COAST
COrsika dAta accesS Tools

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CORSIKA School 2008, Lauterbad

CORSIKA

CORSIKA

COAST

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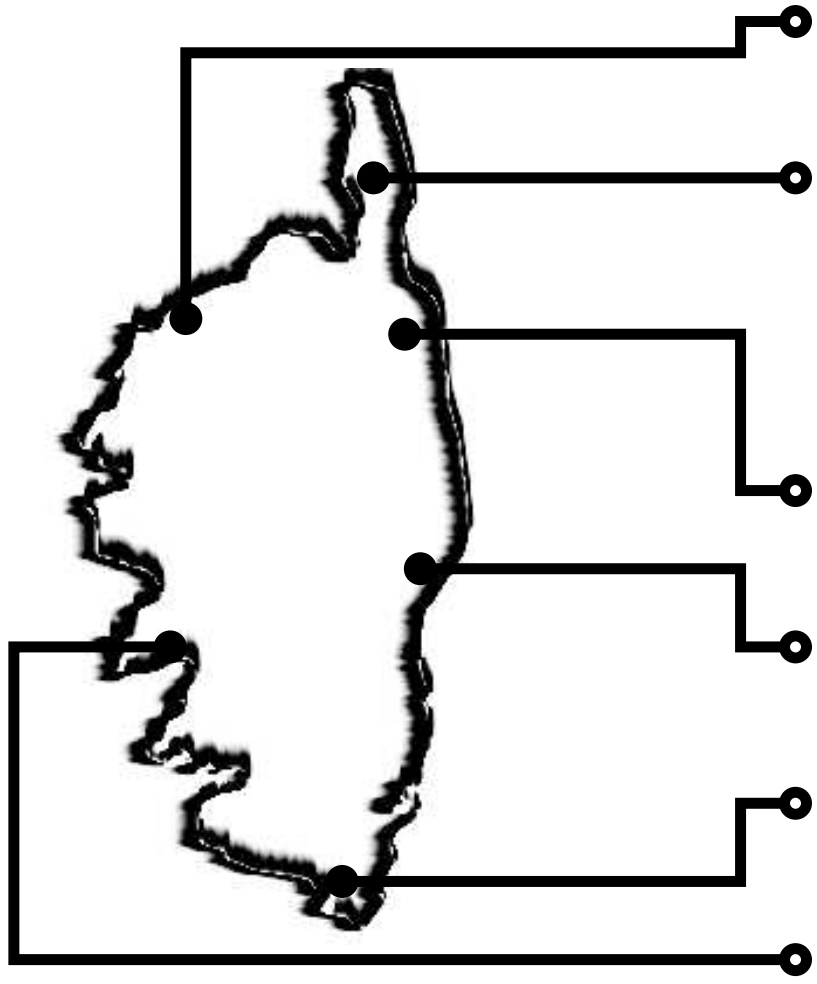


Interface

USER CODE

Level 1 Interface

Functions (C++)

- inida
- wrida
- cloda

Structures (C++ classes)

- TBlock
- TSubBlock

- MRunHeader
- MEventHeader
- MParticleBlock
- MLongitudinalBlock
- MMuonProductionInfo
- MCherenkov
- MPartcle
- MRunEnd
- MEventEnd

- Part of CORSIKA distribution and and build system
- Requires ROOT

Level 2 Interface

Functions (C++)

