strong convection

Convection above tropopause (here 17 km, 370 K)

