PALM Overview

Siegfried Raasch

Institut für Meteorologie und Klimatologie, Leibniz Universität Hannover

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PArallelized **L**ES **M**odel

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- Code is under the GNU public license (GPL V3)

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Software-development in a professional environment

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PALM - Features (General Overview)

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- It allows for very huge applications (currently 4000^3 gridpoints)

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- Error messages inform in case of parameter inconsistencies or other problems detected during runtime

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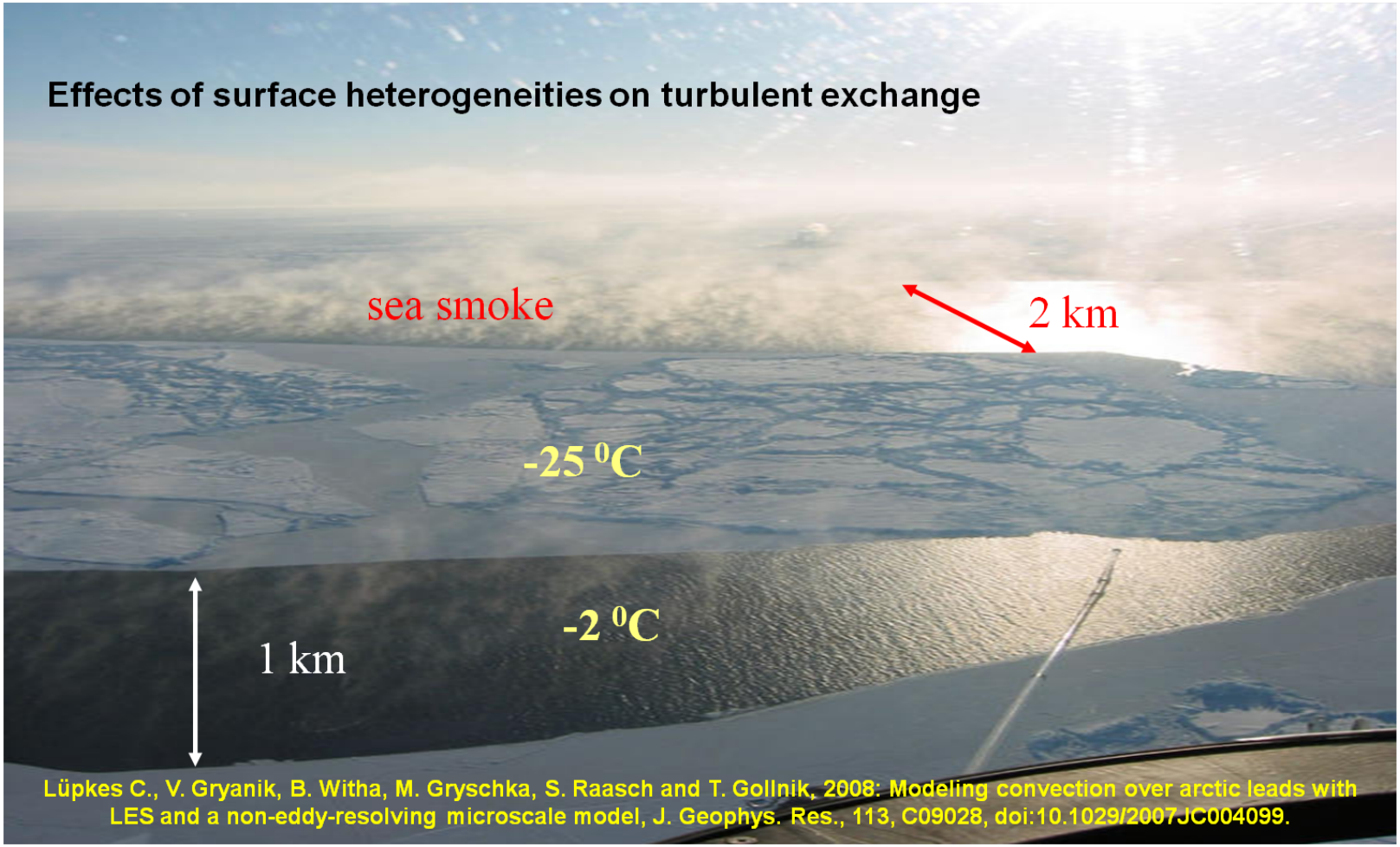
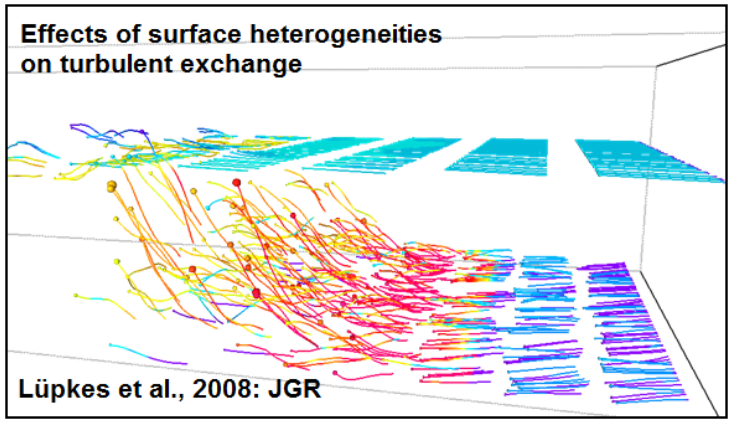
- A user-interface allows for easy code extensions by the user
- A powerful 3D-visualization software is included in the code (requires additional graphics library, (a streaming server), and a plugin for web-browsers)


Effects of surface heterogeneities on turbulent exchange


Effects of surface heterogeneities on turbulent exchange
sea smoke
2 km
-25 ^{0}C
-2 ^{0}C
1 km
Lüpkes C., V. Gryanik, B. Witha, M. Gryschka, S. Raasch and T. Gollnik, 2008: Modeling convection over arctic leads with LES and a non-eddy-resolving microscale model, J. Geophys. Res., 113, C09028, doi:10.1029/2007JC004099.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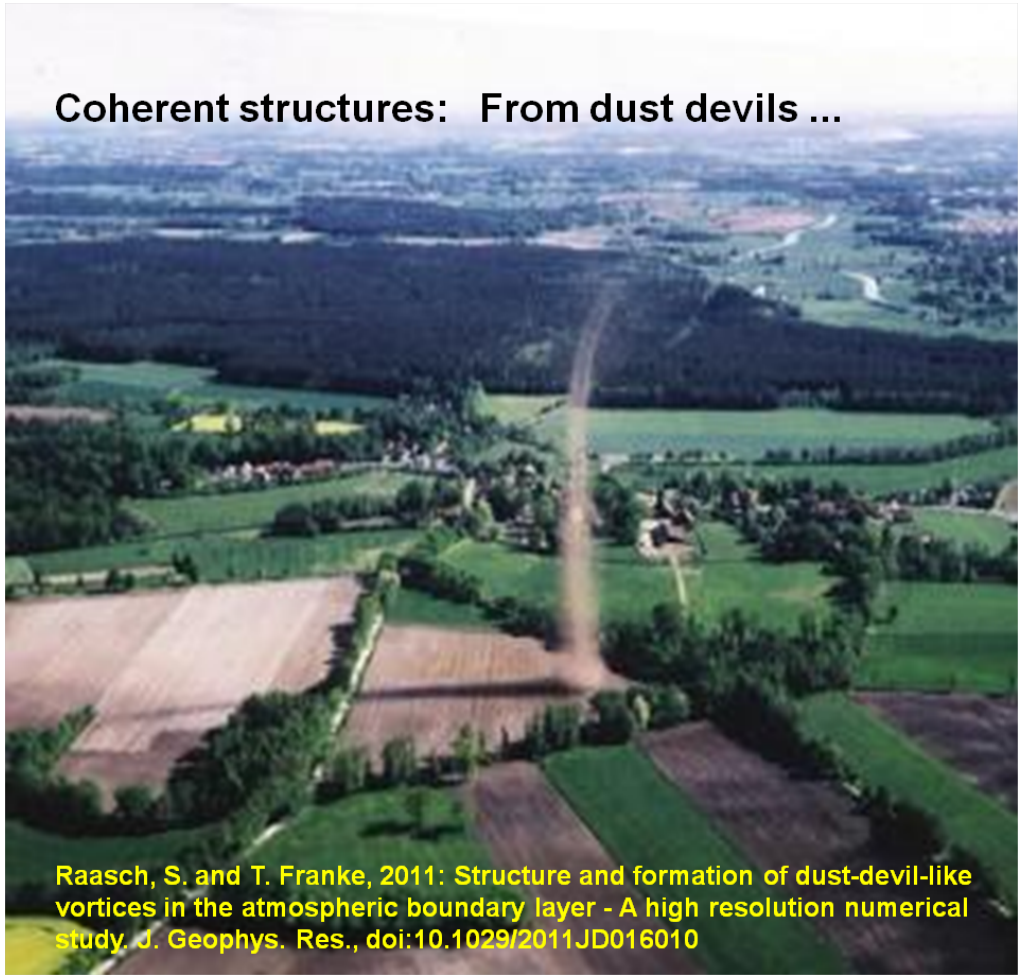
Lüpkes et al., 2008: JGR


Coherent structures: From dust devils ...
Raasch, S. and T. Franke, 2011: Structure and formation of dust-devil-like vortices in the atmospheric boundary layer - A high resolution numerical study. J. Geophys. Res., doi:10.1029/2011JD016010

