cherenkov telescope array

General status of the Atmospheric Correction projects (UC-CAL-ATMO-3000)

CCF general meeting, Barcelona, Oct. 3nd, 2017

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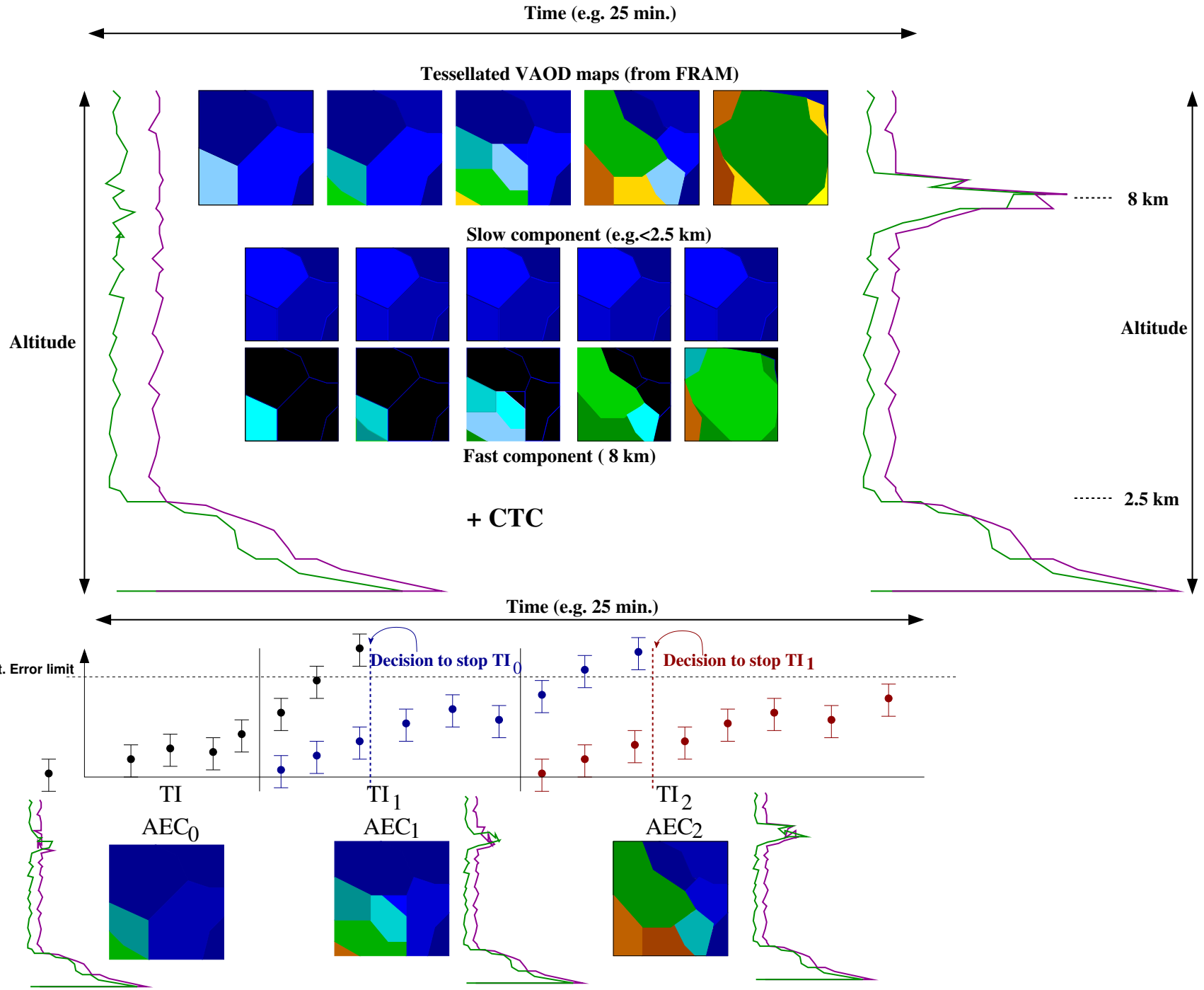

