Hans-Ertel-Zentrum
für Wetterforschung

1st DYAMOND Hackathon

DKRZ
DEUTSCHES
KLIMARECHENZENTRUM

Max-Planck-Institut
für Meteorologie

1ST HACKATHON!

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- 20.08 13h – 21.08 15h (26h)
- Catered food (dinner, breakfast, lunch)
- Sleeping in offices
- 31 Participants
  - MPI scientists 13
  - UH 7
  - Extern 4
  - MPI sci. prog. 5
  - DKRZ 2

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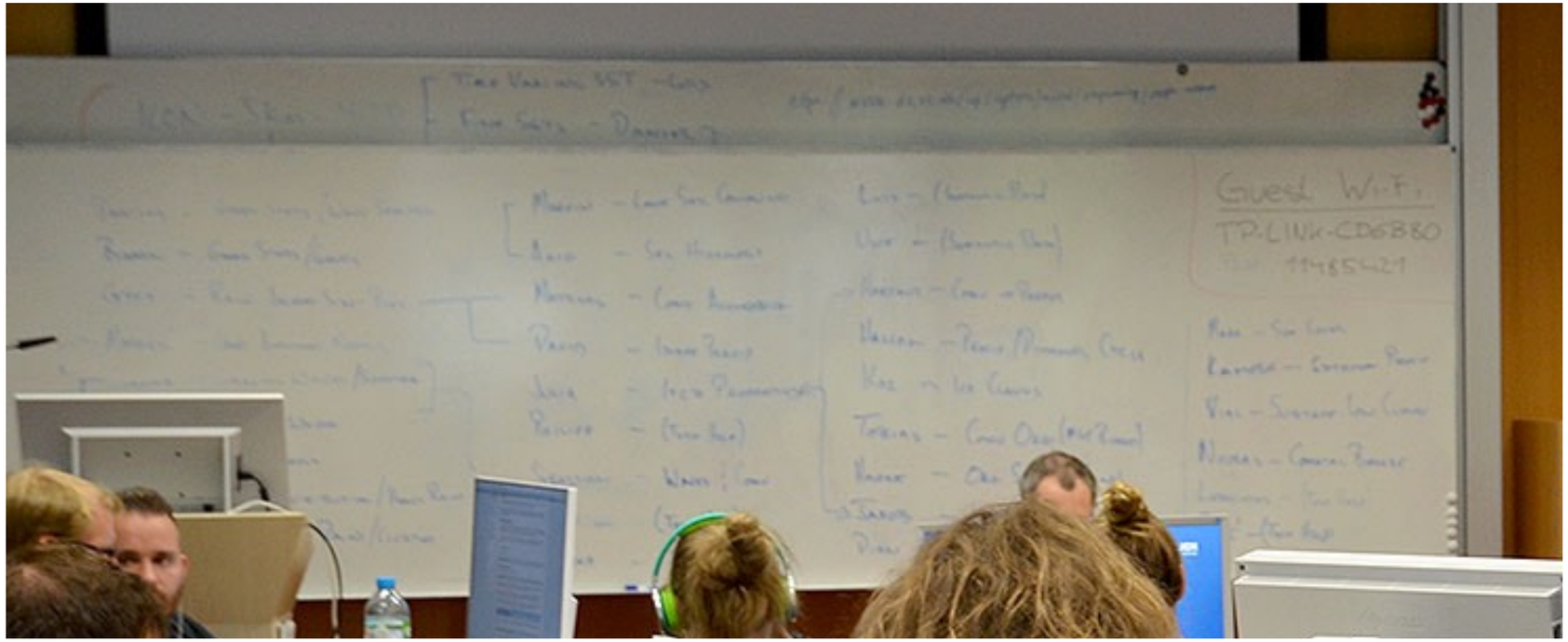
- Collection of ideas, building up teams