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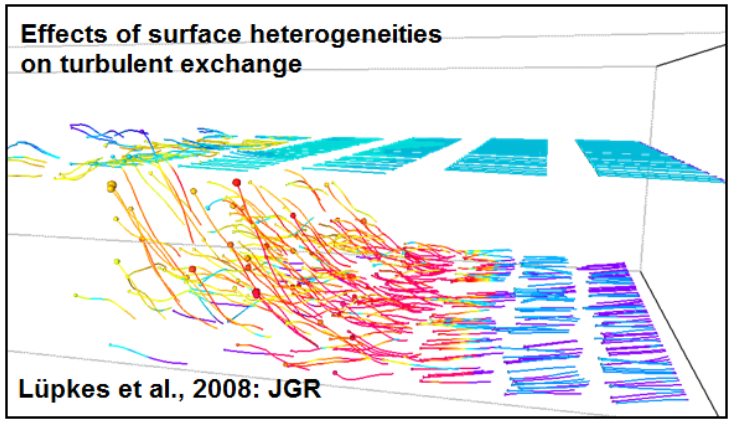
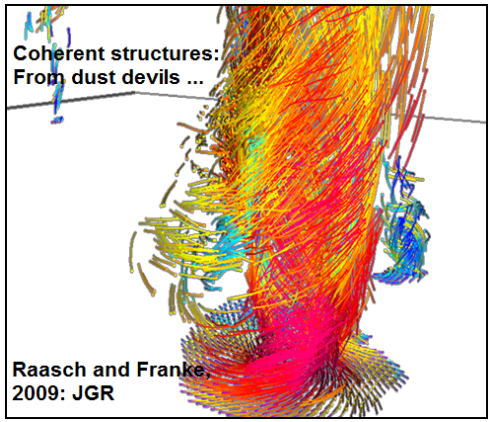
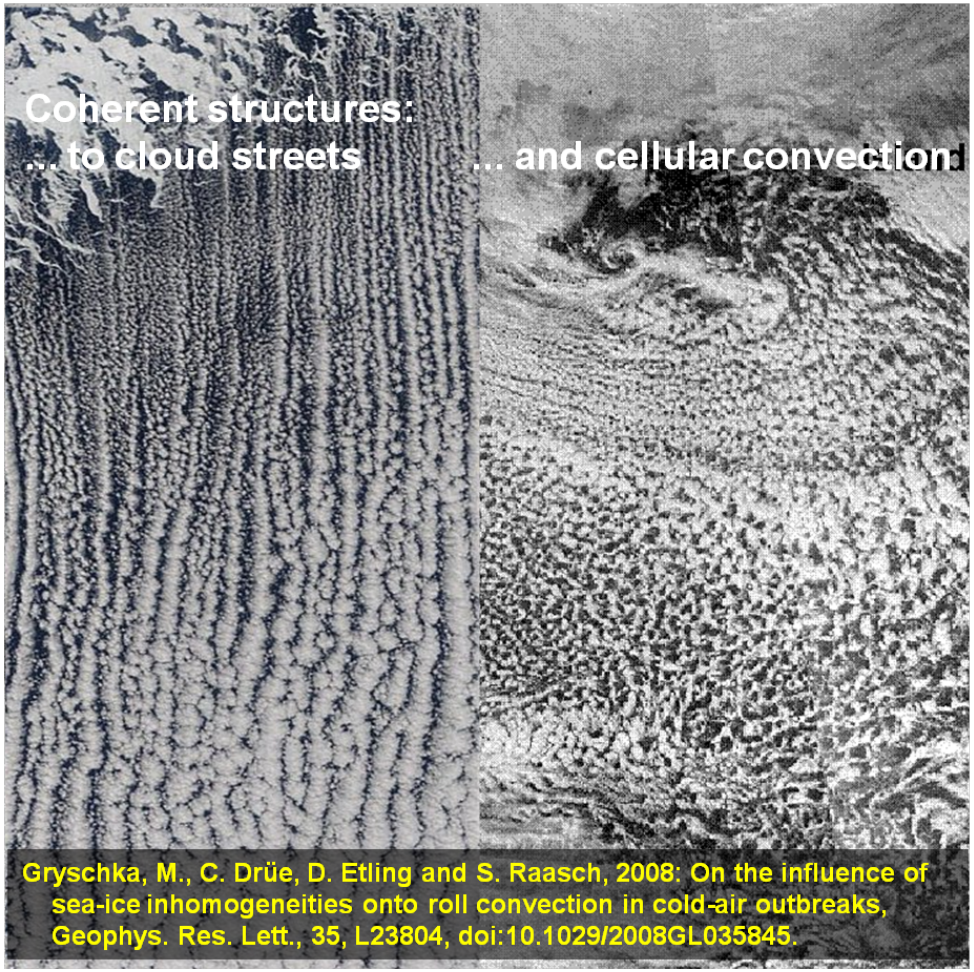
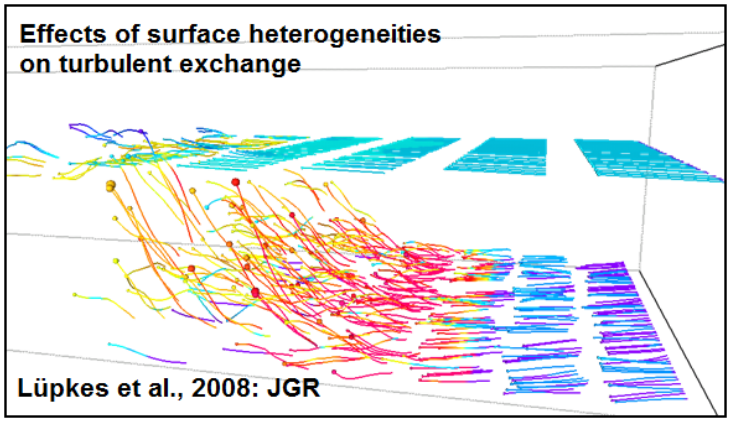





Coherent structures:
... to cloud streets
... and cellular convection
Gryschka, M., C. Drüe, D. Etling and S. Raasch, 2008: On the influence of sea-ice inhomogeneities onto roll convection in cold-air outbreaks, Geophys. Res. Lett., 35, L23804, doi:10.1029/2008GL035845.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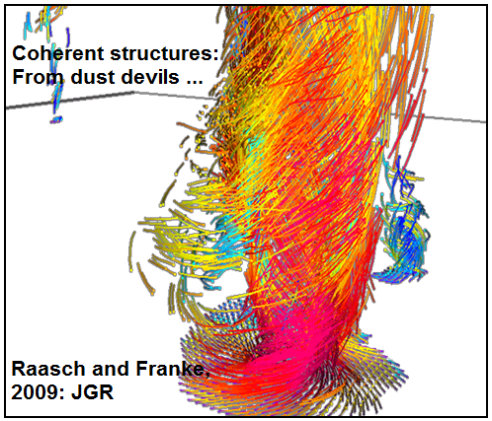
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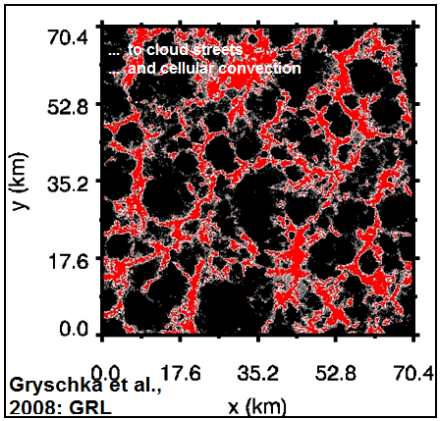
... to cloud streets
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70.4
52.8
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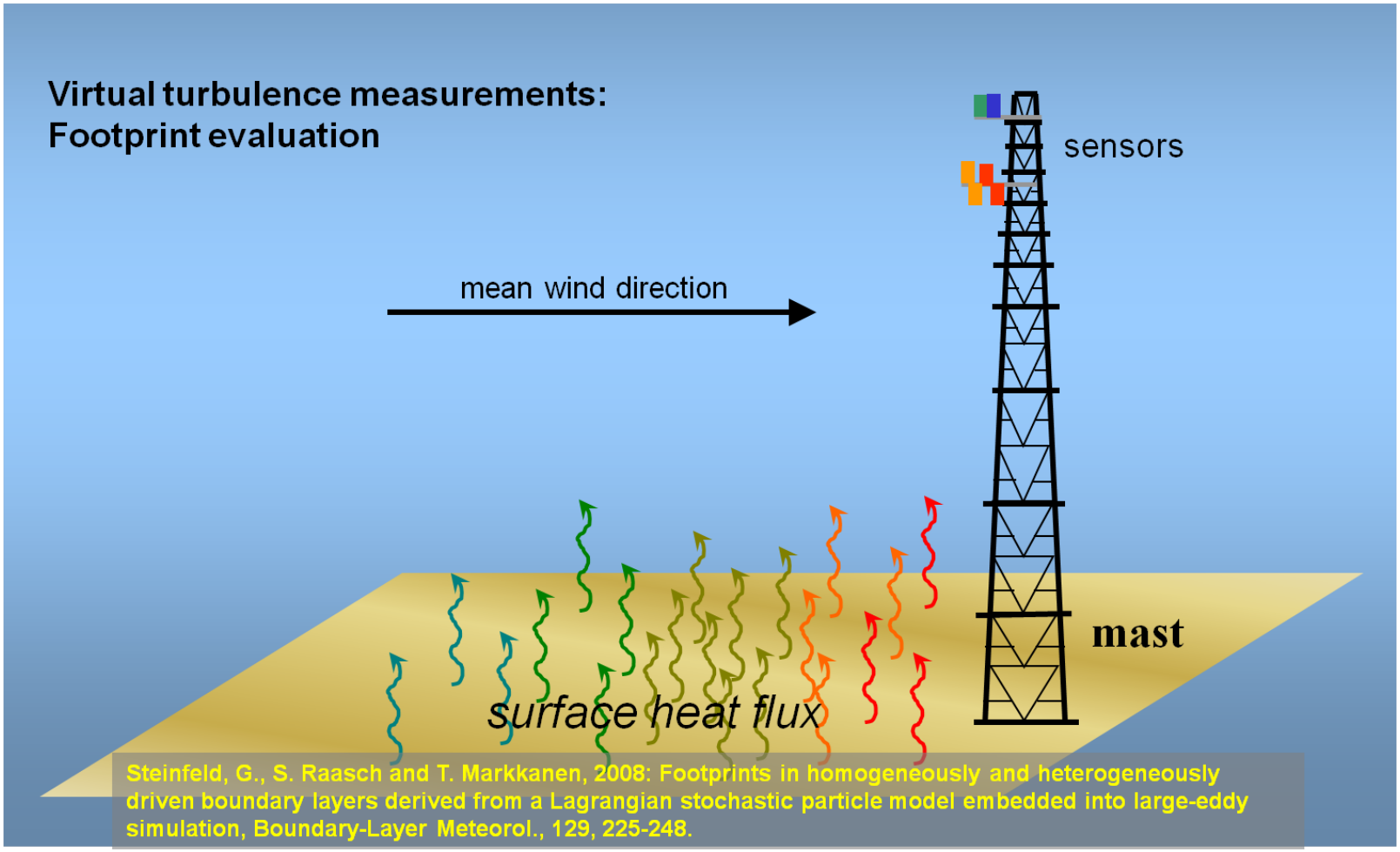
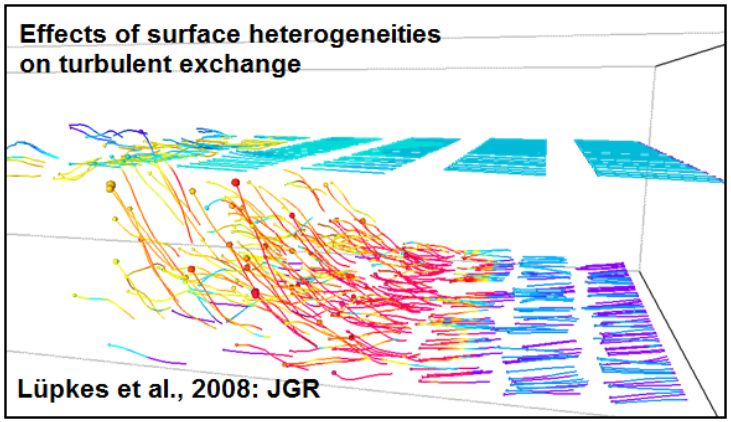