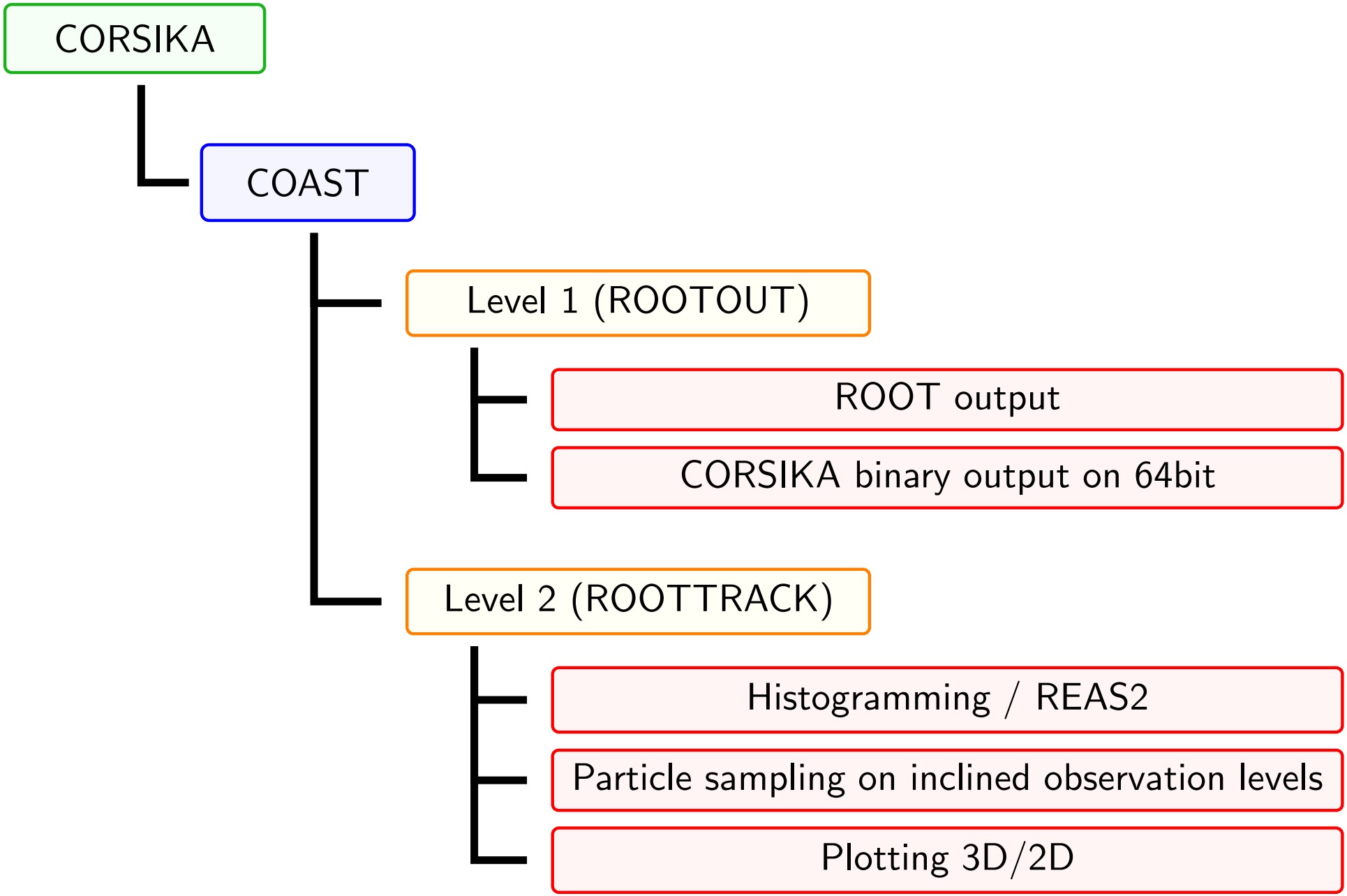
track

Structure (C++ class)

CParticle

- Separate software package
- See: `http://ik-www.fzk.de/~rulrich/coast`
- Part of CORSIKA distribution in the near future

Overview


CORSIKA
COAST
Level 1 (ROOTOUT)
ROOT output
CORSIKA binary output on 64bit
Level 2 (ROOTTRACK)
Histogramming / REAS2
Particle sampling on inclined observation levels
Plotting 3D/2D

How To Use COAST Level 1 Interface

ROOT output

$\Rightarrow$ Select **ROOTOUT** option of CORSIKA

Showers are saved in ROOT TTree structures:

RUNH	$\Rightarrow$	TRun	run.
EVTH+data	$\Rightarrow$	TShower	sim.
		(TParticle TLongitudinal TCherenkov)	

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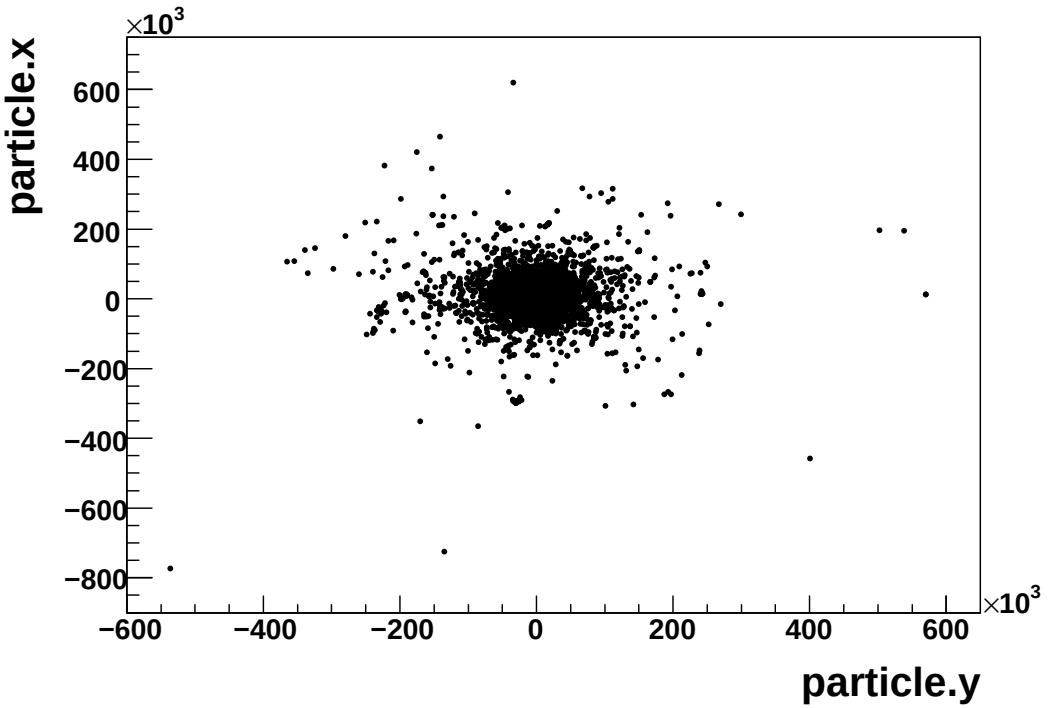
```
sim->Draw("particle.x:particle.y")
```