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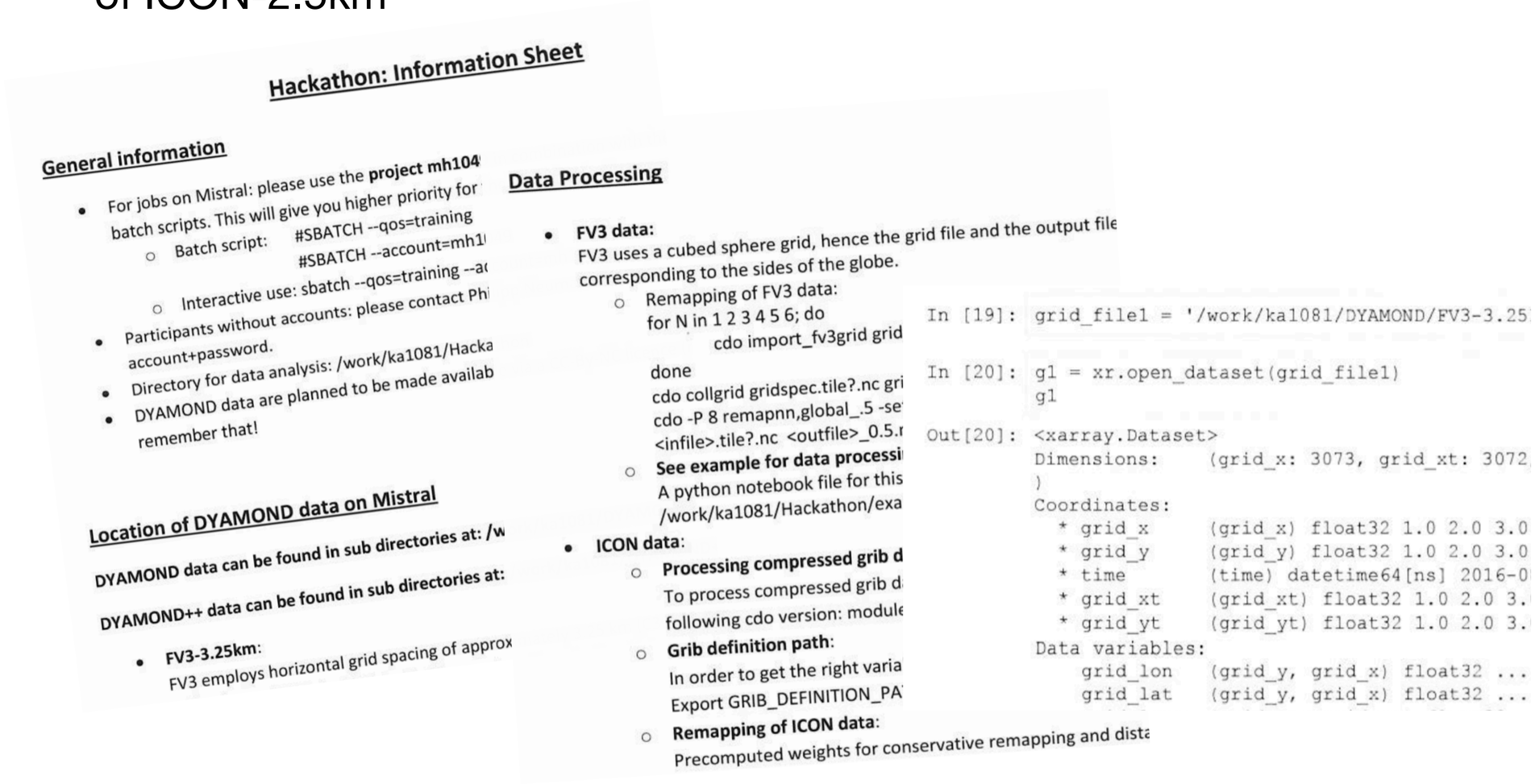
- Short introduction about the data
- FV3, SAM, NICAM-7km, ICON-5km and 4 days of ICON-2.5km



Hackathon: Information Sheet

General information

- For jobs on Mistral: please use the **project mh104** batch scripts. This will give you higher priority for
  - Batch script: #SBATCH --qos=training
    #SBATCH --account=mh1
  - Interactive use: sbatch --qos=training --a
- Participants without accounts: please contact Ph account+password.
- Directory for data analysis: /work/ka1081/Hacka
- DYAMOND data are planned to be made availab remember that!