Virtual turbulence measurements:
Footprint evaluation
sensors
mean wind direction
mast
surface heat flux
Steinfeld, G., S. Raasch and T. Markkanen, 2008: Footprints in homogeneously and heterogeneously driven boundary layers derived from a Lagrangian stochastic particle model embedded into large-eddy simulation, Boundary-Layer Meteorol., 129, 225-248.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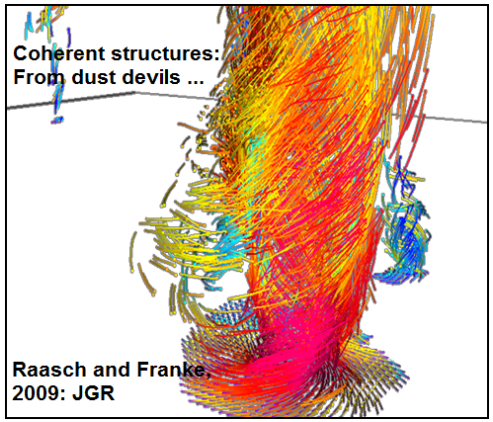
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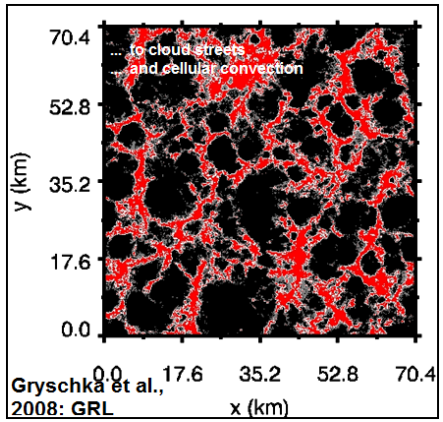
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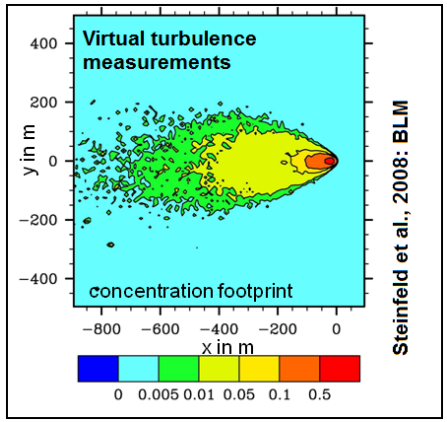
Virtual turbulence
measurements
400
200
0
−200
−400
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concentration footprint
−800
−600
−400
−200
0
x in m
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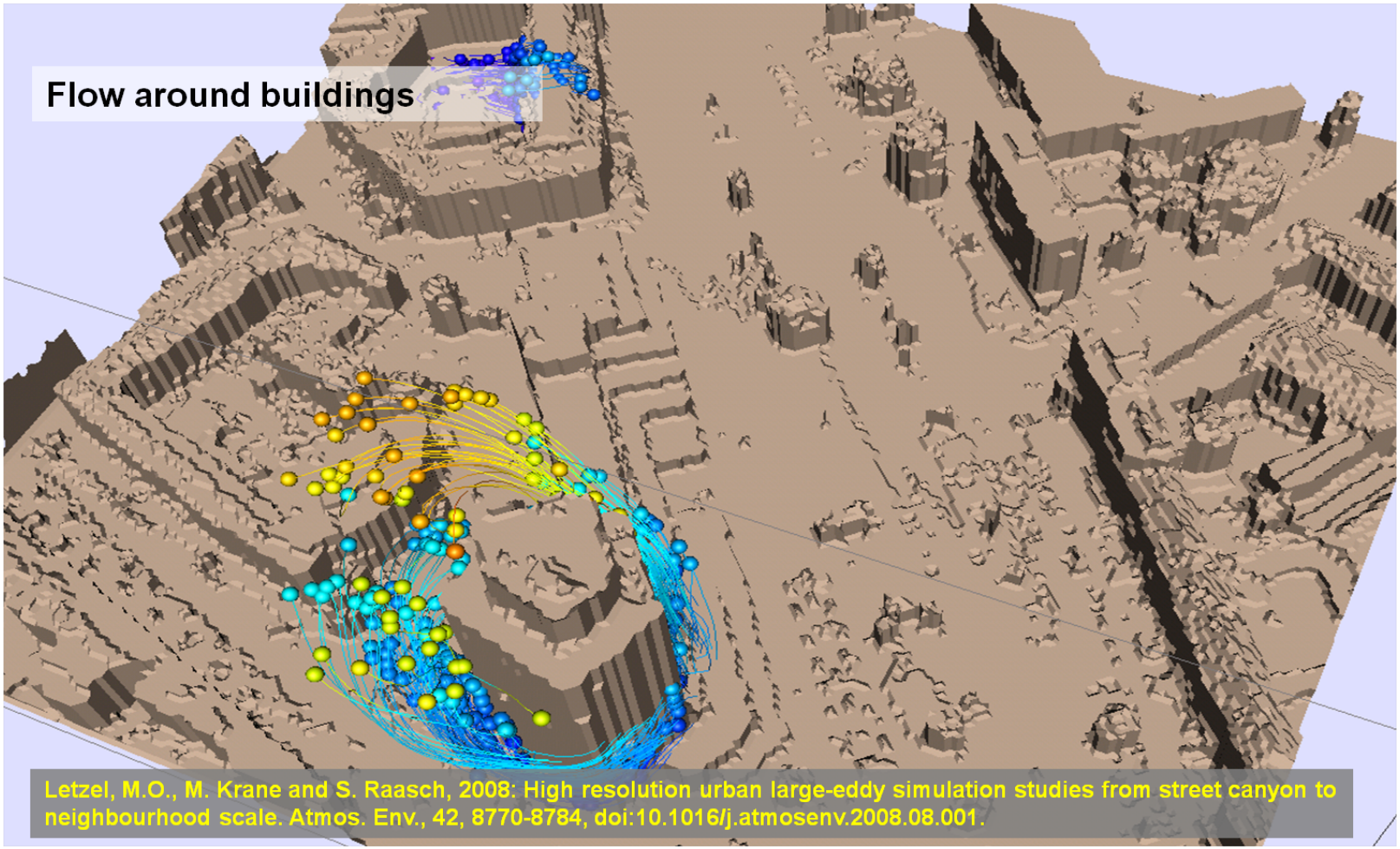
0.005
0.01
0.05
0.1
0.5
Steinfeld et al., 2008: BLM


Flow around buildings
Letzel, M.O., M. Krane and S. Raasch, 2008: High resolution urban large-eddy simulation studies from street canyon to neighbourhood scale. Atmos. Env., 42, 8770-8784, doi:10.1016/j.atmosenv.2008.08.001.

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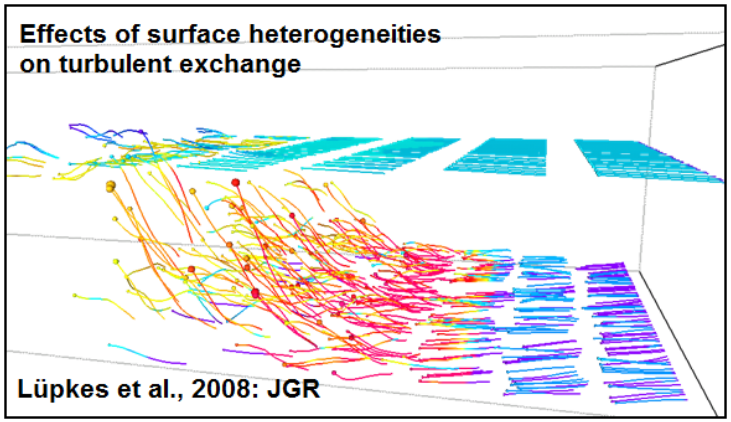

