




# ADM-Aeolus VAMP Vertical sampling scenarios

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## Content:

- constraints
- range bin scenarios
- note that all this is documented in detail in VAMP TN 1

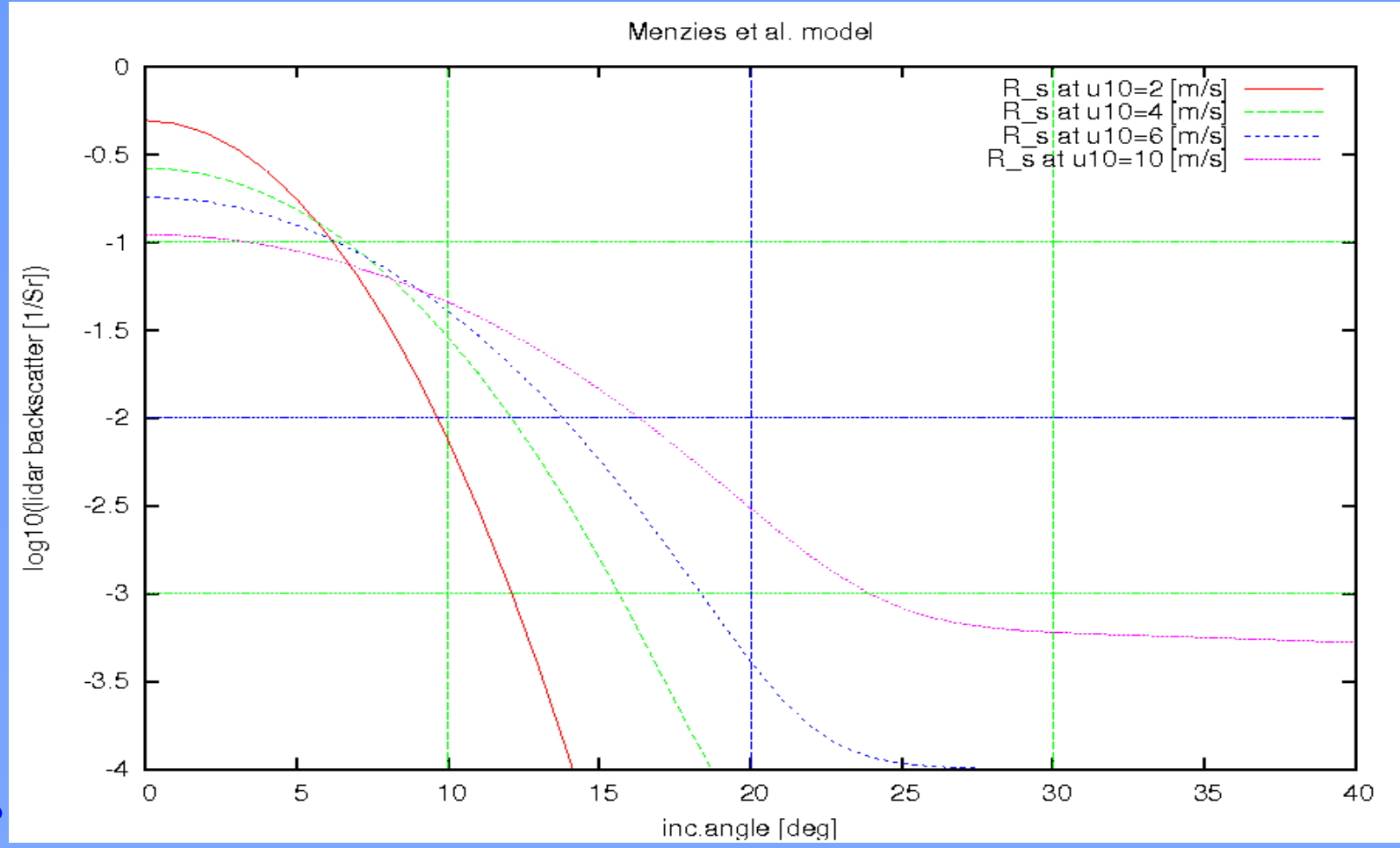
## Constraints:

- operation:
  - switching between scenarios may occur 8 times per orbit  
**on average**
- orbit:
  - on board terrain model has limited accuracy (will use 50x50 km average) => need to project lowest range bin well below the surface to ensure ground reflection
  - orbit will be dawn-dusk, dawn will have different PBL characteristics, convection, cloud presence ...

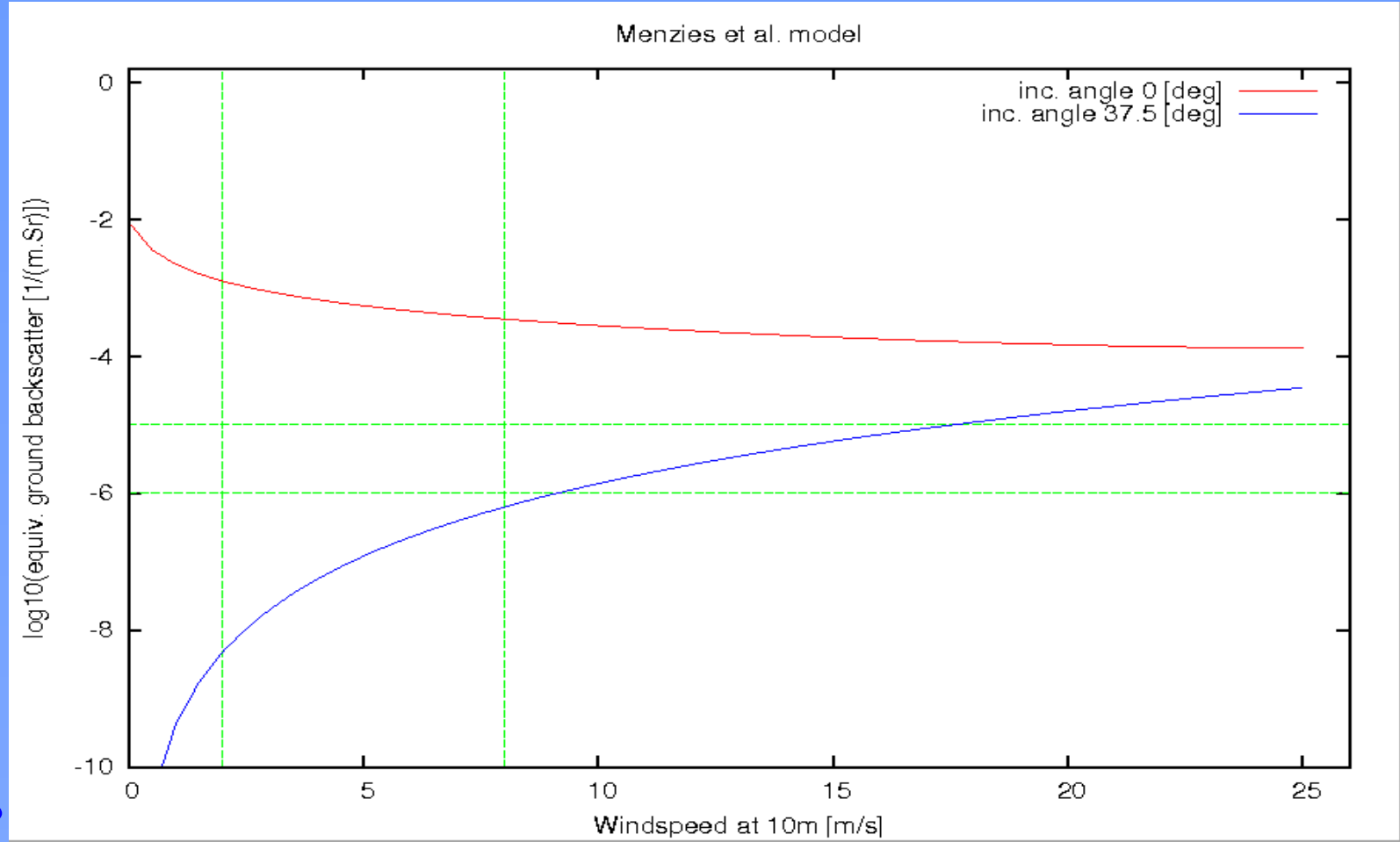
## Constraints:

- instrument:
  - range bins may only be multiple of 250 m
  - largest range bin possible is 2 km
  - maximum allowed altitude is 37 km
- calibration:
  - we need regular ground returns to enable zero wind calibration
  - this is not possible above the ocean

# Reflectivity (Menzies & Tratt):



# Reflectivity (Menzies & Tratt):

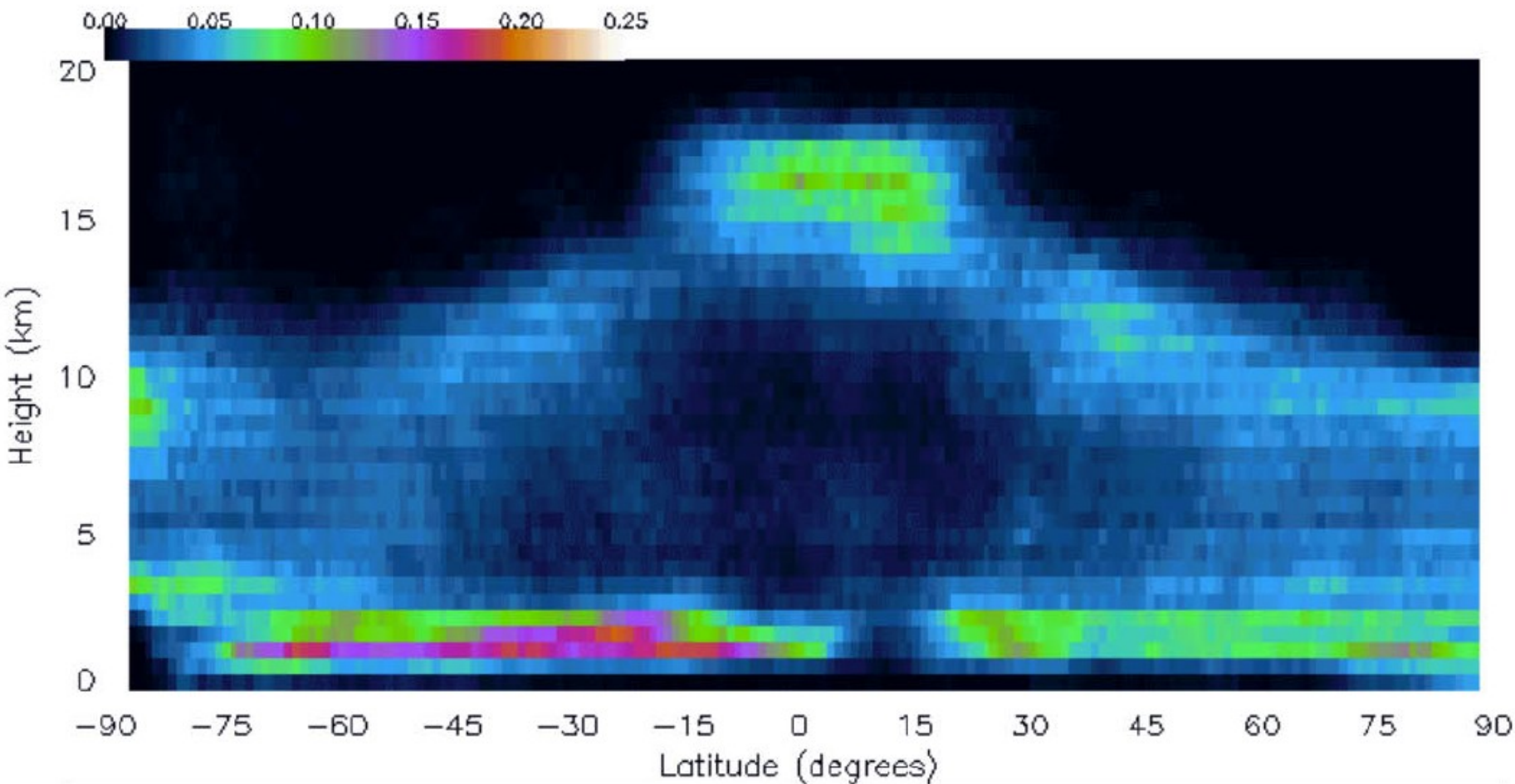


## Constraints:

- processing:
  - matching Rayleigh and Mie range bins as high as possible
  - Mie range bins as small as possible
  - integer matching between Mie and Rayleigh range bins
- atmospheric:
  - Rayleigh range bins above 16km should be 2 km to obtain sufficient signal
  - as much vertical resolution as possible at tropopause level (depending on climate zone)