Time (e.g. 25 min.)
Tessellated VAOD maps (from FRAM)
Slow component (e.g.<2.5 km)
Fast component (8 km)
+ CTC
Altitude
8 km
2.5 km
Altitude
Time (e.g. 25 min.)
Syst. Error limit
Decision to stop TI 0
Decision to stop TI 1
TI
TI 1
TI 2
AEC0
AEC1
AEC2

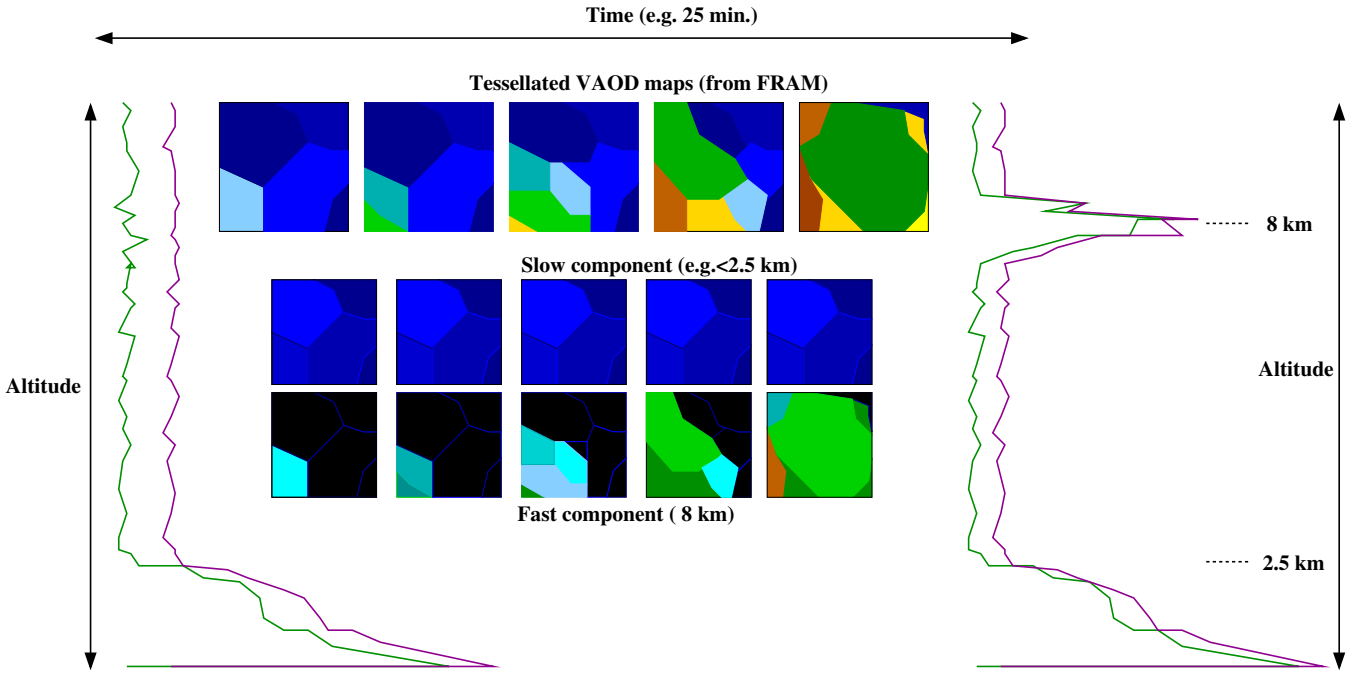
Atmospheric Corrections (UC-CAL-ATMO-3000)