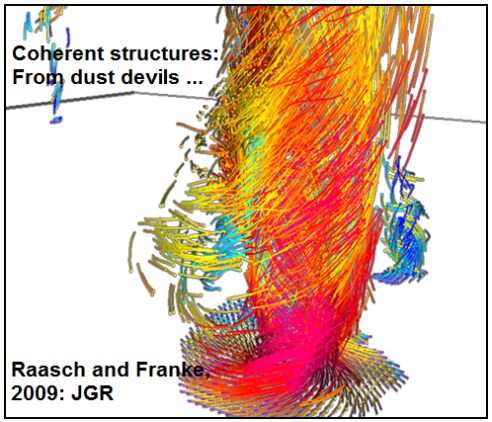

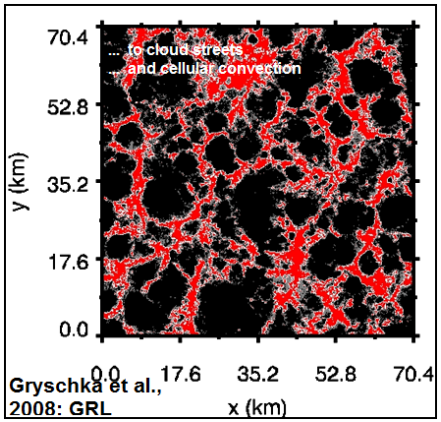

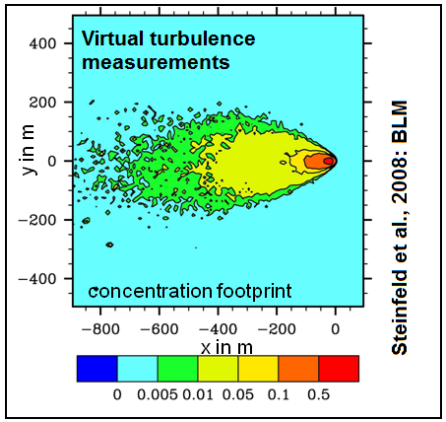

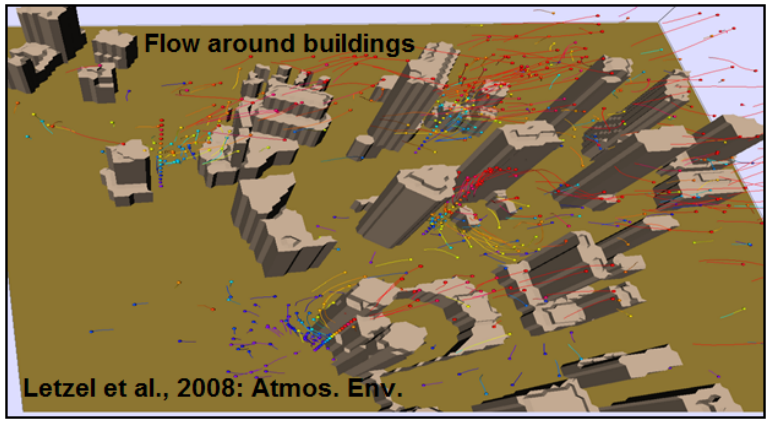

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Technical Issues

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trunk

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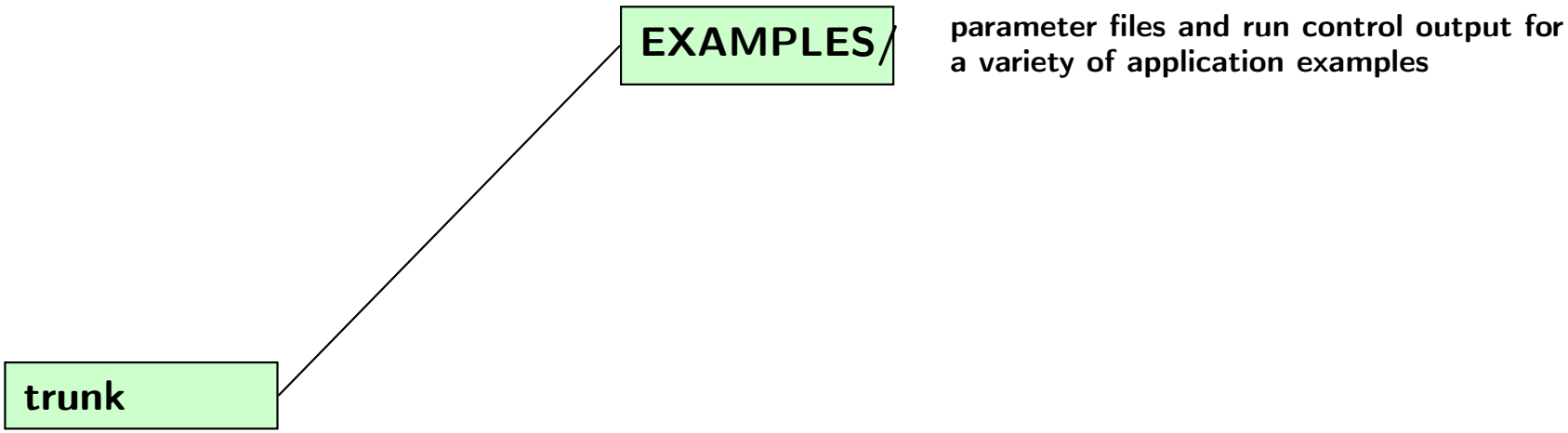

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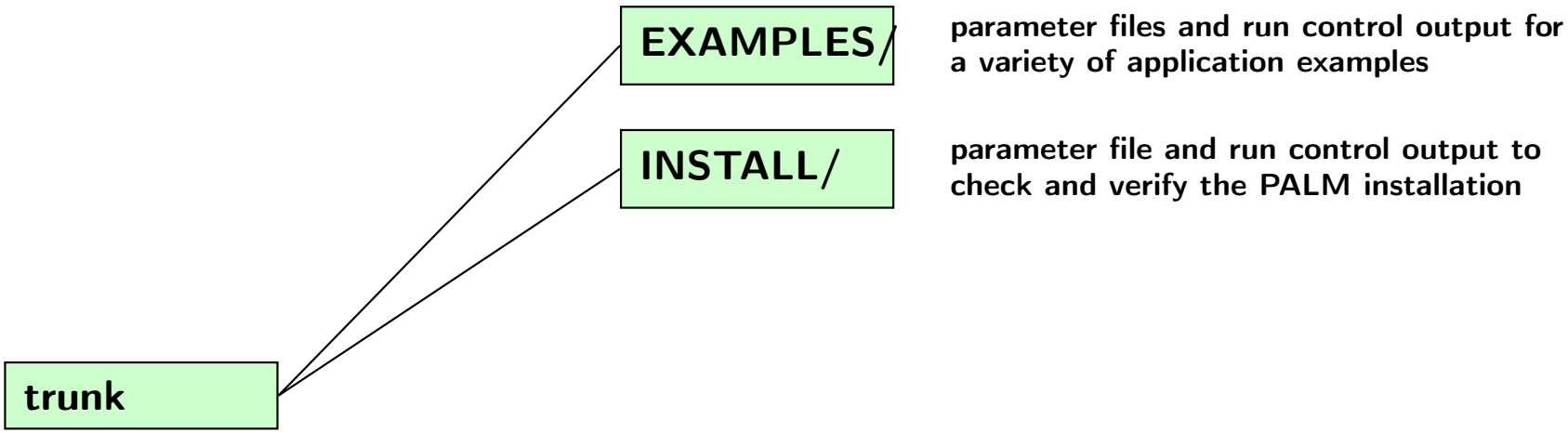

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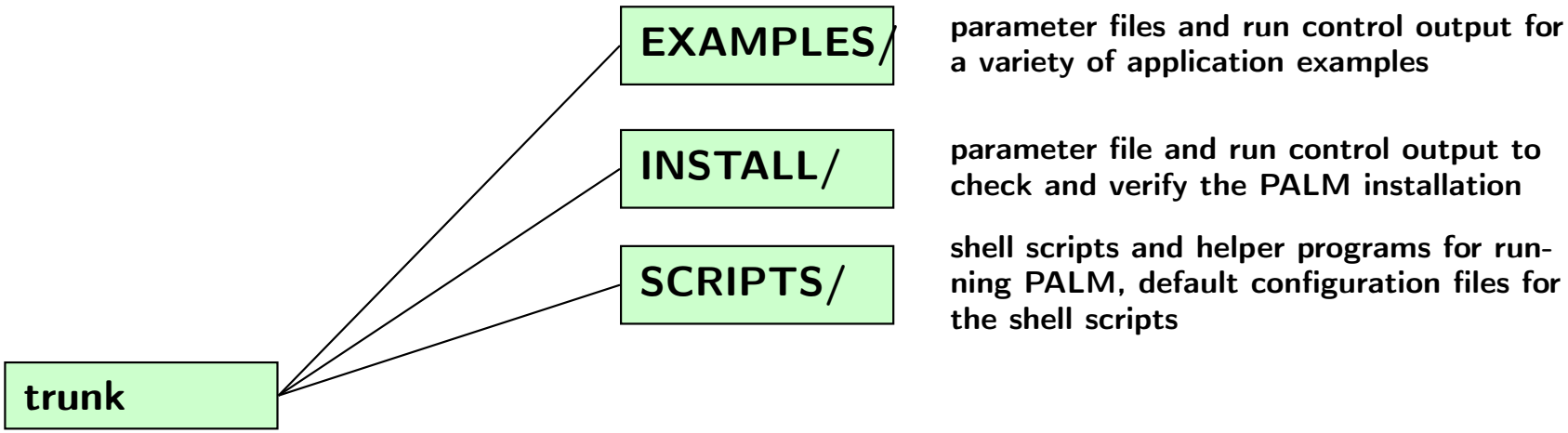

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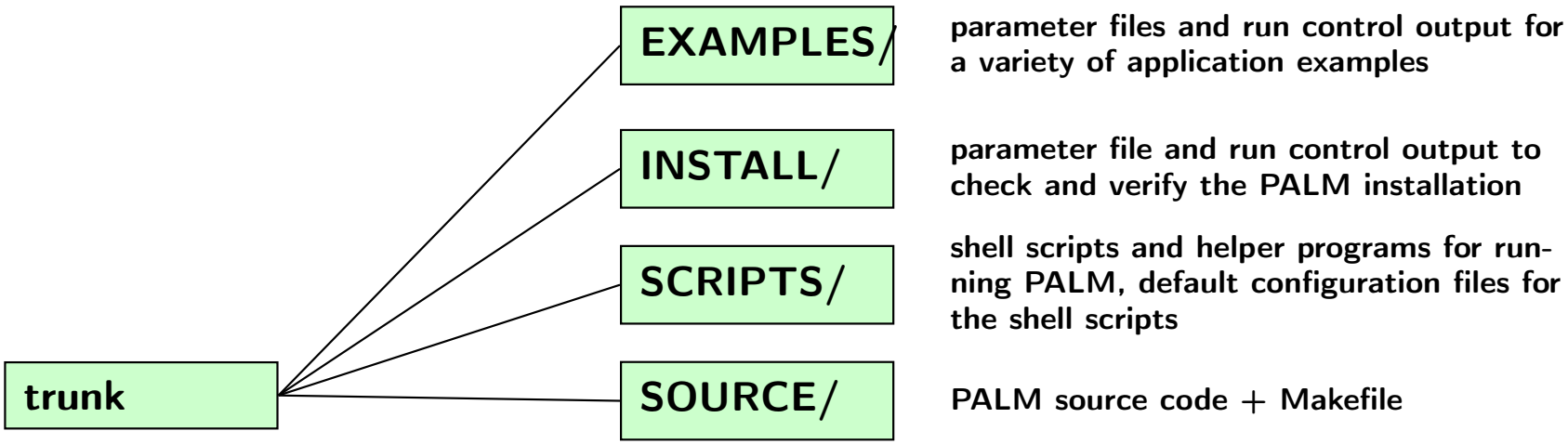