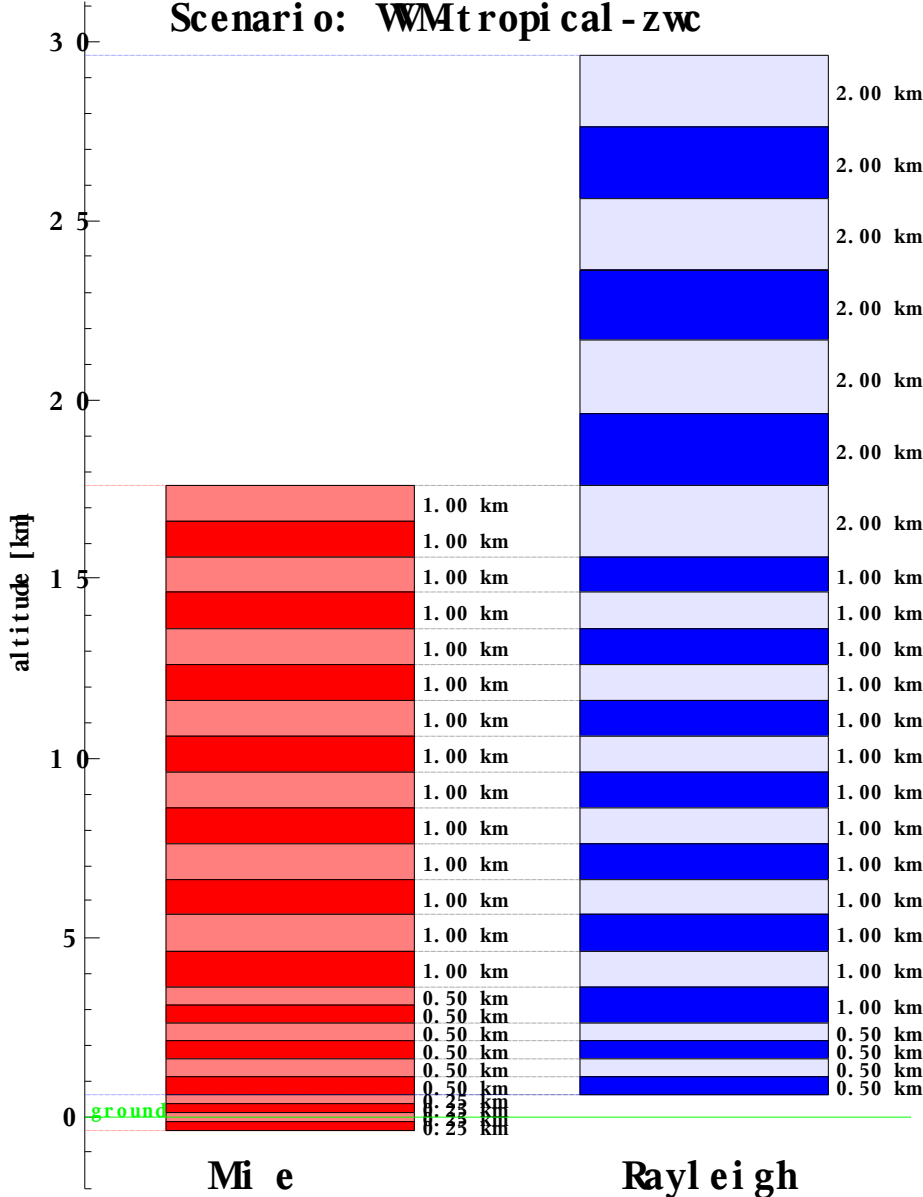


# Cloud statistics (GLAS data, Oct. 2003):

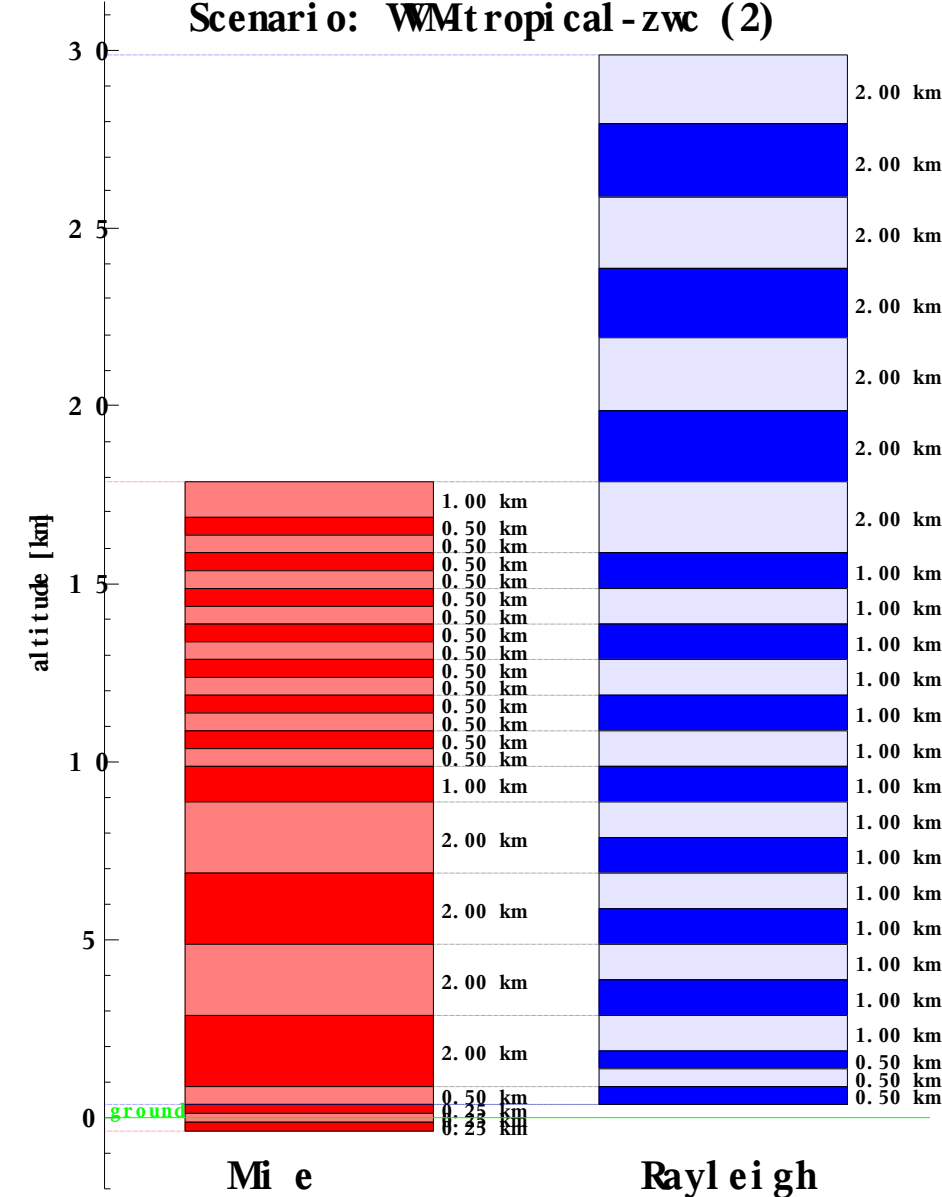