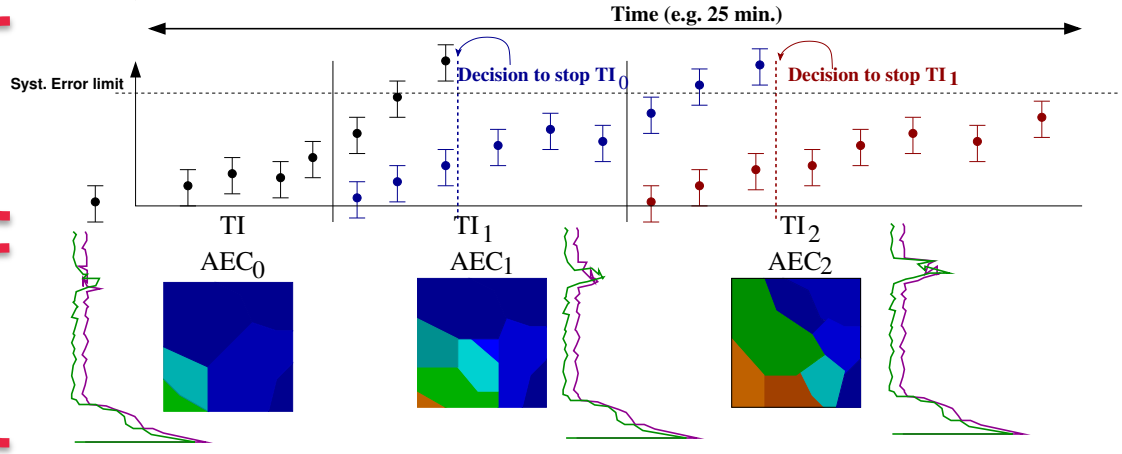
FRAM, LIDAR and CTC internal analyses

Interpolations and combination of instruments

From simulations

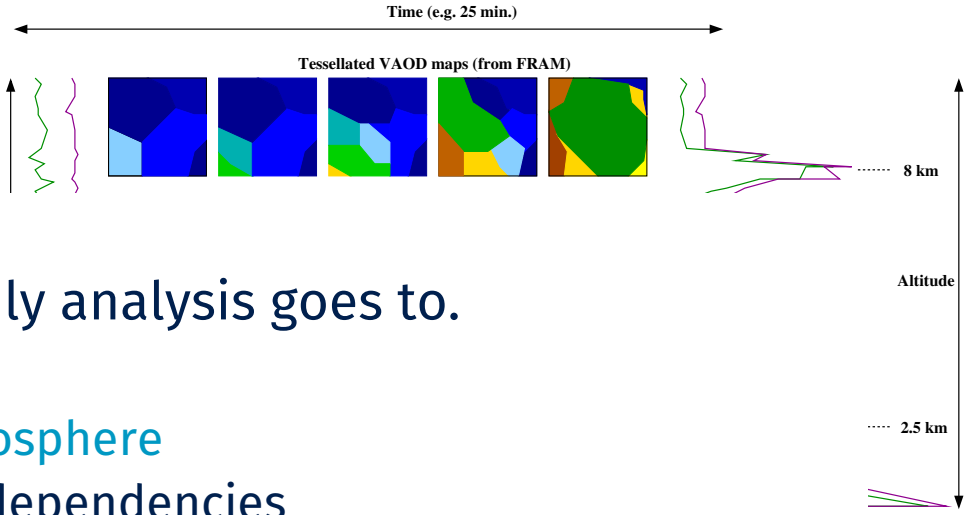
Interaction with simulations, IRF generation





Atmospheric Corrections (UC-CAL-ATMO-3000)