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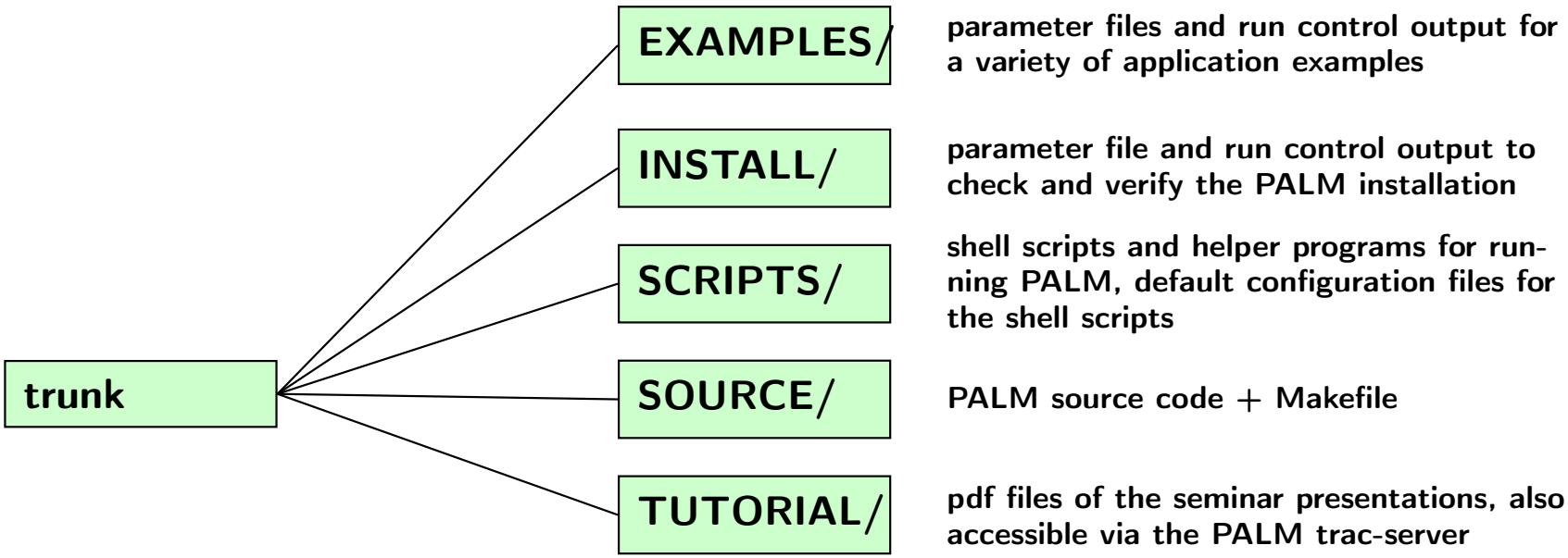

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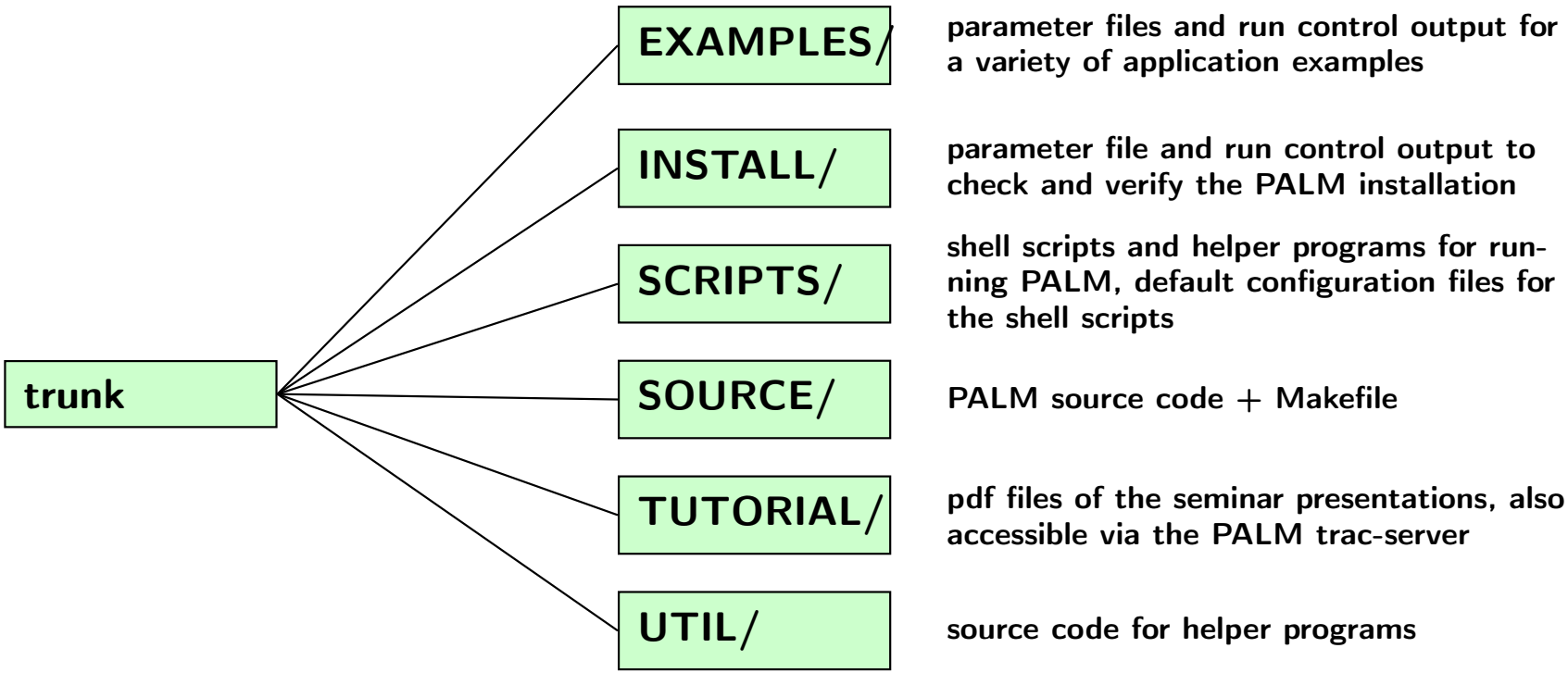

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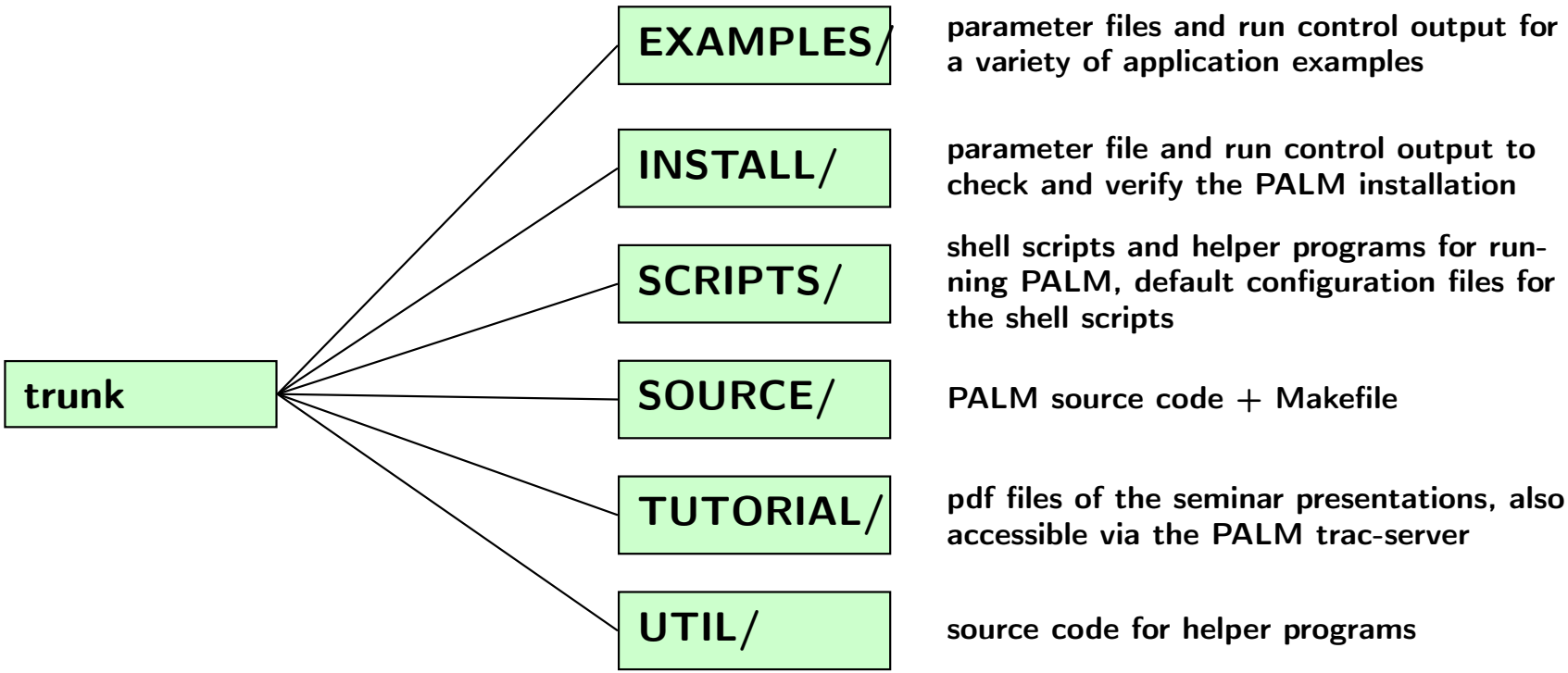

Please never modify or delete files in trunk and its subdirectories!

Recommended Directory Structure for the PALM Installation

$HOME/

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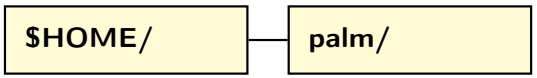

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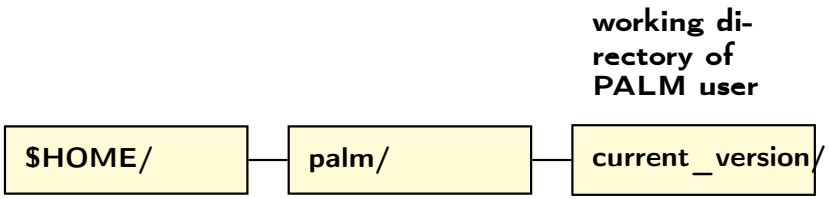

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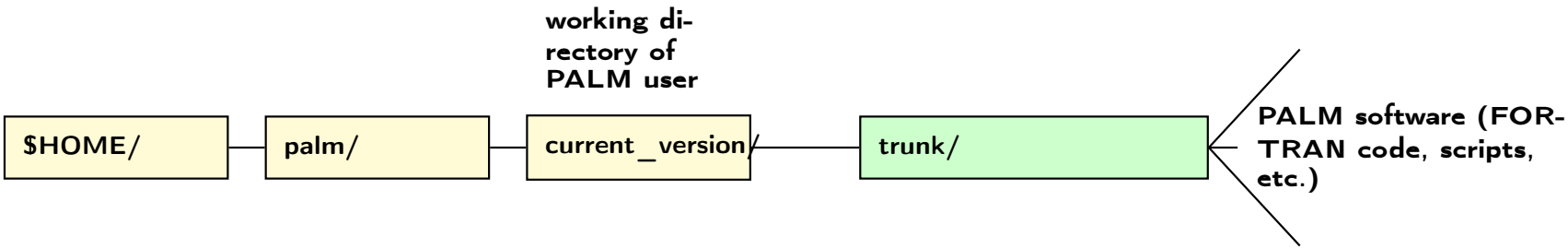