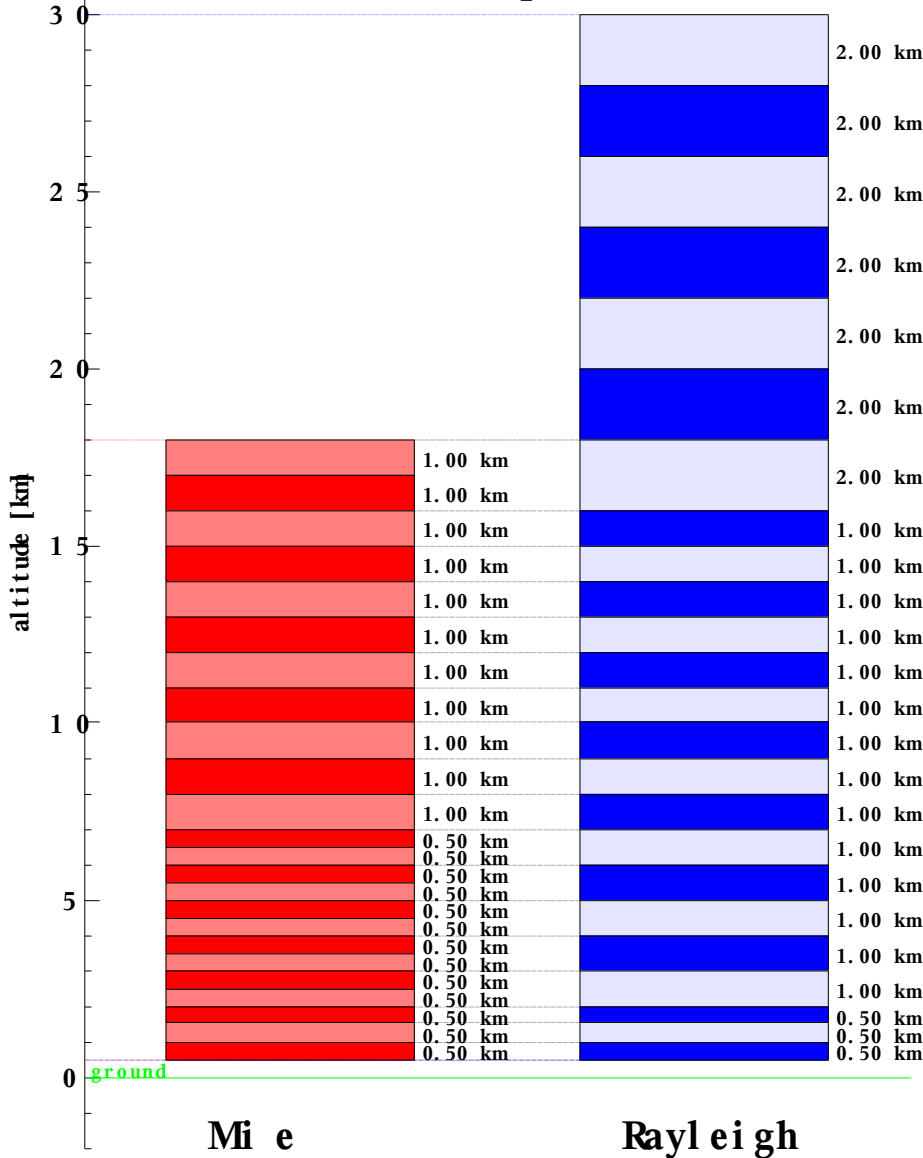
Scenario: WMtropical-zwc



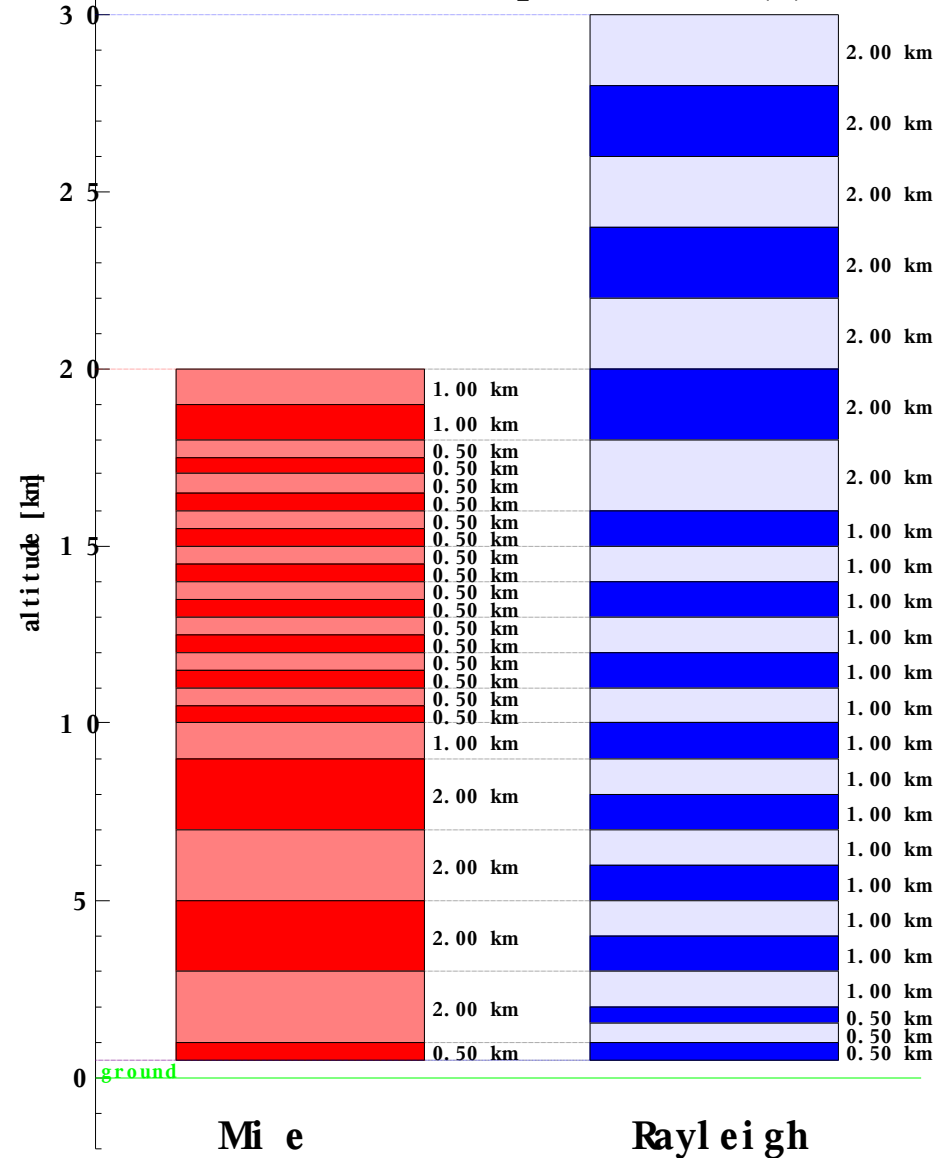
Scenario: WMtropical-zwc (2)