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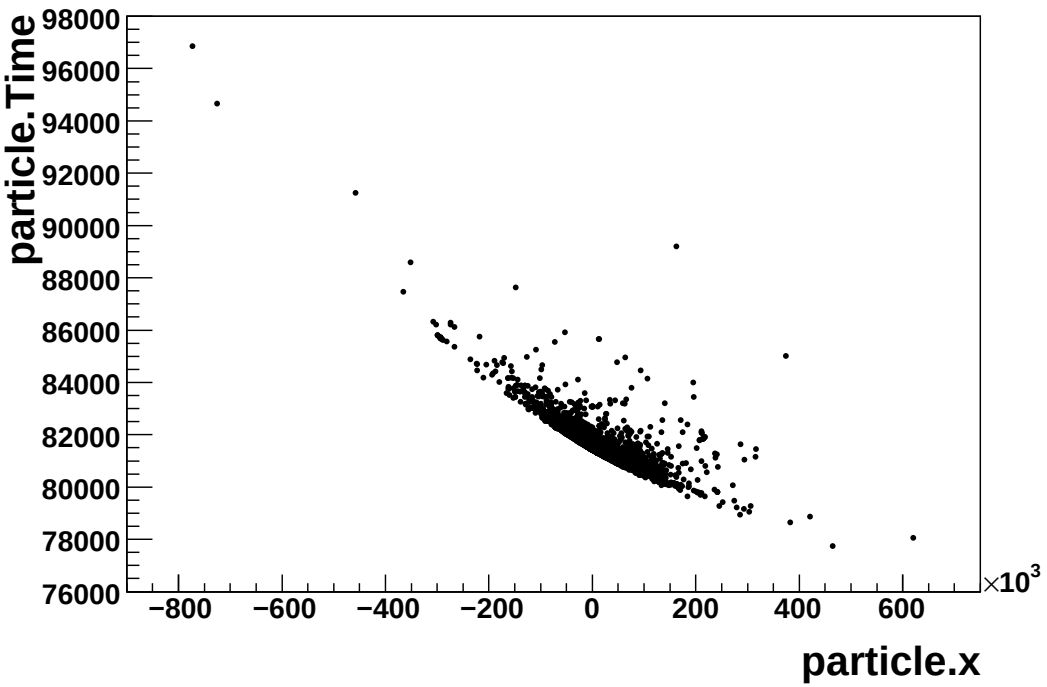
sim->Draw("particle.Time:particle.x")
```



How To Use COAST Level 2 Interface

- Download COAST from `http://www-ik.fzk.de/~rulrich/coast`
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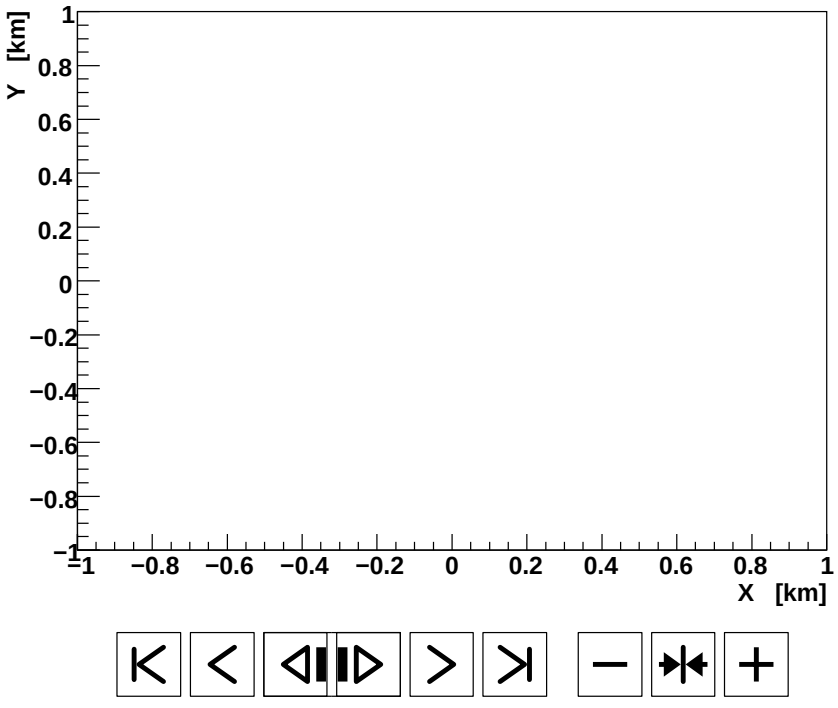
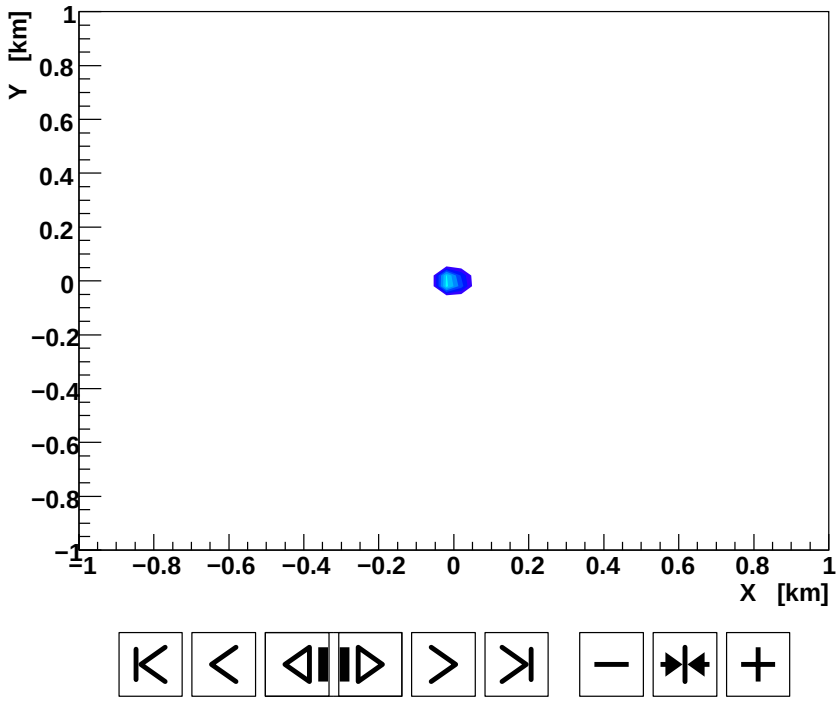
Histogramming

muons

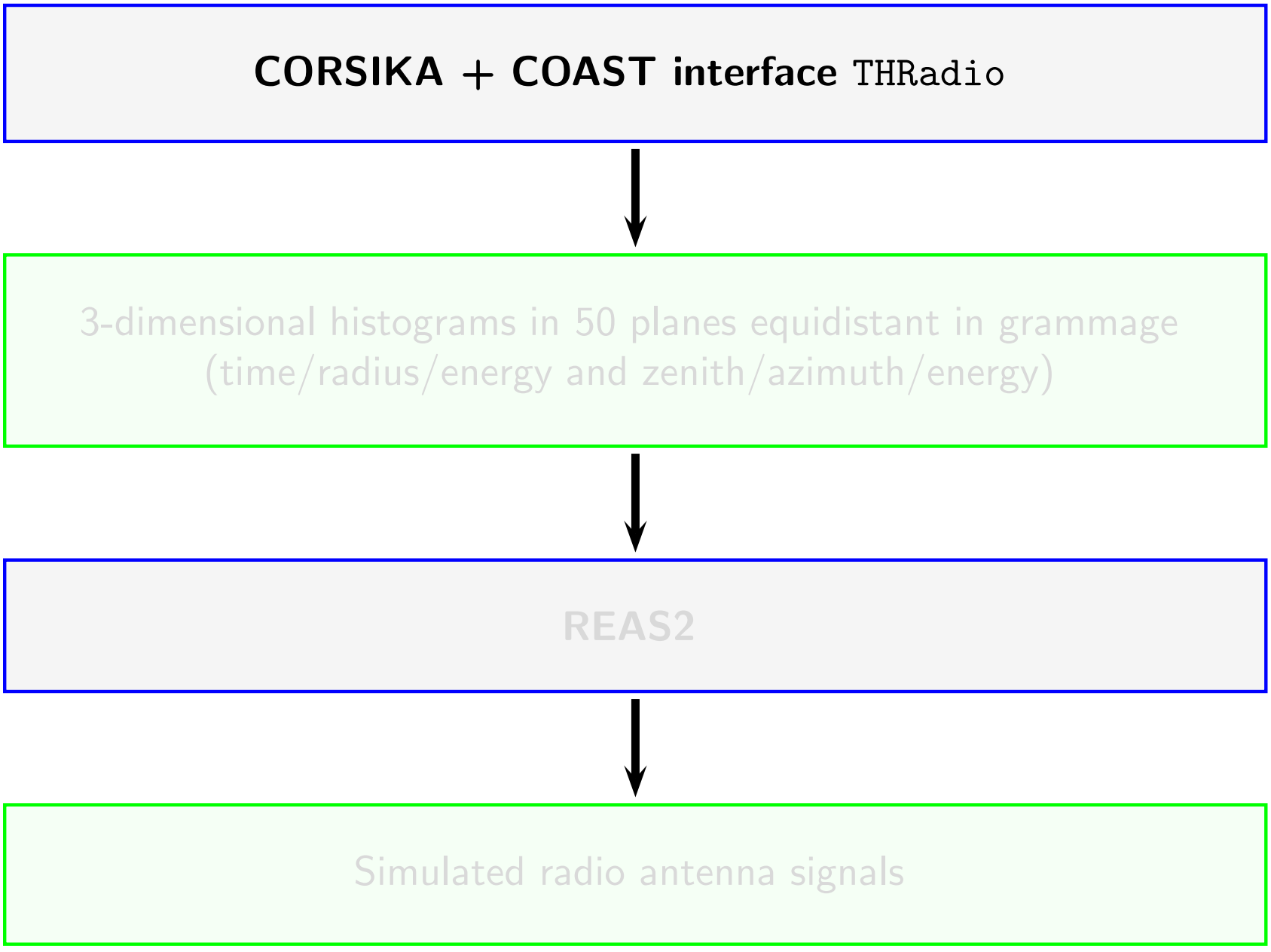


electrons