Location of DYAMOND data on Mistral

DYAMOND data can be found in sub directories at: /w

DYAMOND++ data can be found in sub directories at:

- **FV3-3.25km**:
  FV3 employs horizontal grid spacing of approx

Data Processing

- **FV3 data:**
  FV3 uses a cubed sphere grid, hence the grid file and the output file corresponding to the sides of the globe.
  - Remapping of FV3 data:
    for N in 1 2 3 4 5 6; do
    cdo import_fv3grid grid
    done
    cdo collgrid gridspec.tile?.nc gri
    cdo -P 8 remapnn,global_.5 -se
    <infile>.tile?.nc <outfile>_0.5.
  - **See example for data processi**
    A python notebook file for this
    /work/ka1081/Hackathon/exa
- **ICON data**:
  - **Processing compressed grib d**
    To process compressed grib d
    following cdo version: module
  - **Grib definition path**:
    In order to get the right varia
    Export GRIB_DEFINITION_PA
  - **Remapping of ICON data**:
    Precomputed weights for conservative remapping and dista

```
In [19]: grid_file1 = '/work/ka1081/DYAMOND/FV3-3.25

In [20]: g1 = xr.open_dataset(grid_file1)
         g1

Out[20]: <xarray.Dataset>
         Dimensions:     (grid_x: 3073, grid_xt: 3072
         )
         Coordinates:
           * grid_x      (grid_x) float32 1.0 2.0 3.0
           * grid_y      (grid_y) float32 1.0 2.0 3.0
           * time        (time) datetime64[ns] 2016-0
           * grid_xt     (grid_xt) float32 1.0 2.0 3.
           * grid_yt     (grid_yt) float32 1.0 2.0 3.
         Data variables:
             grid_lon    (grid_y, grid_x) float32 ...
             grid_lat    (grid_y, grid_x) float32 ...
```

1ST HACKATHON - TOPICS

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Teams and scientific questions or interests

Christopher Moseley, Chao Li, Kameswarrao Modali and Shabeh Hasson

Analyzing the capability of various High resolution models in capturing the extreme precipitation events (Hackathon_Extreme_Precip_v1.2.pdf)

Matthias Brueck, David Leutwyler, Cathy Hohenegger

How is convective aggregation represented in 5 storm resolving models - a first glance into Dyamond

Tobias Becker

How can tropical precipitating convection be linked to the thermodynamic environment it occurs in, and how compares this in the different convection-permitting global models that take part at DYAMOND, also with respect to convective aggregation

Claudia Stephan, Cornelia Strube and Daniel Klocke et al.

Comparison of tropical gravity waves in High-resolution ICON simulations with explicit and parameterized convection (Hackathon_Cstephan.pdf)

Jessica Vial, Hauke Schulz, Daniel Klocke and Bjorn Stevens

Variability of trade-wind cloudiness (hackathon_summary.pdf)