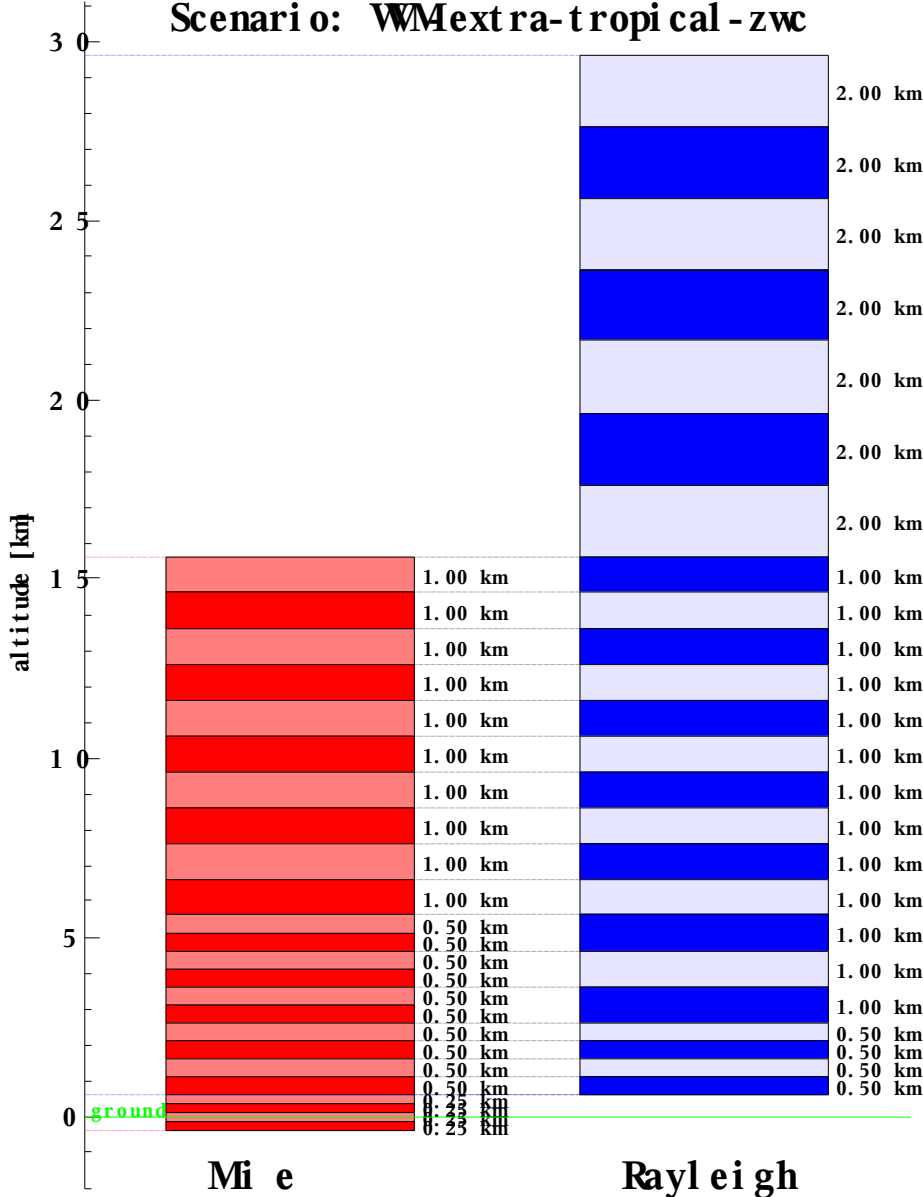
### Scenario: WM tropical - nozwc



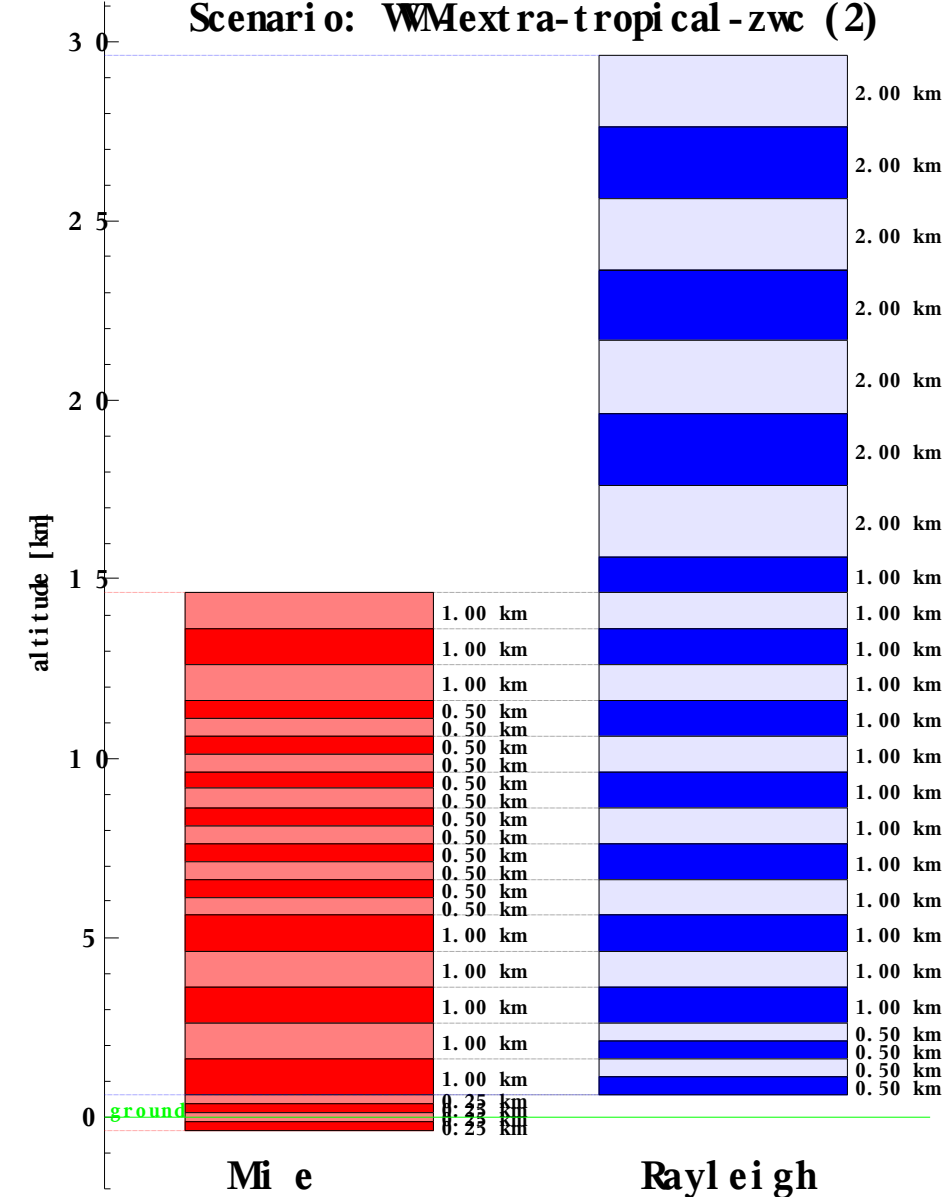
### Scenario: WM tropical - nozwc (2)