CORSIKA + COAST interface `Histogram`

Histogramming for Radio Simulation with REAS2



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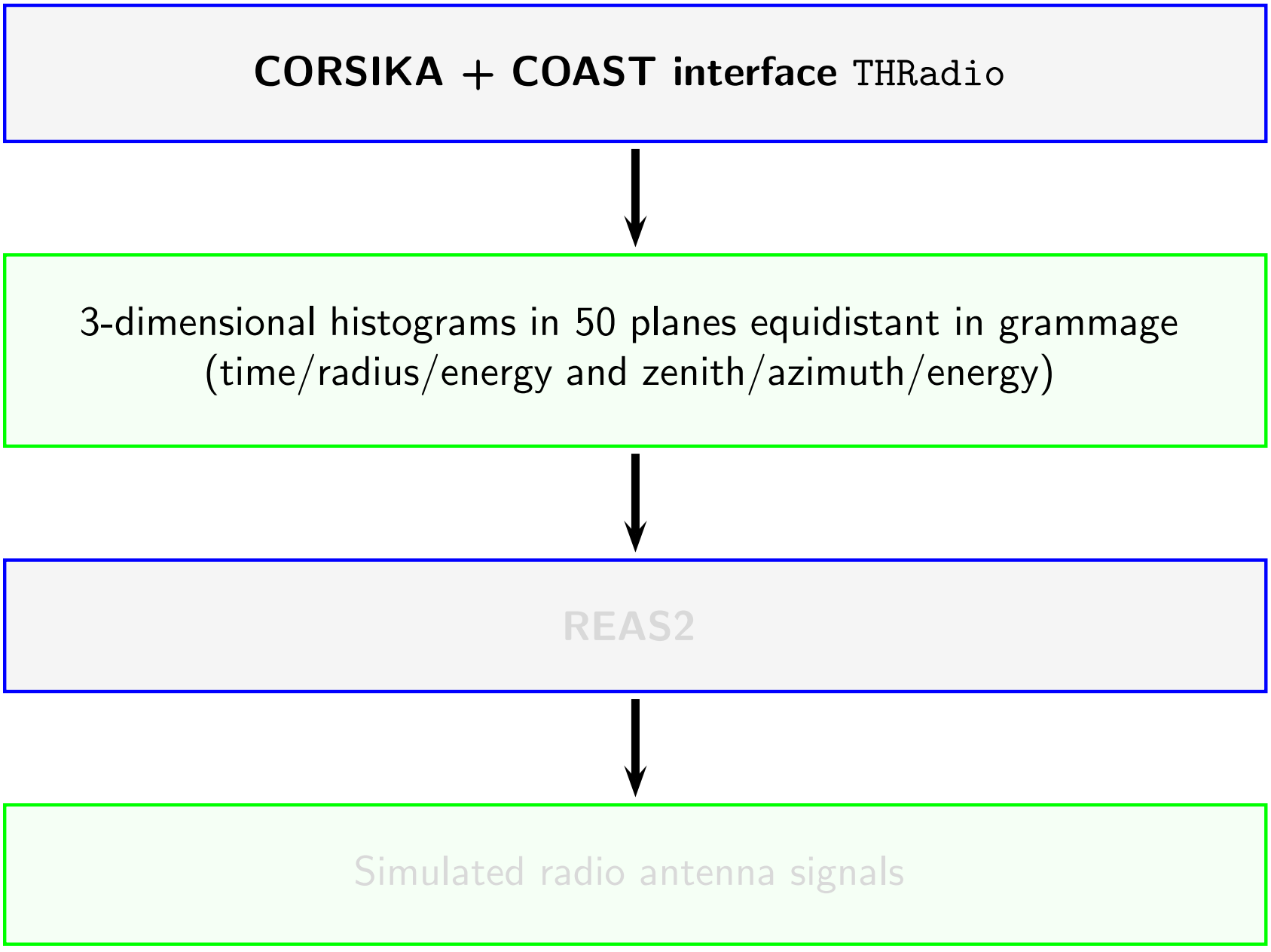

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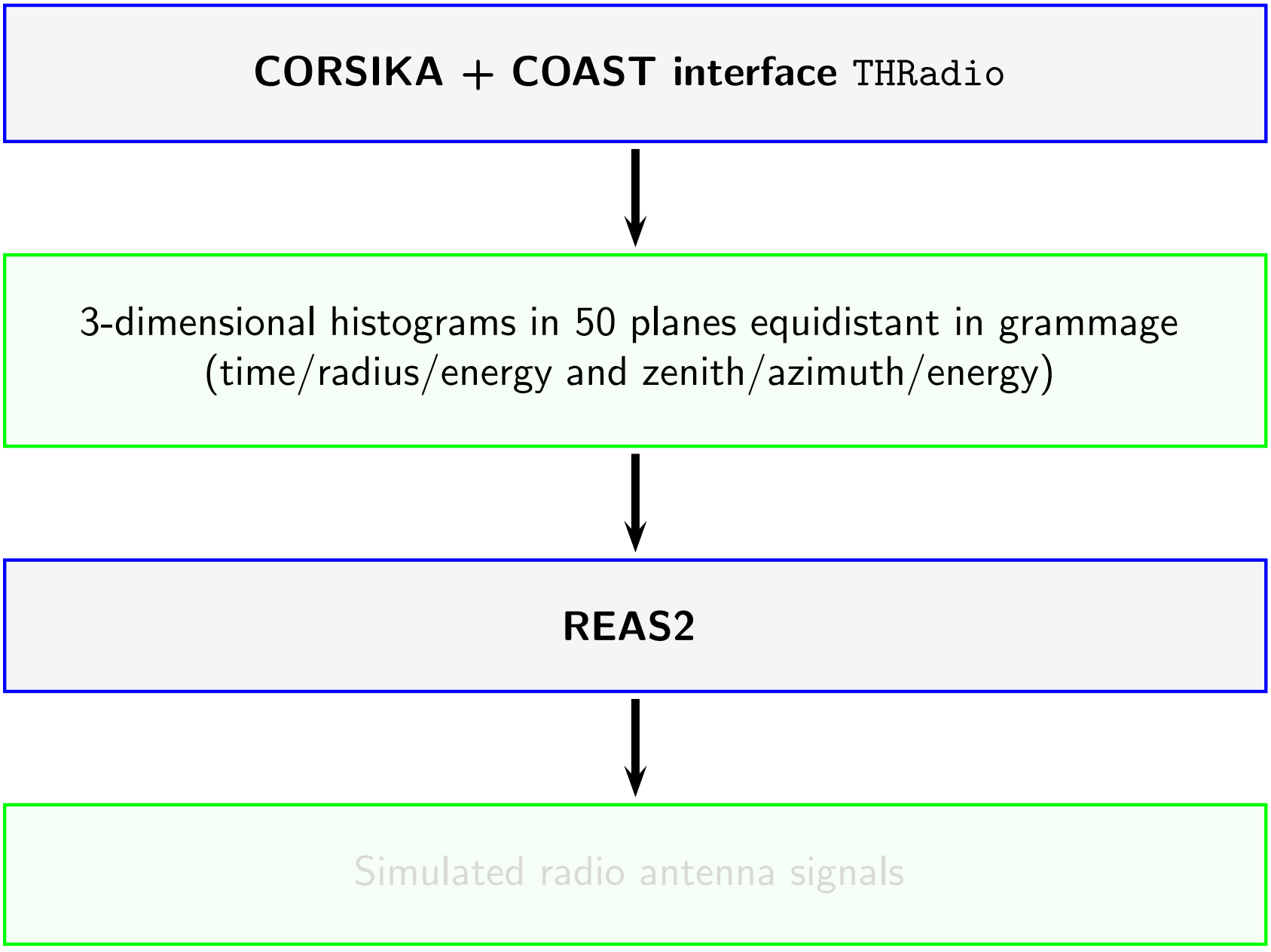

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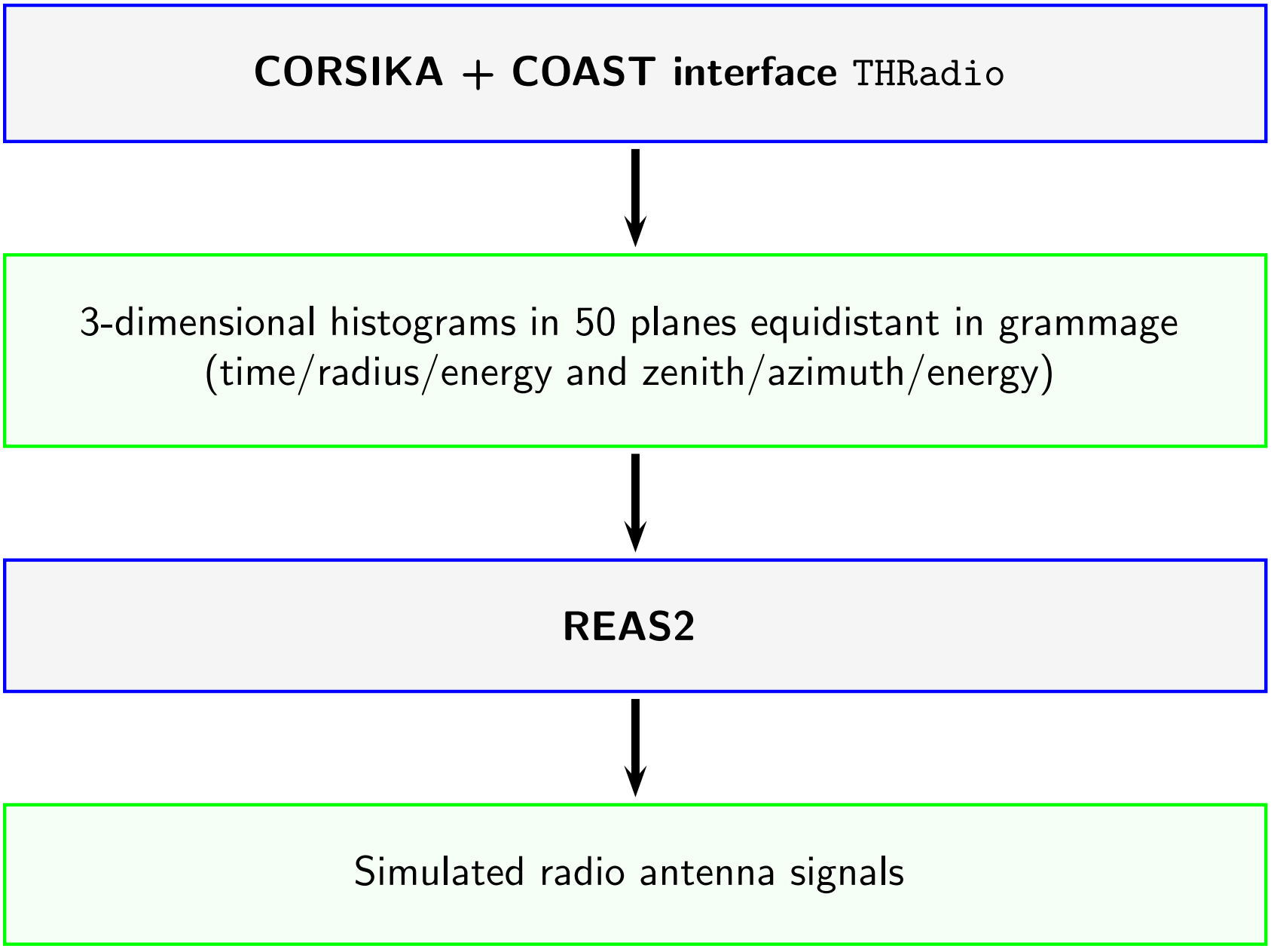
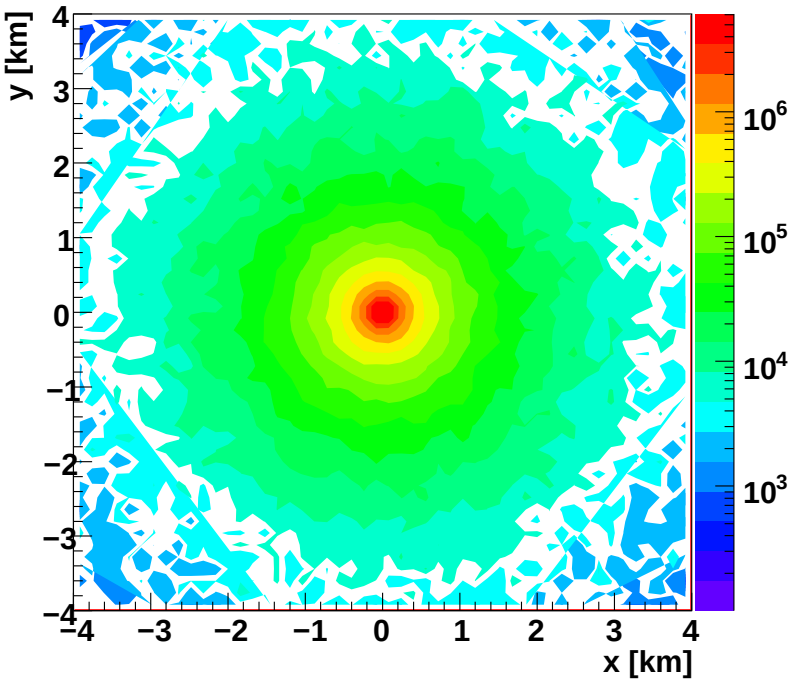
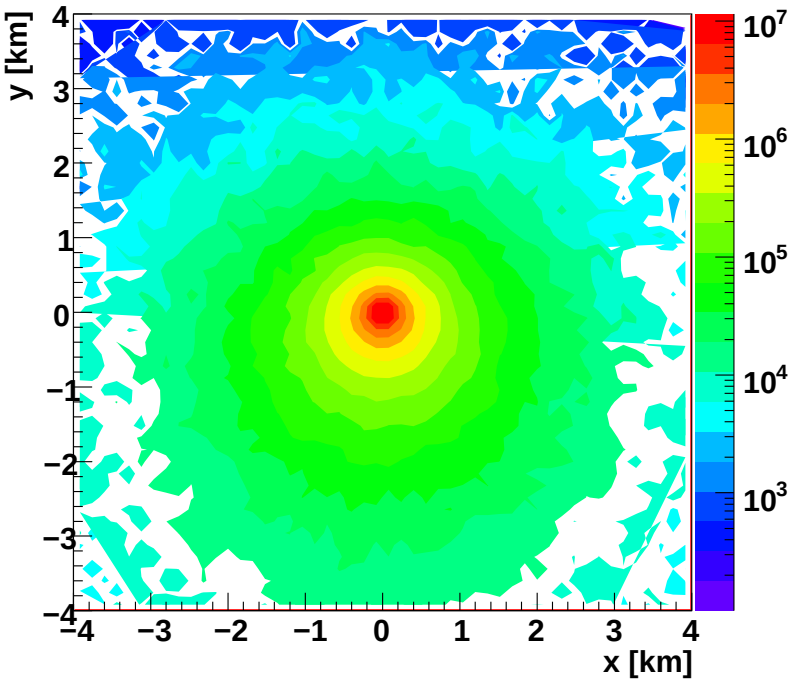


Inclined Observation Levels