FRAM internal analyses

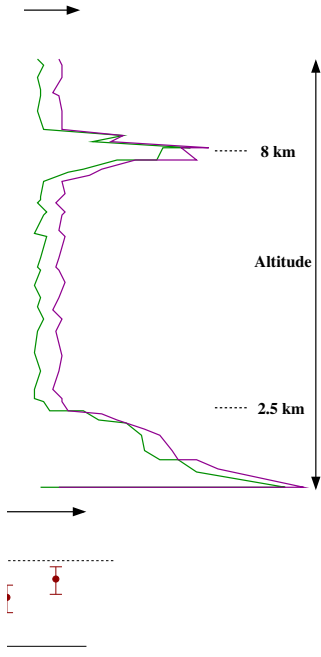


- Need to define where online-only analysis goes to.
- Depending on complexity:
  - either moves into ctapipe/atmosphere
    - if it does not need a lot of dependencies
    - if it can be integrated into the analysis chain
  - or create a separate package, inside GitHub
    - needs to provide a python interface
    - should follow the coding guidelines
    - should import ctapipe
    - Karl Kosack can create the repo package with all standards (docu, tests, etc.)
- What exactly they write out, and which file (table, database)? Should be stored as FITS images

Atmospheric Corrections (UC-CAL-ATMO-3000)

LIDAR internal analyses

- Moves into ctapipe/atmosphere
- Inputs:
  - LIDAR measurement itself
  - molecular profile
  - database with long-term degradation
- Two (corrected) LIDAR extinction profiles are written into a FITS/HD5 file.



- We want to write **one common analysis suite**, together with the experts from ARCADE, CEILAP, LUPM and IFAE/UAB.
- Organize a workshop to start this activity.

Atmospheric Corrections (UC-CAL-ATMO-3000)