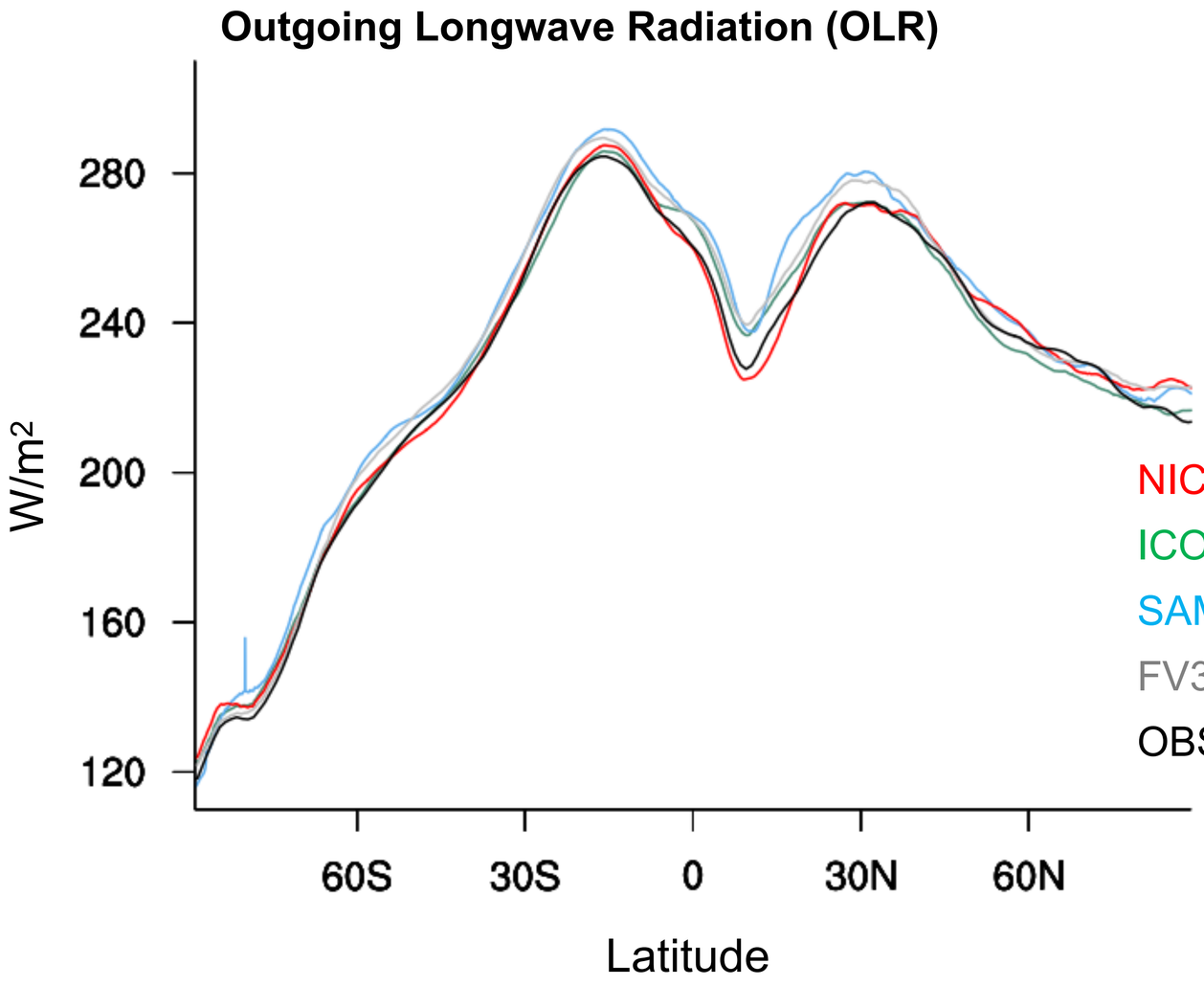
Akio Hansen and Marvin Heidkamp

Precipitation Quicklook Movie:
https://swift.dkrz.de/v1/dkrz_1e33ba3a-9ecb-452f-93b9-583cf4a66e57/Dyamond/Precip_Dyamond_AllModelsGPM_movie.mp4

Making the vast amount of DYAMOND data accessible by generating easily accessible Quicklook movies for several parameters (Summary_Hackathon_AkioMarvin.pdf)