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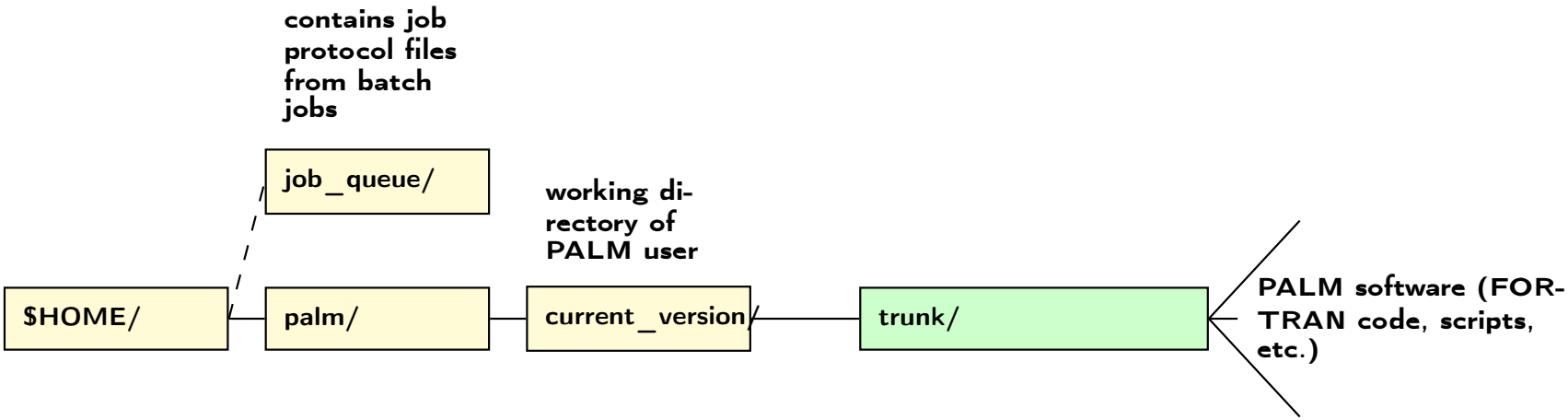

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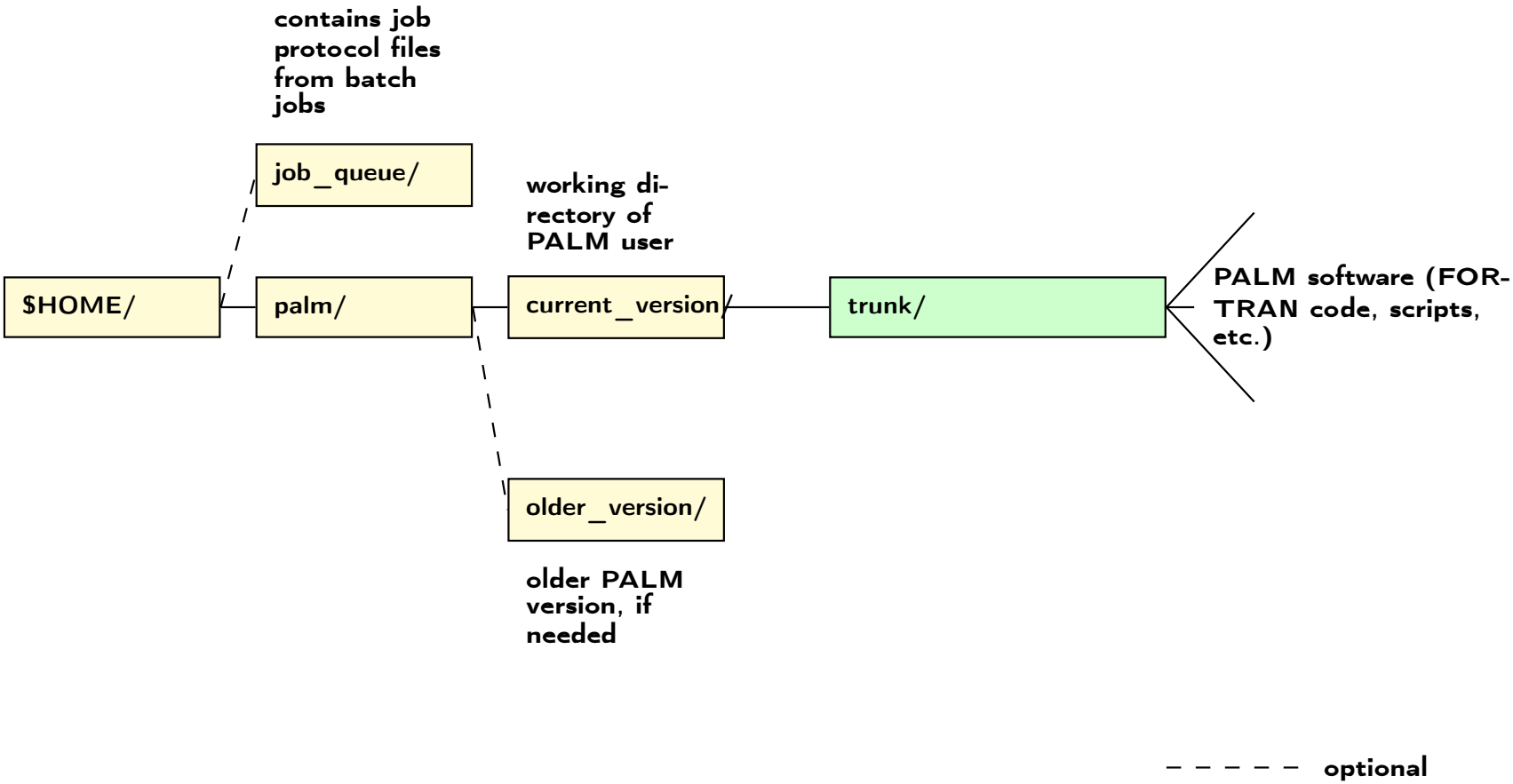

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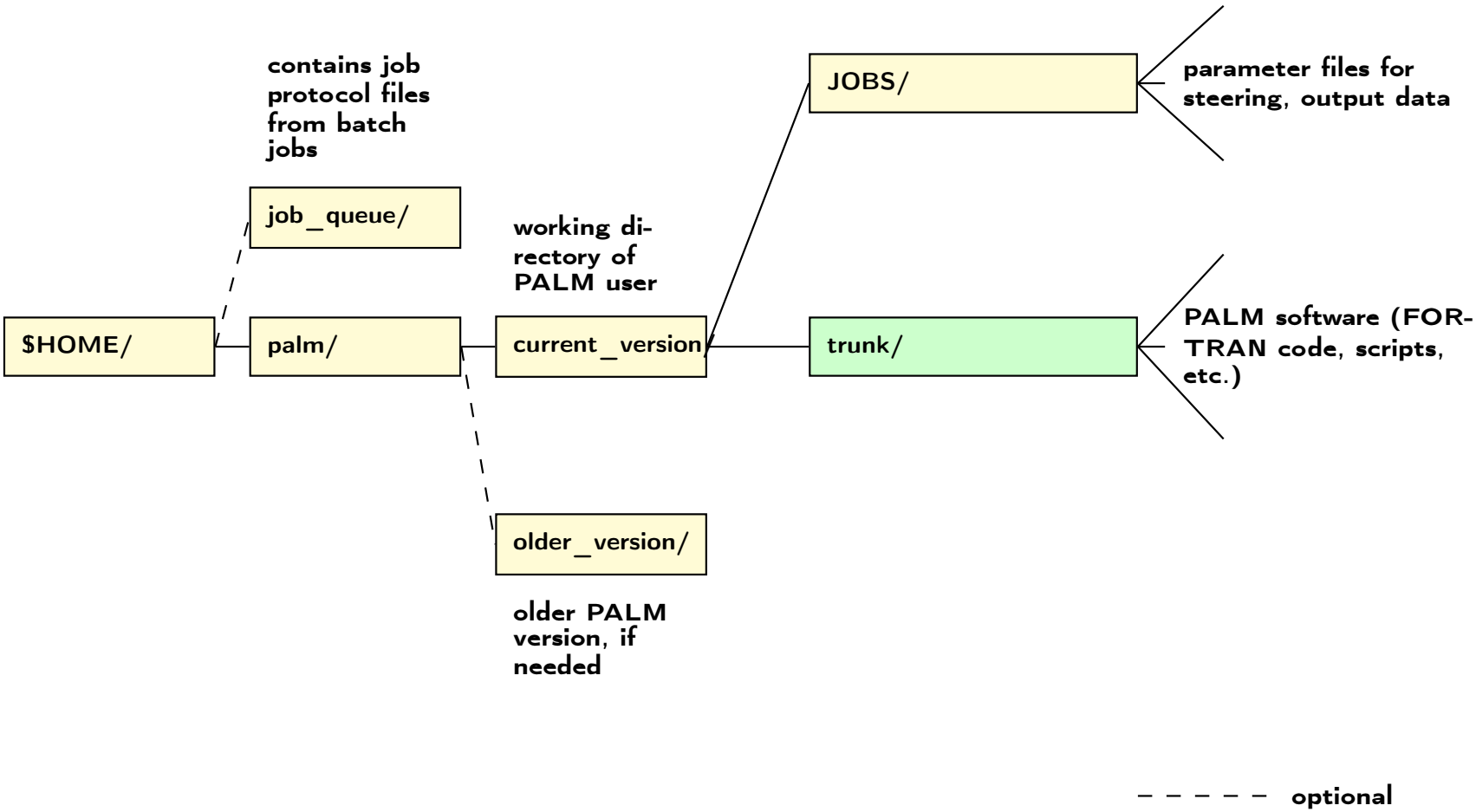