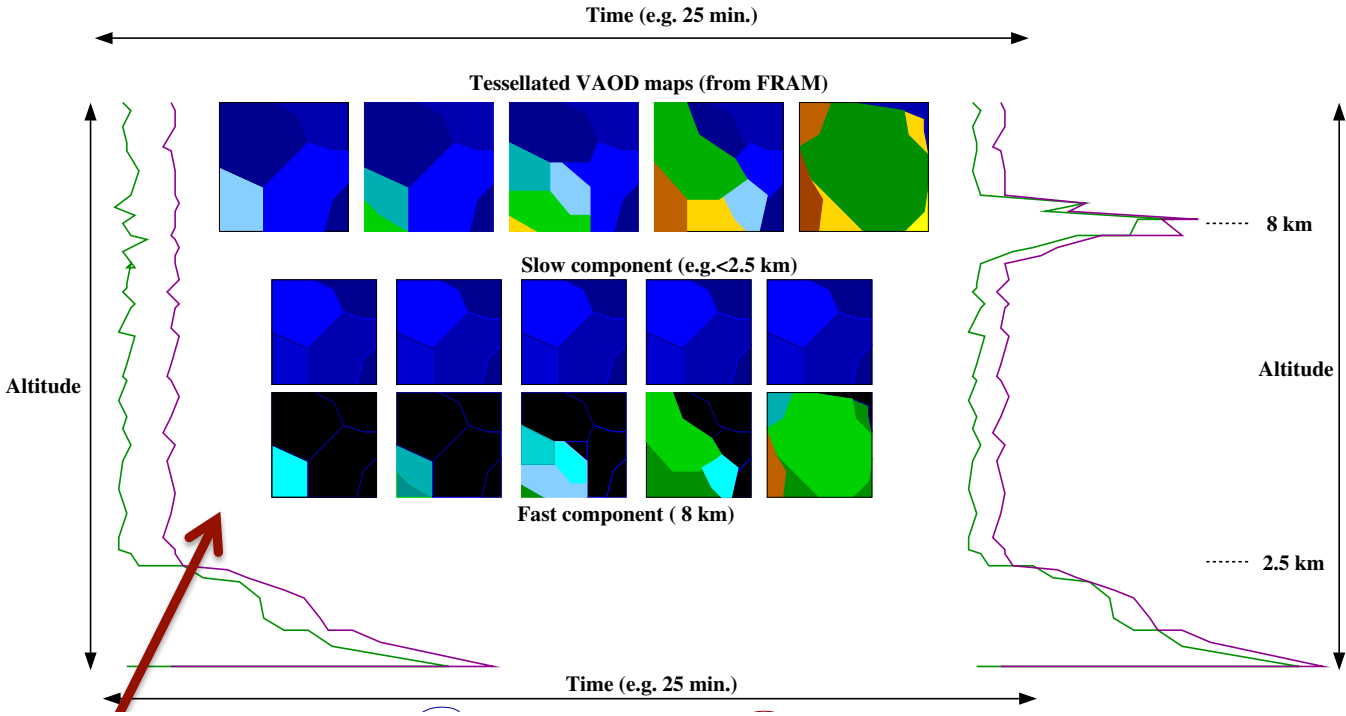
Pure CTC analyses

- Depending on complexity:
  must go into ctapipe/atmosphere
- What exactly they write out?

Atmospheric Corrections (UC-CAL-ATMO-3000)

FRAM, LIDAR and CTC internal analyses

Interpolations and combination of instruments:



Calculate interpolated extinction cubes

(altitude, camera FOV, wavelength, time)

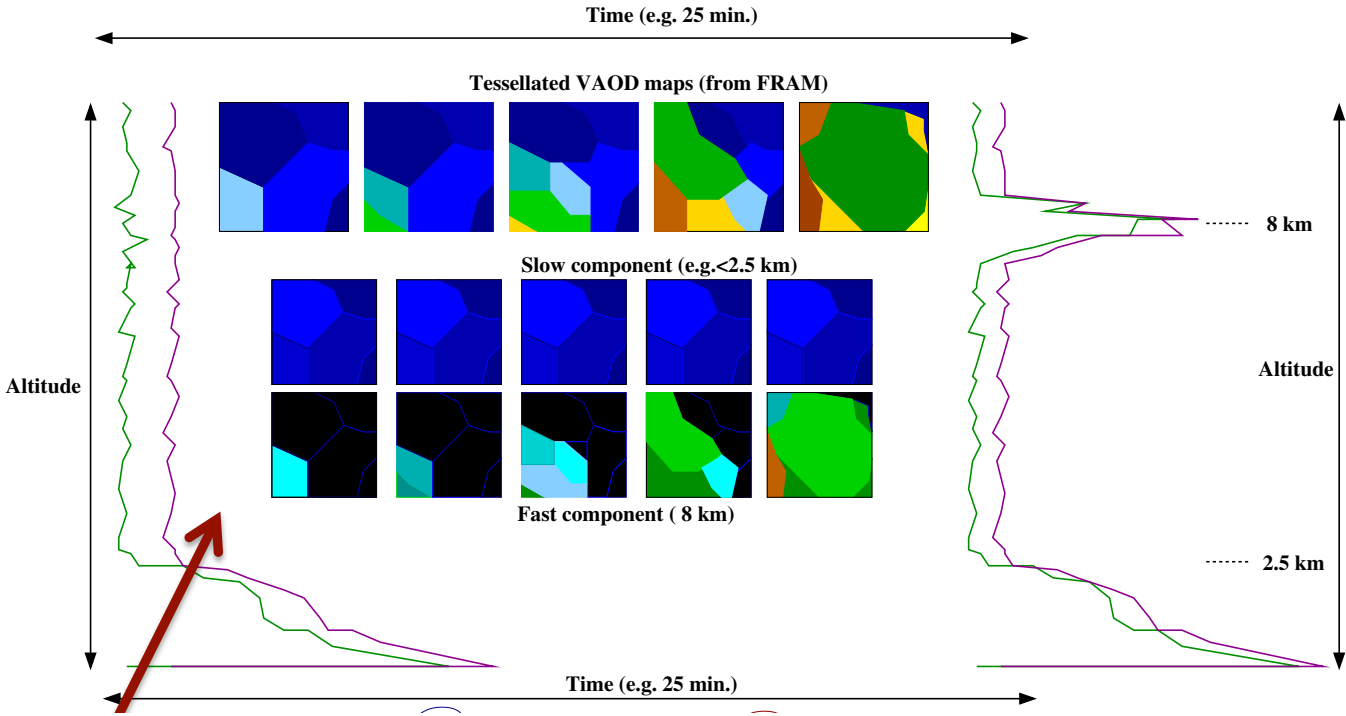
Atmospheric Corrections (UC-CAL-ATMO-3000)

