Atmospheric simulations update





J. Bregeon for the group IN2P3-LUPM CCF Meeting Barcelona, October 3rd 2017

Atmospheric Simulations

- Two requests made by the CCF group more than 6 months ago
 - 1. many protons to start the study of the Cherenkov Transparency Coefficient
 - 2. different atmosphere transmission and density profile to study the effect of the atmosphere
- $\rightarrow\,$ no real progress on CTC, more work needed on the proposal
- ightarrow progressing slowly on atmosphere quality for different reasons
- A few links:
 - Atmospheric Simulation forum
 - Document describing the La Palma atmospheric simulation request

LA PALMA ATMOSPHERIC SIMULATION (DONE)

What has been done:

- all the software is now available to run efficiently a full simulation and analysis chain: Corsika+simtel_array, EventDisplay Conversion, Calibration, Reconstruction and Analysis
- La Palma Prod3(b) baseline simulation is running now, see (Issue #17019)
 - ightarrow that should be the reference for all atmospheric studies
 - as an example: the gamma South pointing, 20 deg Zenith production is done and holds in 10 DL2 like evndisp files (just 2 GB overall), from which one can derive the IRFs

LA PALMA ATMOSPHERIC SIMULATION (TODO)

What to do now:

- run the same simulation but changing the atmosphere
- first goal is to run a series of simulations, just scanning the overall optical depth
 - either need to produce the corresponding transmission tables, just scaling the OD ?
 - use an option of simtel_array: -DEXTRA_CLOUD with CLOUD_HEIGHT and CLOUD_TRANSMISSION environment, to add extra clouds corresponding to a grey extra absorption layer
- $\rightarrow\,$ man power needed to run tests before we put any of this into production
- ightarrow needs iterations with Konrad, validation and verification
- ightarrow needs documentation on redmine wiki or issue, or a document
- → then pipe Corsika into 3 simtel_array at a time with each a different atmosphere (as done for NSB test running now)

LA PALMA ATMOSPHERIC SIMULATION (AN OPTION)

Another option that can be run in parallel:

- run another baseline simulation just changing the full atmospheric transmission profile
- just provide me with an "atm_trans" table that Corsika can ingest

I could probably even do with a MODTRAN transmission table

- we can keep the same density profile at first order
- ightarrow straightforward to setup, fast to run and analyse
- $\rightarrow\,$ could be an interesting option if we want some results shortly. . .