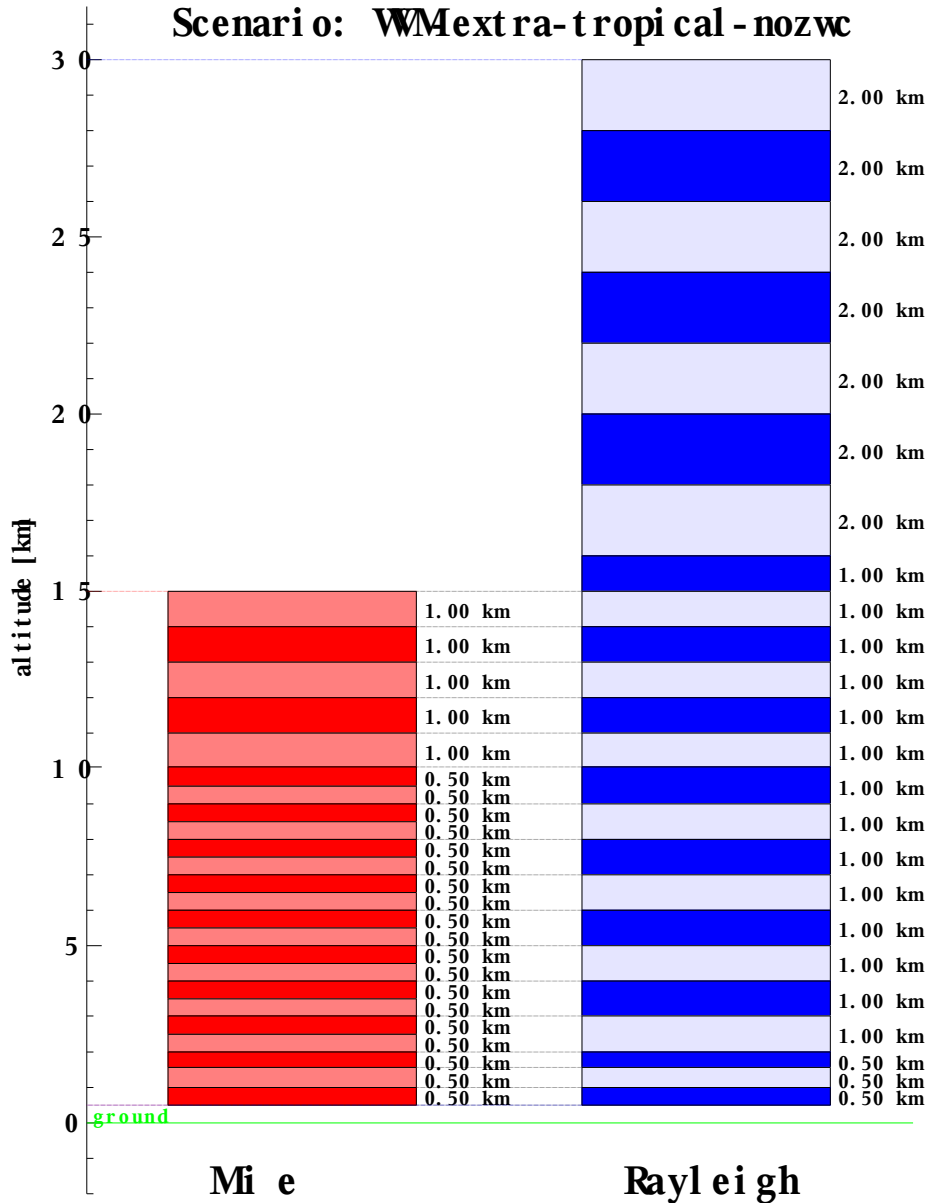
Scenario: WMextra-tropical-zwc



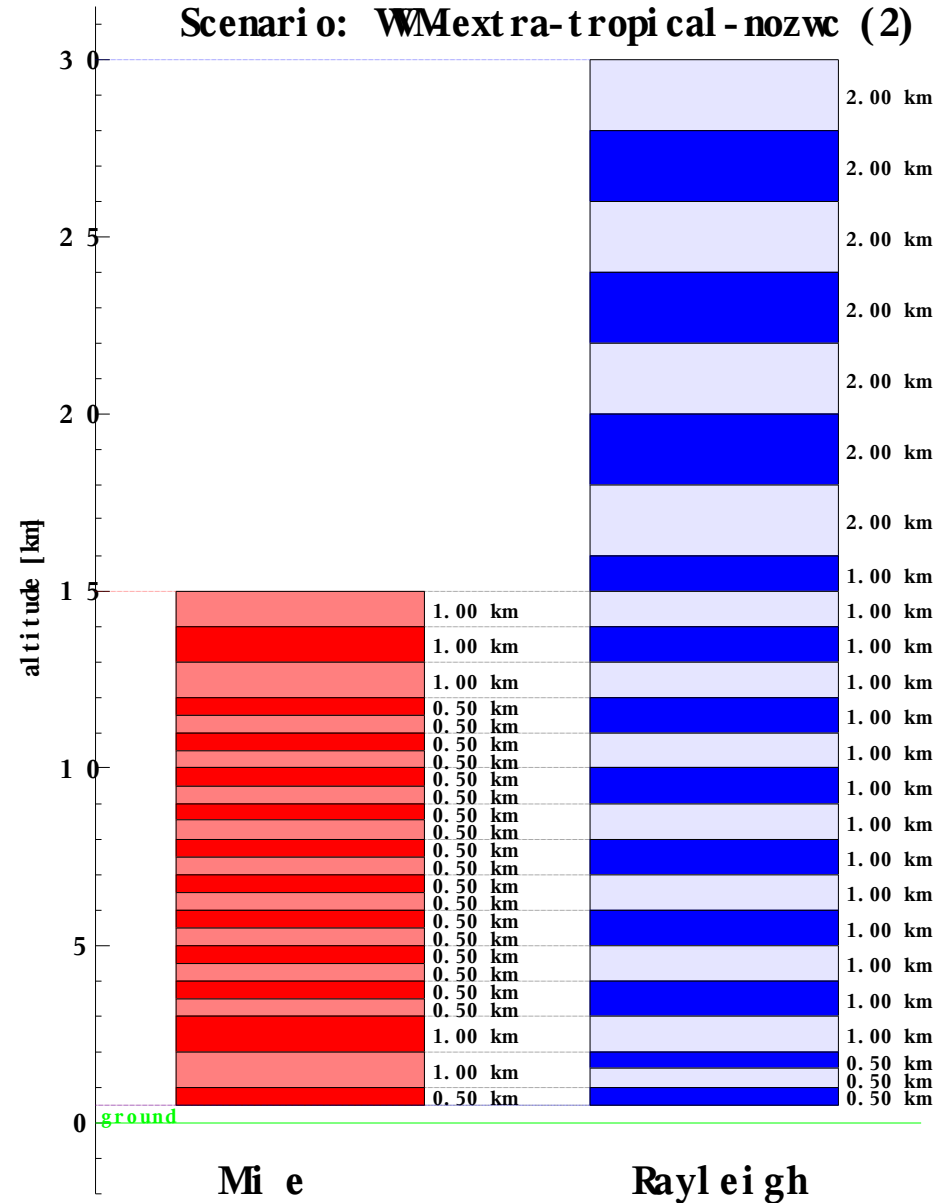
Scenario: WMextra-tropical-zwc (2)



Scenario: ~~W~~Mextra-tropical-nozwc



Scenario: ~~W~~Mextra-tropical-nozwc (2)



## Conclusion

- 2 default range bin definitions
- 8 custom range bin definitions
- questions:
  - what should our switching strategy be?
  - do we need more or different definitions?
  - how to test performance?
  - what figure-of-merit?
  - which software: E2S/L1B/L2B and/or LIPAS



## End of this part

- questions ?



## Running the chain of simulators

- before start of VAMP we had:
- available data
  - ASCII database (KNMI)
  - default input files for E2S, L1B, L2B
  - adapted default input files by ESA
- available software:
  - E2S (GUI, java, c++, matlab): hardware simulation
  - L1B (GUI, java, c++): Lo, L1A, L1B processing
  - L2B (CL, fortran): L2B processing

## Running the chain of simulators

- available tools:
  - conversion ASCII DB to E2S input (matlab, CL, GUI)
  - conversion ASCII DB to L2B input (fortran, CL)
  - creation of E2S scenario input files (matlab GUI)
  - plotting tool (matlab, CL)

**File**

**Define Input Parameters**

Atmosphere: Profile    Atmosphere: Ground

LIDAR Instrument Mode    AOCs Errors

**Manage Scenario**

Current Scenario:

Create/Modify Scenario

**Scenario Editor**

**File**

**Scenario Information**

Scenario:

Operator Name:

Comments:

**Configuration Parameters**

AISP Default Parameters:

AISP Housekeeping Parameters:

AISP Error Default Parameters:

arInstrumentDetectorParameters.xml

y/lidarInstrumentLinkParameters.xml

y/lidarInstrumentMieParameters.xml

arInstrumentRayleighParameters.xml

mentCalibrationModeParameters.xml

**Segment Editor**

**File**

**Segment Information**

Segment ID:

Start Time [yyyy-MM-dd'T'hh:mm:ss.uuuuuu]:

**Segment Parameters**

AOCs Error Param

Atmosphere Profile Param

Atmosphere Cloud Param

Atmosphere Ground Param

LIDAR Instrument Mode Param

AISP Error Param

**Atmosphere Profile Parameters Editor**

**File**

Altitude [km]	HLOS Wind Vel [m/s]	Temperature [C]	Mol Ext [E-6/m]	Mol B.sca [E-6/m/sr]	Aer Ext [E-6/m/sr]	Aer B.sca [E-6/m/sr]
0	0	-1.25	73.991	8.832	0.000	0.000
0.125	0	-1.75	72.985	8.712	0.000	0.000
0.25	0	-2.15	71.955	8.589	0.000	0.000
0.375	0	-2.65	70.933	8.467	0.000	0.000
0.5	0	-3.05	69.919	8.346	0.000	0.000
0.625	0	-3.45	68.922	8.227	0.000	0.000
0.75	0	-3.95	67.951	8.111	0.000	0.000
0.875	0	-4.35	66.996	7.997	0.000	0.000
1	0	-4.75	66.066	7.886	0.000	0.000
1.125	0	-5.25	65.127	7.774	0.000	0.000
1.25	0	-5.65	64.206	7.664	0.000	0.000
1.375	0	-6.15	63.293	7.555	0.000	0.000
1.5	0	-6.55	62.379	7.446	0.000	0.000
1.625	0	-6.95	61.466	7.337	0.000	0.000
1.75	0	-7.45	60.570	7.230	0.000	0.000
1.875	0	-7.85	59.690	7.125	0.000	0.000
2	0	-8.35	58.836	7.023	0.000	0.000
2.125	0	-8.75	57.990	6.922	0.000	0.000
2.25	0	-9.25	57.152	6.822	0.000	0.000
2.375	0	-9.75	56.339	6.725	0.000	0.000
2.5	0	-10.25	55.553	6.631	0.000	0.000