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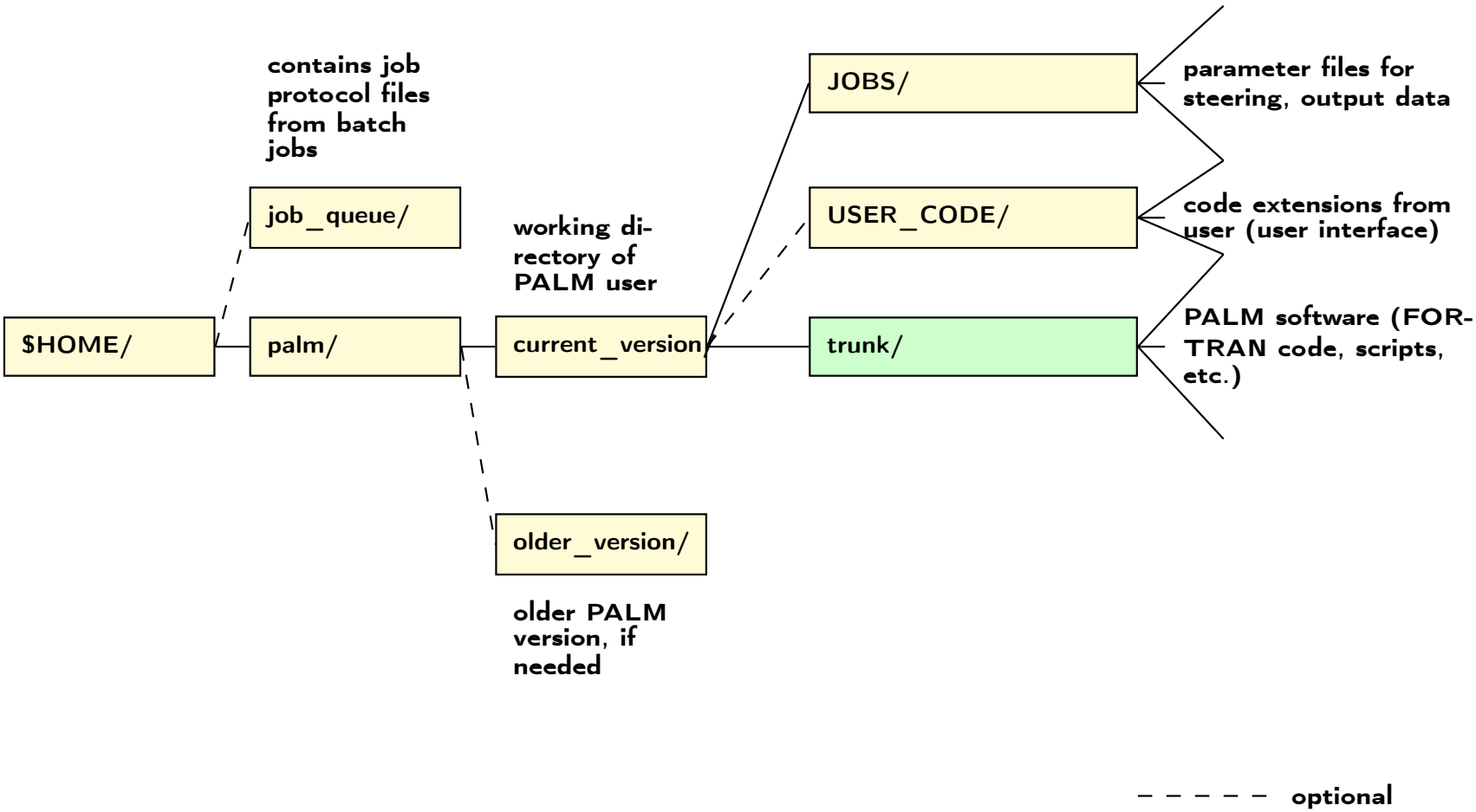

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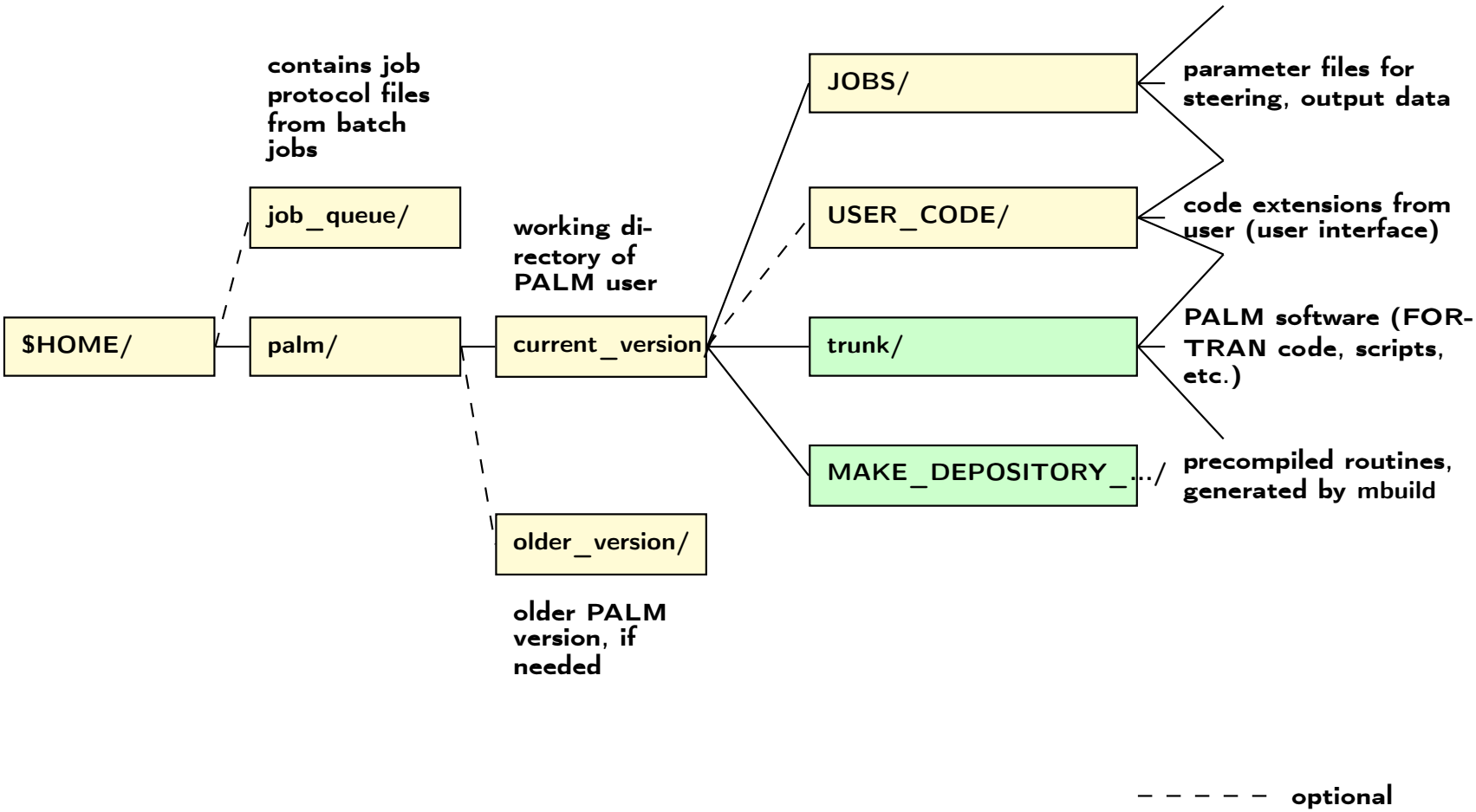

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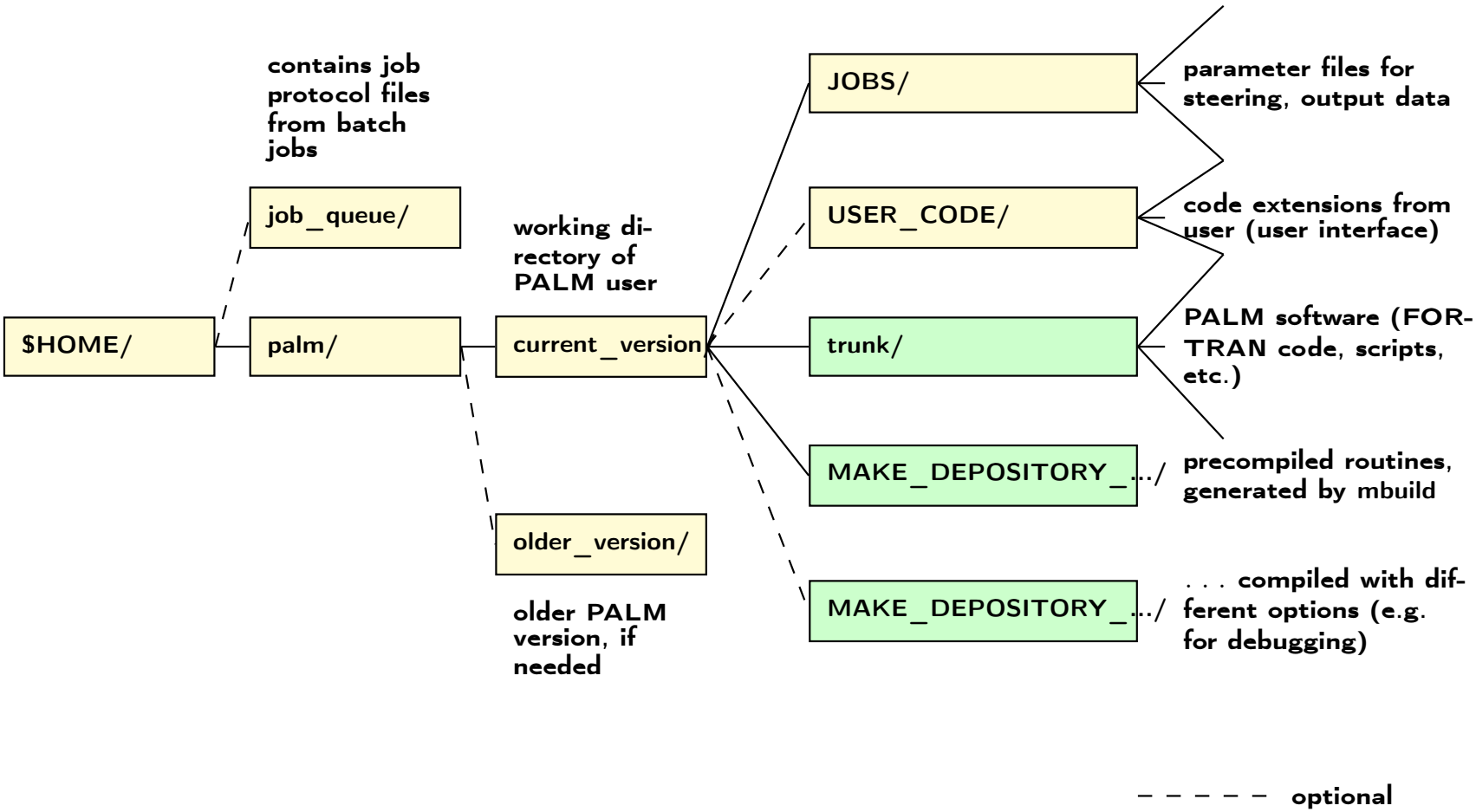