Standard observation level
110 m a.s.l.



Inclined observation level
1 km a.s.l., 66° around x-axis



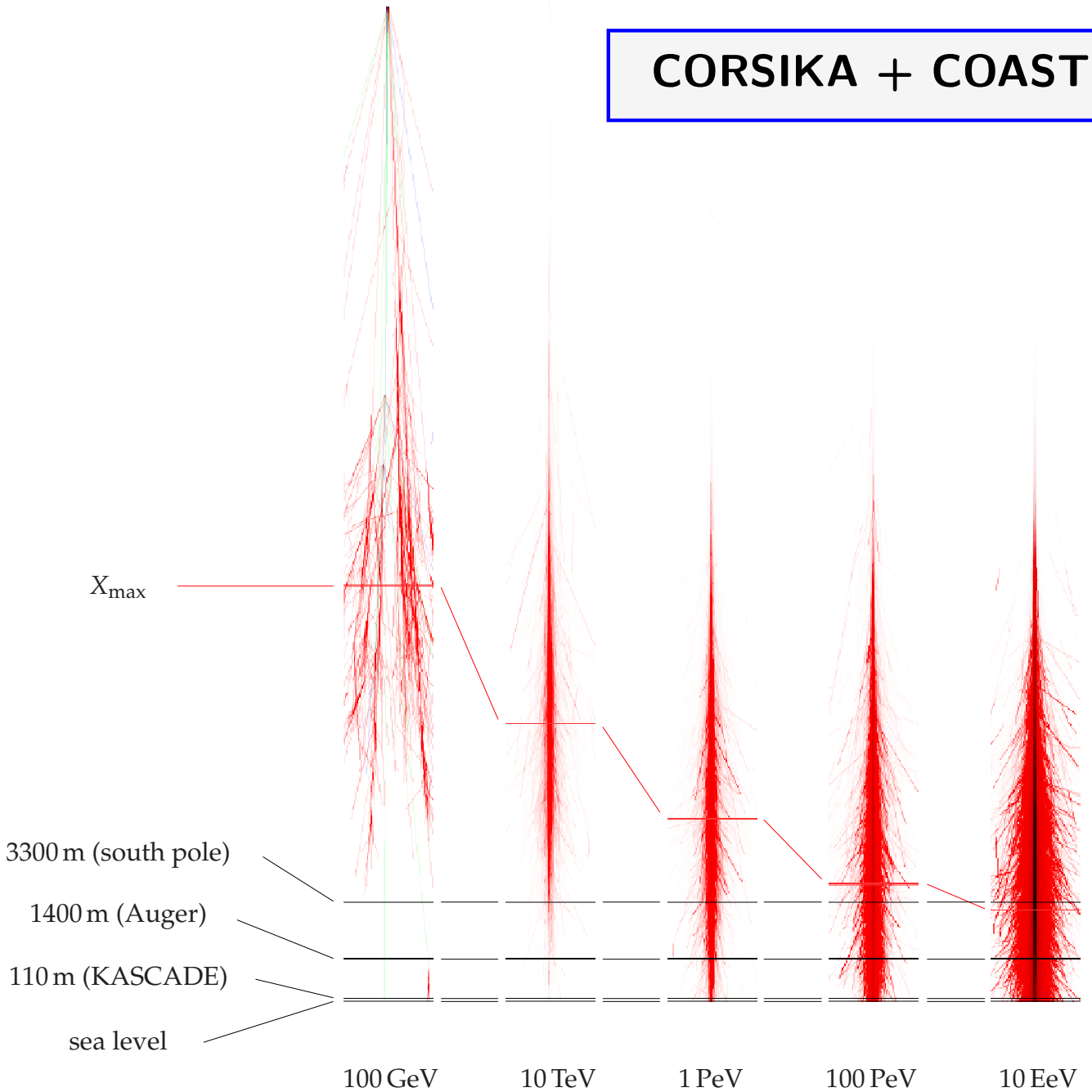
(proton primary at 10^{17} eV)

CORSIKA steering card

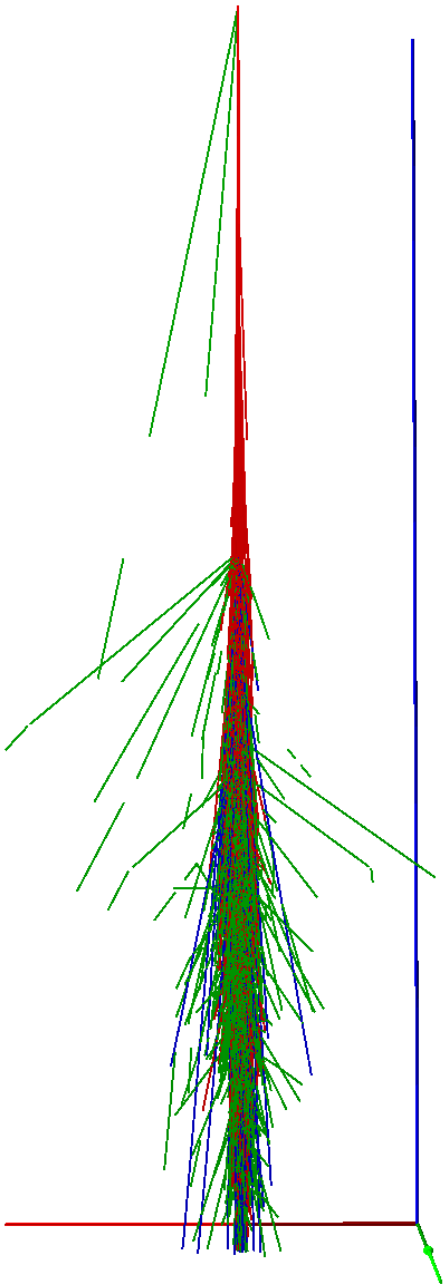
```
INCLIN 0. 0. 1000.E2 0. 0.9165 0.4
OBSLEV 110.E2
...
```

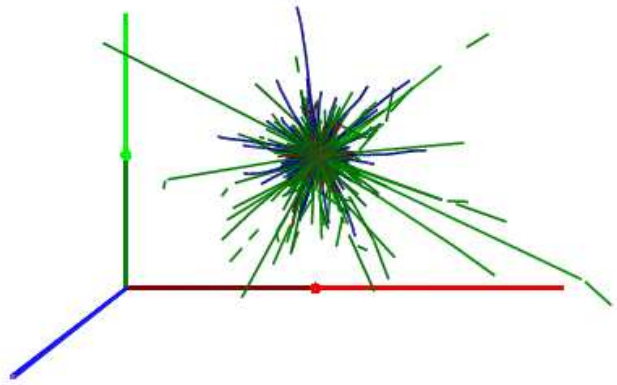
Plotting (2D)

CORSIKA + COAST interface `plot2D`



Plotting (3D)





hadrons muons e.m.

- Full ROOT 3D graphics