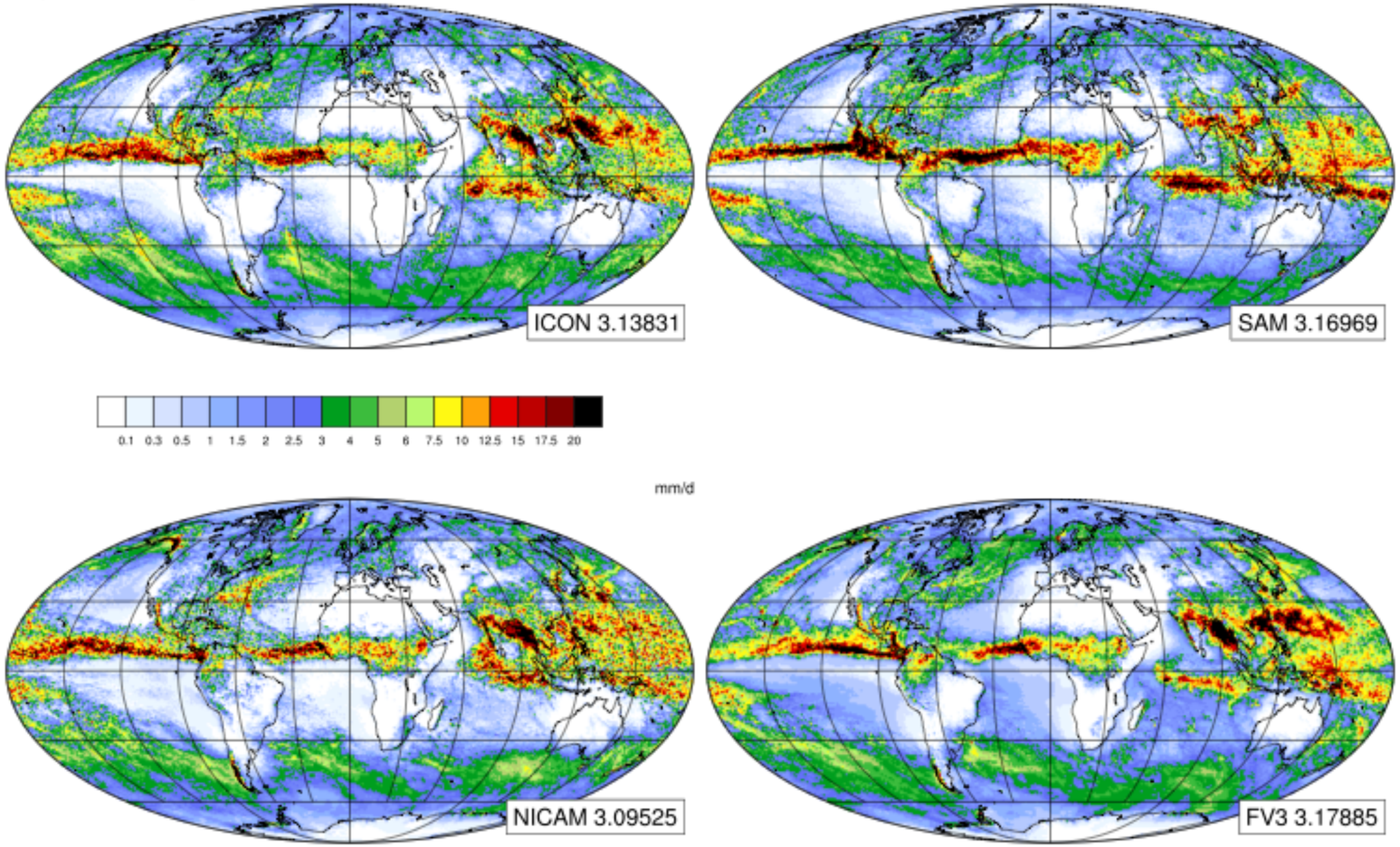
- Hackathon_Extreme_Precip_v1.2.pdf (1.41 MB) Monika Esch, 2018-10-11 14:15
- Hackathon_Cstephan.pdf (2.74 MB) Monika Esch, 2018-10-11 14:21
- hackathon_summary.pdf (2.49 MB) Monika Esch, 2018-10-11 14:21
- Summary_Hackathon_AkioMarvin.pdf (3.24 MB) Monika Esch, 2018-10-11 14:22

https://code.mpimet.mpg.de/projects/icon-sapphire/wiki/First_hackathon_at_MPI-M_from_20_to_21_August_2018



NICAM (7 km)	245 W/m²
ICON (5 km)	246 W/m²
SAM (4 km)	251 W/m²
FV3 (3.25 km)	250 W/m²
OBS (August)	244 W/m²