- Needs the following inputs:
  - the FRAM output Voronoi tesselated images vs. time
  - the LIDAR profiles before and after the time interval
  - historical database from AERONET, etc.)
  - CTC vs. time (within time interval)
- What exactly they write out:
  - Interpolation of tessellated VAOD maps
  - Interpolation with LIDAR profiles / splitted into low and fast component
  - Confontration with historical database
  - Confrontation with interpolated CTC
  - Calculation of systematic error vs. time , using “current” Average Extinction Cube (AEC)
  - Definition of new Time Interval (TI) in case of exceeding threshold
  - Calculation of new AEC with corresponding (better) TI start.

Atmospheric Corrections (UC-CAL-ATMO-3000)

FRAM, LIDAR and CTC internal analyses

Interpolations and combination of instruments:



Calculate molecular extinction parts (from GDAS/ECMWF)

- Download data from outside
- Stores (manipulated) data in a central archive
- For now, a local file only
- Should go into ctapipe/atmosphere

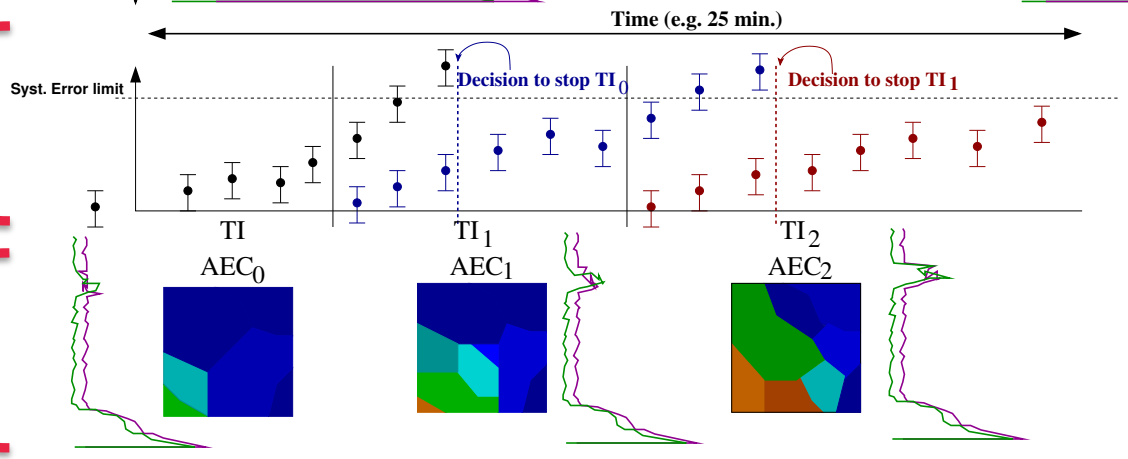
Atmospheric Corrections (UC-CAL-ATMO-3000)

Simulations:

- Part (e.g. altitude dependency) included in simulations prepared now
- More complicated parts (e.g. obstruction of parts of FOV) not yet planned.
- Results should go into a database, accessible by ctapipe

From simulations

Interaction with simulations, IRF generation



Atmospheric Corrections (UC-CAL-ATMO-3000)

Interaction with simulations:

- Results should go into a database, accessible by ctapipe
- Online analyses: **Use data corrections! (from MAGIC)**
- Offline analyses: **Use MC corrections!**
- **still not clear where and when and at which time intervals MC will be run....**

From simulations

Interaction with simulations, IRF generation