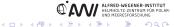
Back trajectories starting at the flight paths (with and without convection)

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Stratoclim Meeting Nov 6–8, 2017



Introduction

As a service to all which interpret measurements from the flight campaign:

Using the AWI flight planning tool (back trajectories) for looking at the air mass history along the flight paths

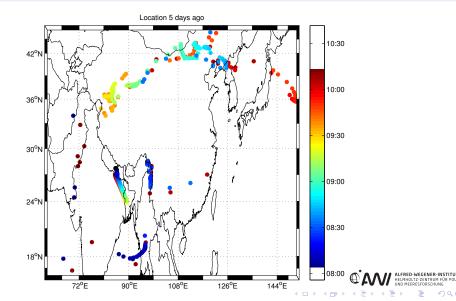
- 5 day back trajectories
- Without convection (one trajectory per aircraft position)
- With convection (statistical ensemble at every aircraft position)



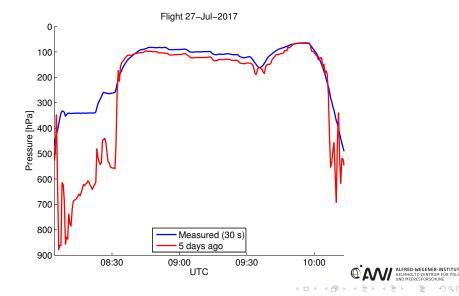
Without convection



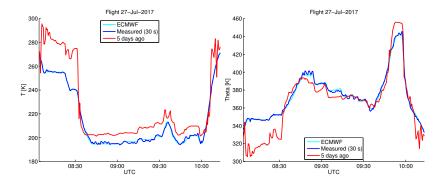
Example: Flight 27 July: Origin



Example: Flight 27 July: Pressure

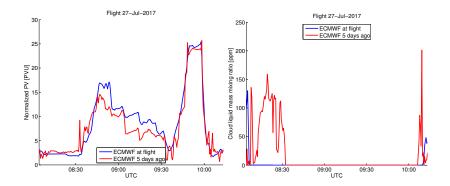


Example: Flight 27 July: Temperature, Theta



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Example: Flight 27 July: nPV, Cloud liquid



Proof of concept!

No convective mass flux for summer 2017 from ECMWF so far!

To be able to show something: What if the same flight would have been one year earlier?



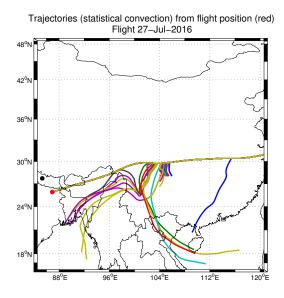
Convection model

- Statistical approach
- Probabilities for entrainment and detrainment
- If trajectory is entrained and where it is detrained determined by random numbers

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- Subsidence outside of convection for mass conservation
- More details: poster

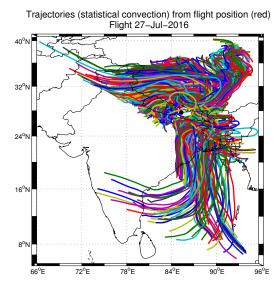
Convection example: Flight 27 July (start at 86 hPa)



For a single location on flight path (red)

2.7% of 1000 started trajectories in convection

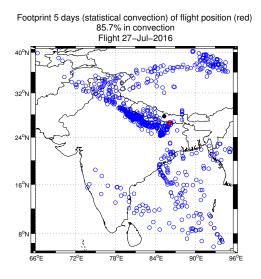
Convection example: Flight 27 July (start at 208 hPa)



85.7% of 1000 started trajectories in convection



Convection example: Flight 27 July (start at 208 hPa)





Convection probability: Part of Flight 27 July