40 day averaged precipitation



1ST HACKATHON - SHALLOW CUMULUS CONVECTION

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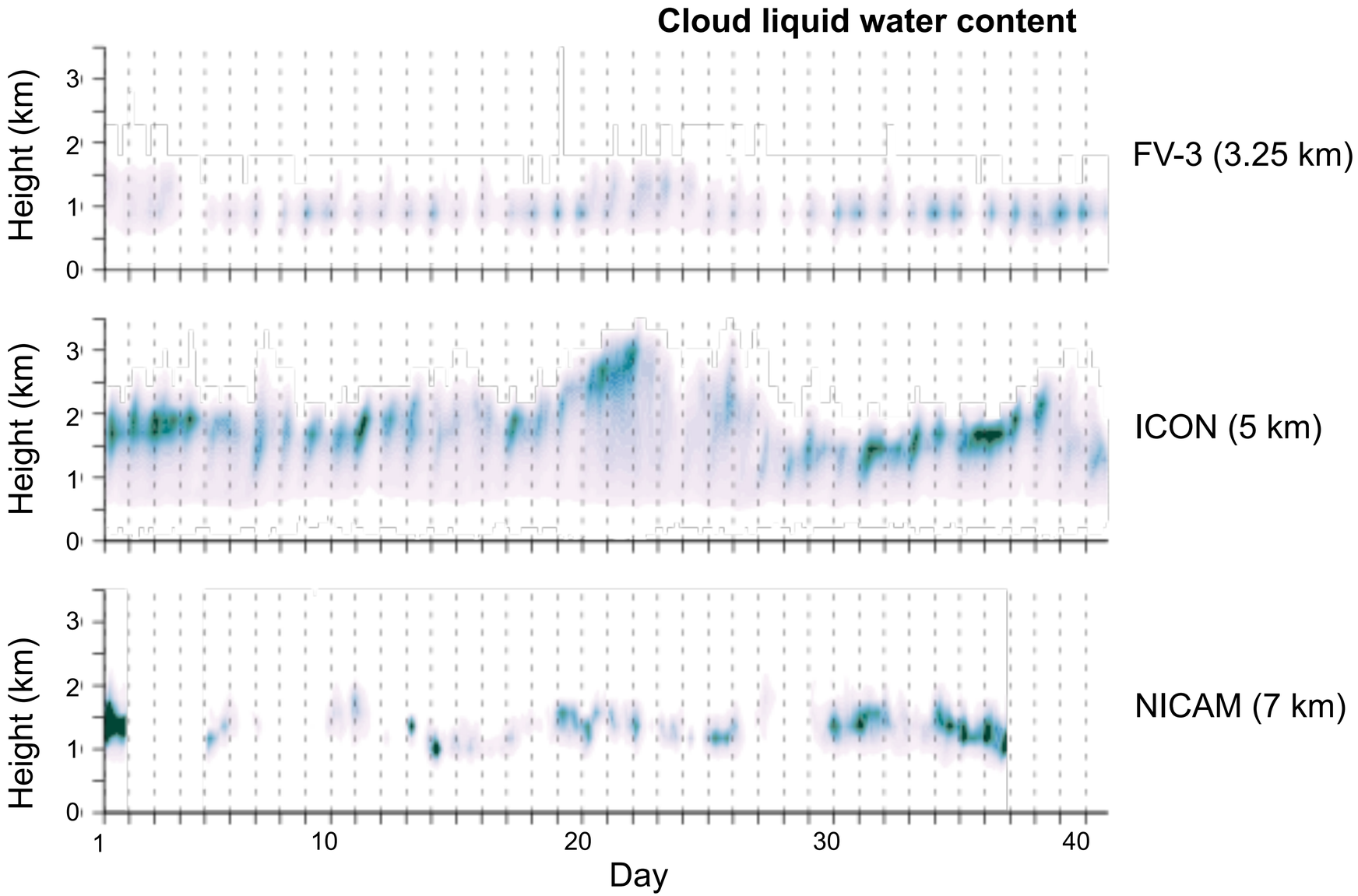

Jessica Vial (MPI) and Hauke Schulz (MPI)