- Customize via configuration file `COAST3DConfig.xml`

CORSIKA + COAST interface 3D

COAST Standalone

CORSIKA to ROOTOUT converter

- Convert existing `CORSIKA` output into `ROOTOUT` format
- Tool at `$COAST_DIR/CorsikaToROOT/corsika2root`

CORSIKA binary data reader

- Read `CORSIKA` data
- Auto-detect thinning
- See example at `$COAST_DIR/Documentation/Examples/novice/medium`

CORSIKA binary data writer

- Write `CORSIKA` data format independent of the system
- Compare `COAST` interfaces `MachineIndependent` or `InclinedPlane`

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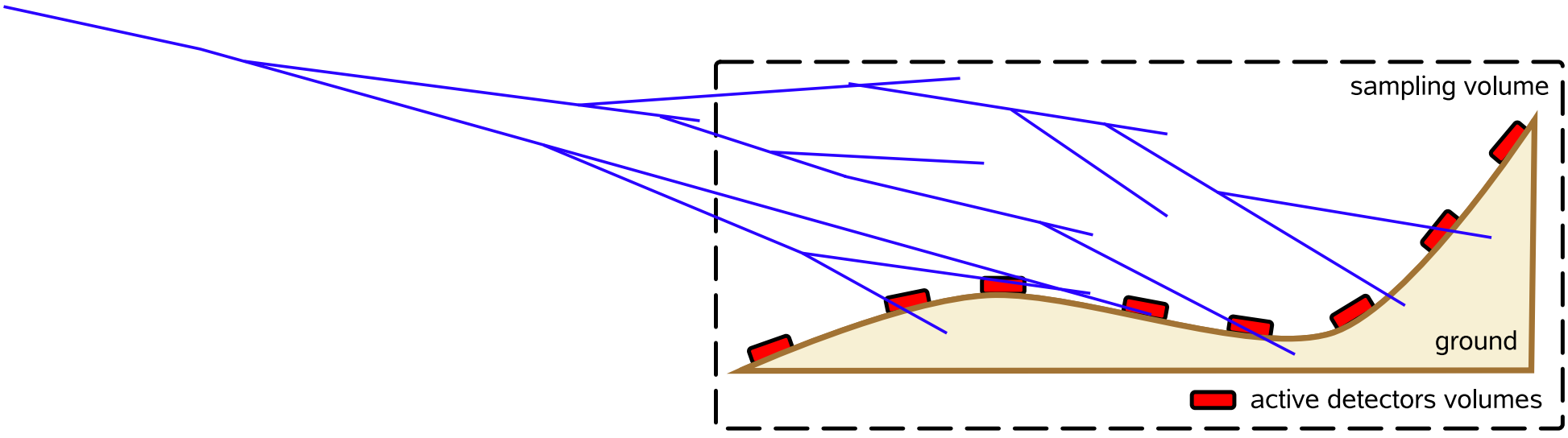
Outlook



Horizontal showers + complicated detector geometry

⇒ Sampling of air showers on flat observation level is not appropriate

⇒ **Volume sampling**

⇒ **Detector Monte-Carlo (e.g. GEANT4) at run-time within CORSIKA**

Summary

COAST provides access to

- CORSIKA binary data-structures (blocks/subblocks)
- CORSIKA particle tracking

For downloads and more documentation see:

`http://www-ik.fzk.de/~rulrich/coast`

Preparation for COAST exercise

Requirements: `ROOT` (histograms) and `gifsicle` (animations, optional)

- Copy `coast-exercise` directory from my USB-stick
- Download `coast-exercise.tar.gz` from `www-ik.fzk.de/~rulrich/coast` and unpack
- ⊕ Read **Requirements** (and **Preparation**) pages of `histogramming.pdf`