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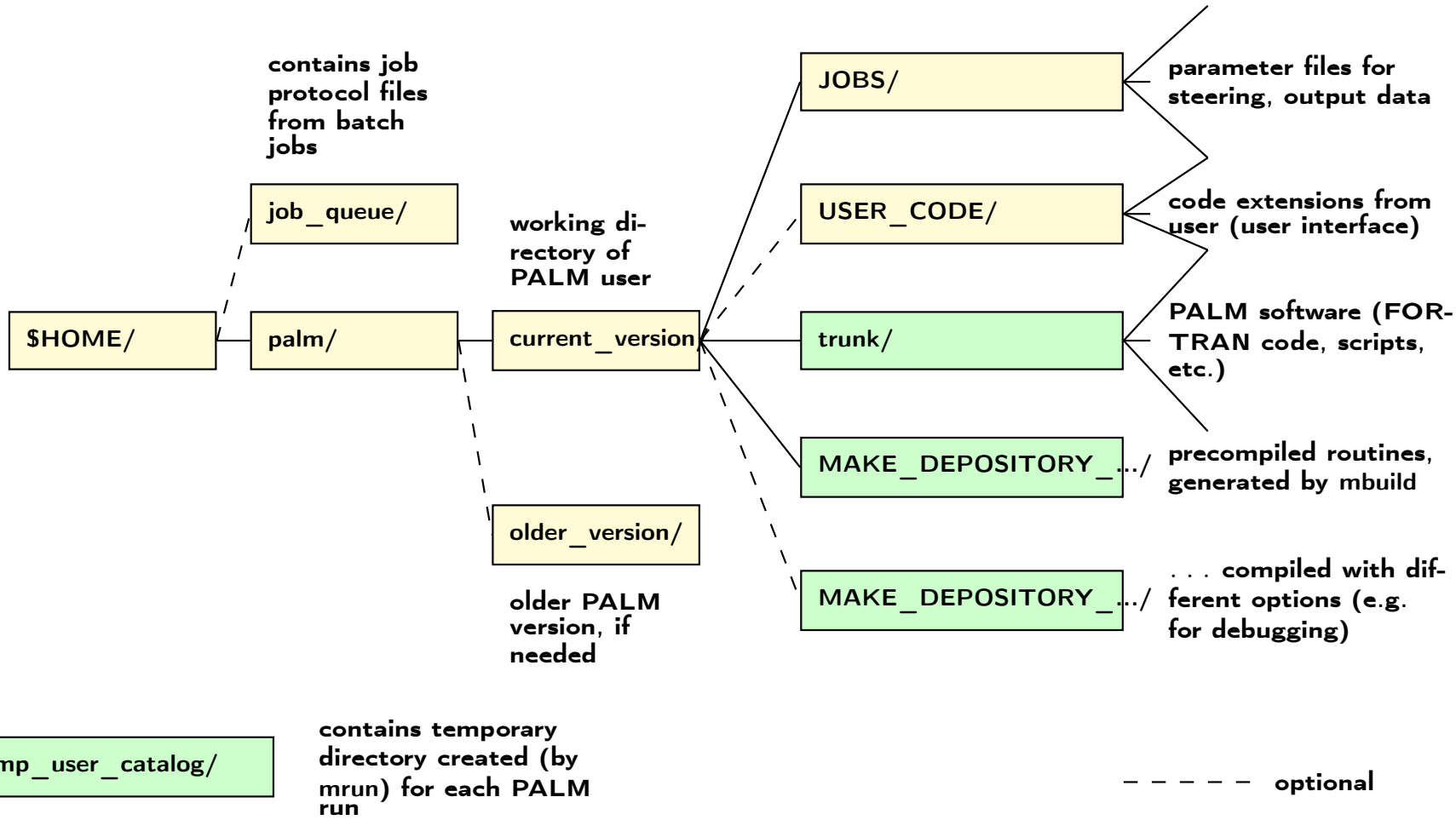

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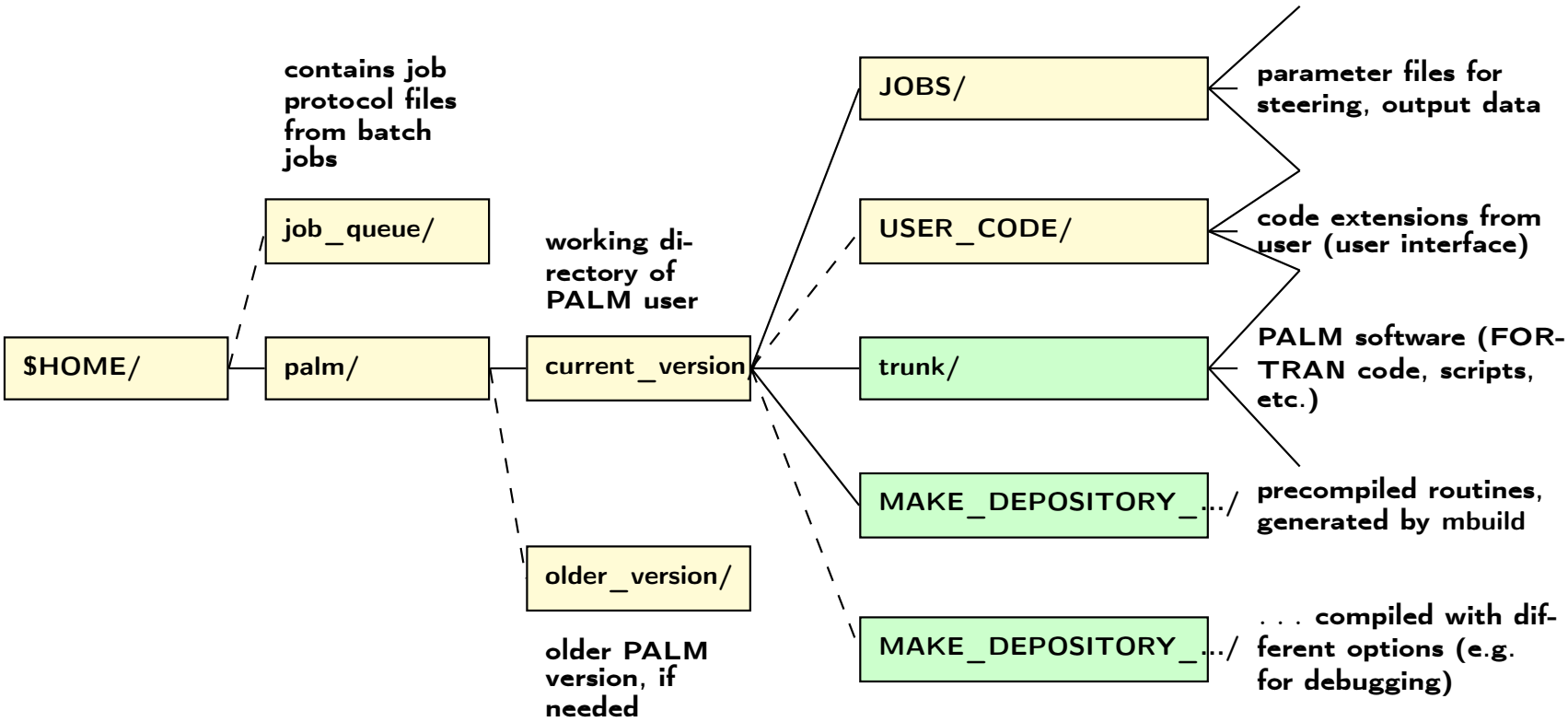

/tmp_user_catalog/ — contains temporary directory created (by mrun) for each PALM run

/tmp_data_catalog/ — contains large binary data files created by PALM and needed e.g. for restarts

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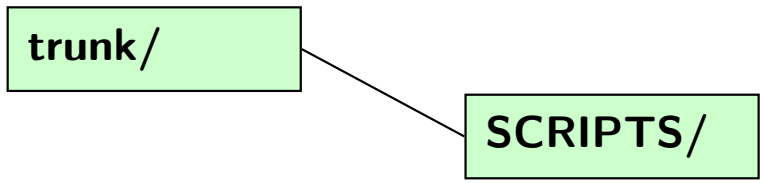

The scripts have a large number of options. A short summary of available options can be listed by giving the question mark as the only option, e.g. `mrun ?`

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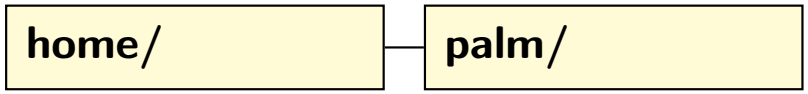

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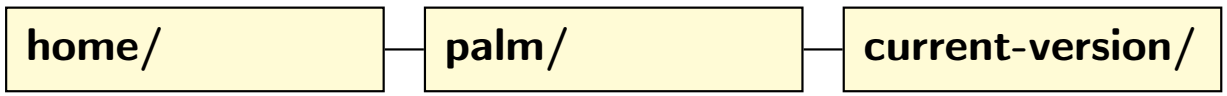

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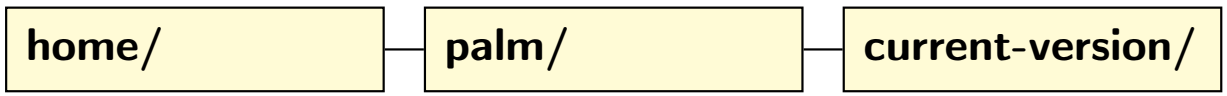

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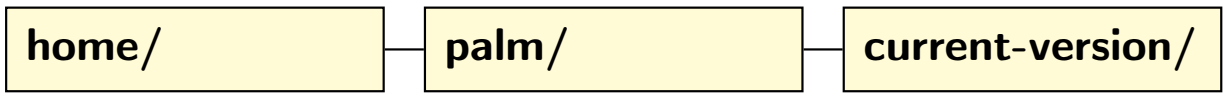

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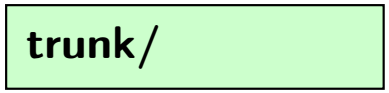

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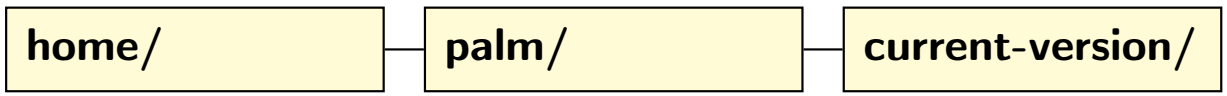

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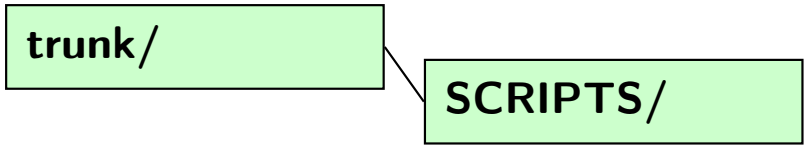

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