Interpolate HLOS Wind Velocity Along Track     Interpolate Temperature Along Track

Interpolate Mol Extinction Along Track     Interpolate Mol Backscatter Along Track

Interpolate Aer Extinction Along Track     Interpolate Aer Backscatter Along Track

```

3:48pm bhw034 1942 >xv
3:49pm bhw034 1943 >cp VAMP
3:49pm bhw034 1944 >o VAMP
input file: VAMP_PM1_JdeK1
Suffix = ODP
starting OpenOffice
[1] 20152
3:49pm bhw034 1945 >pwd
/usr/people/kloedej/presen
3:54pm bhw034 1946 >o Menz
input file: Menzies_Windsp
Suffix = EPS
starting ghostview
[1] 20210
3:54pm bhw034 1947 >xv
3:55pm bhw034 1948 >xv

```

L1BP HMI Main Panel

File JobOrder Edit View Log

Job Order: b/L1BP/MDA\_DEL\_V1.08\_Runtime/etc/JobOrder.99994.xml

Processing Stage: Job Order Loaded

Generate Products

Process All

Process L0    Process L1A    Process L1B/Cal

Stop

my little menu

Process.py

Run\_E2S\_L1B\_L2B.py

VAMP

bhw034    L1BP    Job Order Ed

Move    Kill    Xterm

EXIT    Restart    Dummy

Quit

cpu use

Mijn UK

Inbox f

Job Order Editor

File

Job Order

- <lplf\_Job\_Order>
  - <lplf\_Conf>
    - <Processor\_Name>: AE\_RAW\_L1B\_WIND
    - <Version>: 01.08
    - <Order\_Type>: OPER
    - <Stdout\_Log\_Level>: INFO
    - <Stderr\_Log\_Level>: NOOP
    - <Test>: false
    - <Breakpoint\_Enable>: false
    - <Acquisition\_Station>: Kiruna
    - <Processing\_Station>: Esrin
    - <Config\_Files>:
    - <Sensing\_Time>
      - <Start>: 20071002\_000005000000
      - <Stop>: 20071002\_012018000000
    - <List\_of\_lplf\_Procs [count="4"]>
      - <lplf\_Proc>
        - <Task\_Name>: IPF1\_RAW\_L0
        - <Task\_Version>: 01.08
        - <Breakpoint>
          - <List\_of\_Brk\_Files [count="0"]>

Browse

### CreateDataInterface

Parameters

scenario Name   mie contribution

data directory    AllNoise

start Time   PoissonNoise

duration segment   Aocs Errors

N  P   Interpolation

nbRand   Reset Counter

Running

- Scenario Creation
- E2S Simulator
- Generate JobOrder
- L1B Processors
- Random Noise to L1A data

Status

File Edit Debug Desktop Window Help

Current Directory: [ ]

Shortcuts How to Add What's New

Help

Help Navigator

Workspace

Name	Value	Size	Class
ans	'/nobackup/us...	1x44	char

Current Directory Workspace

Command History

```

-- 3/03/08 12:39 PM --
-- 3/3/08 4:13 PM --
  CreateDataInterface.m
  pwd
  cd INTERFACE
  cd ..
  cd INTERFACE/
  1s
  CreateDataInterface.m
  CreateDataInterface
  1s ..
  1s ../CREATIONDATA/
  ../CREATIONDATA/DefinePaths
-- 3/3/08 4:17 PM --
  pwd
  cd ../INTERFACE/
  ./CreateDataInterface
  CreateDataInterface

```

```

To
MAT

To

>> pw

ans =

/nobackup/users/matlab/MATLABT00LS_1.1/T00LS

>> cd ../INTERFACE/
>> ./CreateDataInterface
??? ./CreateDataInterface
|
Error: Unexpected MATLAB operator.

>> CreateDataInterface

SimPathL1b =

/nobackup/users/matlab/L1BP/DEL_V1.3/Installation

SimPathL1b =

/nobackup/users/matlab/L1BP/DEL_V1.3/Installation

SimPathL1b =

/nobackup/users/matlab/L1BP/DEL_V1.3/Installation

>>

```

bhw034

bhw034 bhw03 MATL CreateDataInterface

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## Limitations of GUI's:

- large amount of mouse actions, pointing and clicking, needed to fill in many fields
- only those settings can be changed that have been anticipated in the GUI
- making a test **reproducible** is extremely hard
- creating a new test scenario with only small differences, still requires a lot of work ....

## Dedicated test script (1):

- we needed a test script to circumvent all these gui's
- it should enable us to:
  - define a test sequence for given input data and software versions
  - rerun easily when only one switch changes (for example a range bin setting or a noise switch)
  - rerun easily all previously defined tests when one of the software components is updated
  - keep the tests in cvs to ensure reproducibility

## Dedicated test script (2):

- script language: python
- first created a toolbox to do basic actions:
  - unpacking zip/tgz files
  - copying files
  - creating symbolic links and directories
  - ensure permissions are correct
  - checks to see if input files are present
  - checks to verify all output files have been generated
  - modifications to xml files

## Dedicated test script (3):

- this toolbox is then used to:
  - install each piece of software
  - insert required new default files
  - set paths to data
  - correct bugs/errors in input files
  - set all required switches in the xml files
  - run each piece of software
  - do some timing
- verbosity of logging info is adjustable
- option: export all actions to csh script

## Dedicated test script (4):

- test sequence will be:
  - Atm.Profile converter
  - E2S (2 steps: DataGenerator/DownlinkFormatter)
  - L1B (3 steps: Lo, L1A, L1B)
  - Atm.DB-to-AuxMet converter
  - L2B
- several todo's
- DEMO



# The end

- questions ?