1ST HACKATHON - EXTREMES

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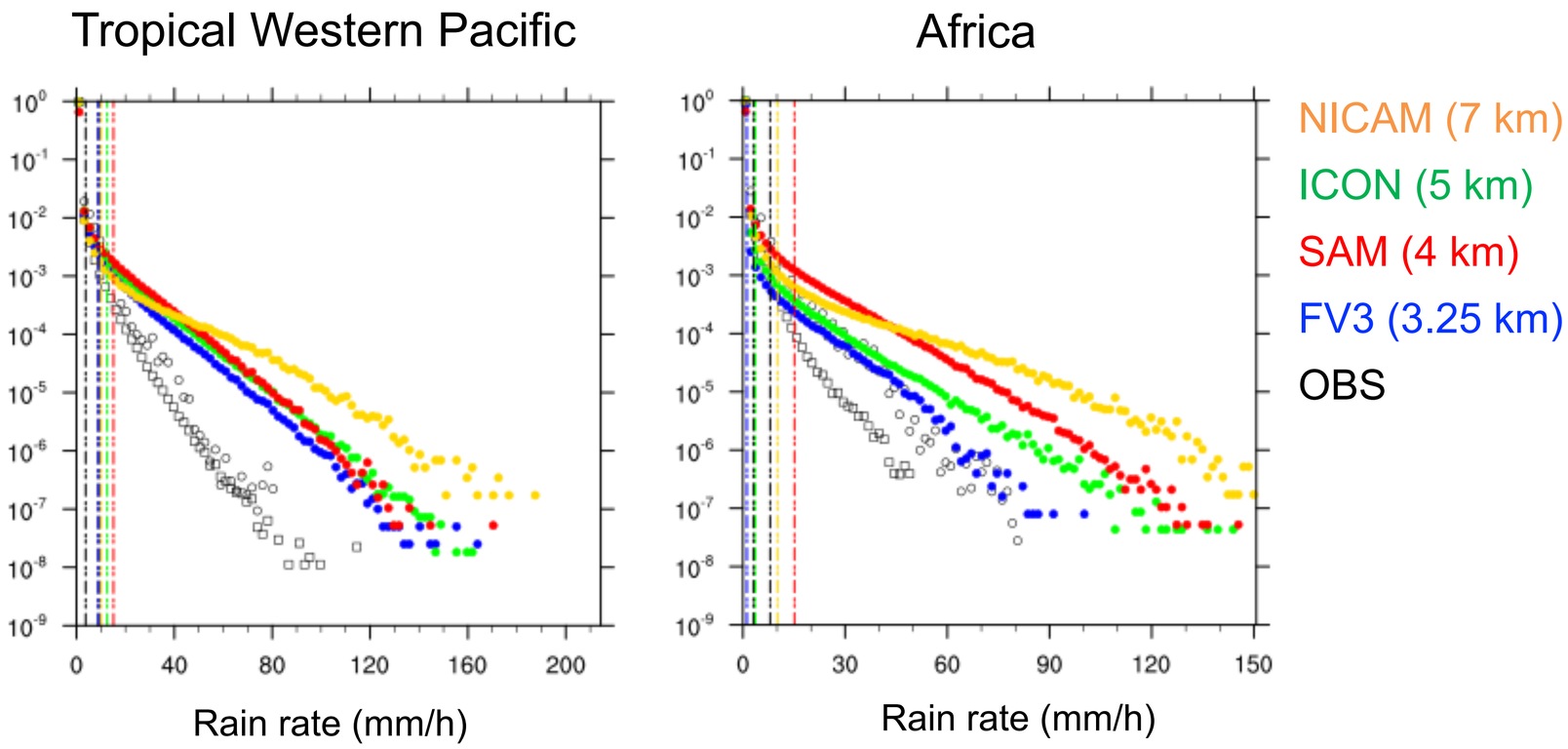
Probability distribution function of hourly rain rates



Christopher Moseley (MPI), Chao Li (MPI), Kameswarrao Modali (UH) and Shabeh Hasson (UH)

1ST HACKATHON - LESSONS

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- We were able to achieve results in the 26h of working with the data
- …not as complicated to deal with the data as we have imagined
- Every model needs (deserves) some special attention
- Subset the data!
- Learn to be patient!
- Think before processing
- Ask for help and help others

1ST HACKATHON - LETS DO IT AGAIN!

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