



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology



VieVS Introduction

Tobias Nilsson








VieVS User Workshop
11 – 13 September, 2012
Vienna









What is VieVS?

- A new, state of the art, geodetic VLBI data analysis software developed at IGG, Vienna University of Technology
- Latest IERS Conventions etc. are implemented
- Written in Matlab

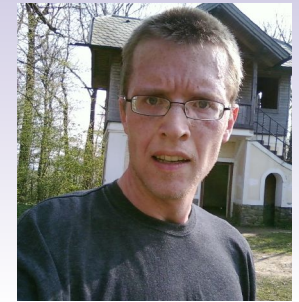
Why did we develop VieVS?

-  Important that there exist several different VLBI analysis softwares
 -  Different softwares can validate each other. Helps identifying bugs etc.
 -  Analysts have a choice of what to use
-  Previously, we used OCCAM
 -  Several different developers spread over the world. Development diverged
 -  Some old pieces of code
 -  No graphical user interface

Why did we develop VieVS? (cont.)

-  VLBI2010 put new demands and challenges on the VLBI analysis softwares
-  We want to have a VLBI software which is easy to use:
 -  BSc, MSc, and PhD students can easily learn it and use it
 -  Should be easy to add new models etc. for special investigations
 -  Should have a Graphical User Interface (GUI)
 -  Should have a clear structure

Who did develop VieVS?







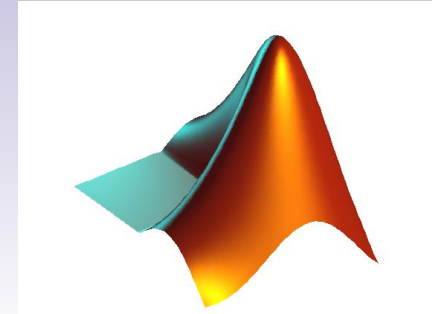
VieVS development

- Development started in 2008
- First version released in the end of 2009
- In the first version many parts were based on OCCAM. Now almost every subroutine is written from scratch
- Version 2.0 released in August 2012
- Currently registered users from about about 20 institutions worldwide



Why Matlab

Advantages:

-  Easy to use
-  Easy to change source code
-  Good tools for plotting etc.
-  Matlab available on all major operating systems (Windows, Linux/UNIX, Mac OS)



Disadvantages:

-  Matlab is an expensive commercial software (VieVS is in principle working on GNU Octave, but no GUI and is much slower)
-  Slower than C++ or Fortran. Not a major problem.

System Requirements

- MATLAB 7.6 (R2008a) or later.
- About 7 GB of disk space, including all data files (NGS files 1979-now: 6.7 GB, source code: <10 MB).
- Should work with any operating system able to run this MATLAB version (tested on Windows and Linux).
- Possible to run on older MATLAB versions or the free counterpart GNU-Octave if the Graphical User Interface is not used.

Policy

- ♣ VieVS is freely available to registered users:
 - ♣ Easier to get feedback
 - ♣ Easy to spread information about bugs, new updates, etc.
 - ♣ Nice to know how many and who are using the software
- ♣ For information, see VieVS homepage (<http://views.hg.tuwien.ac.at>)
- ♣ We are open to cooperation:
 - ♣ Modules etc. can be written at other institutions

Downloading and Installing VieVS

- ▣ VieVS can be downloading using ssh/sftp from the server:

`views.hg.tuwien.ac.at`

- ▣ Log in to the server as user *users*, download the **VieVS** directory.

Downloading VieVS using rsync

- On Unix/Linux systems, VieVS can easily be downloaded using the rsync command:

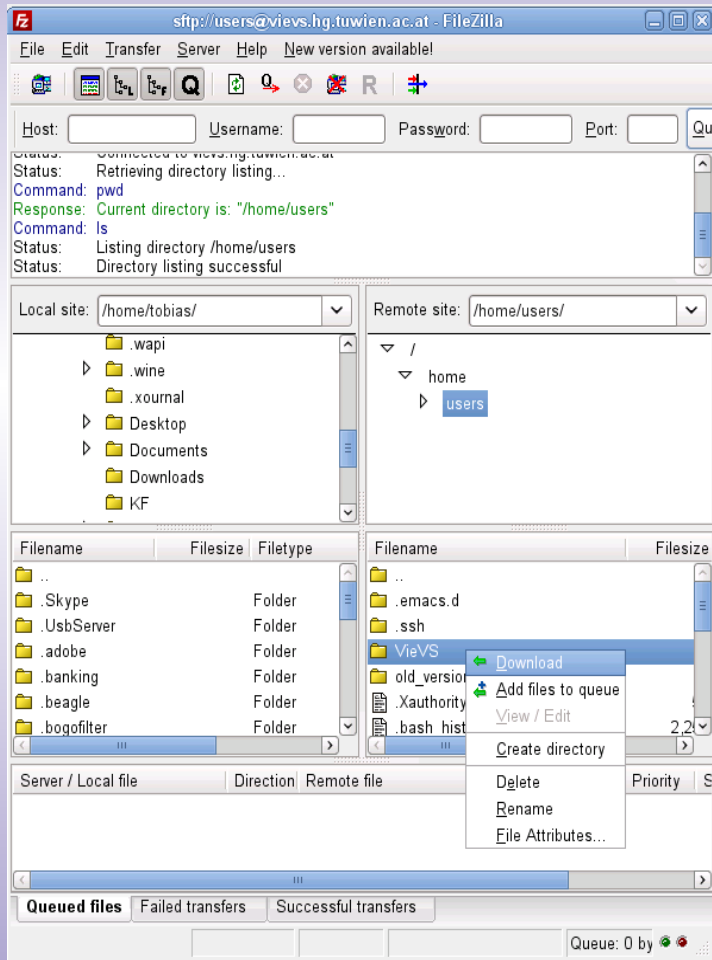
```
rsync -aL users@views.hg.tuwien.ac.at:VieVS .
```


- The same command can also be used to update your VieVS installation.


- To skip the NGS files (e.g. slow connections):

```
rsync -aL --exclude 'DATA/NGS/*' users@views.hg.tuwien.ac.at:VieVS .
```

Downloading VieVS using an sftp/scp client

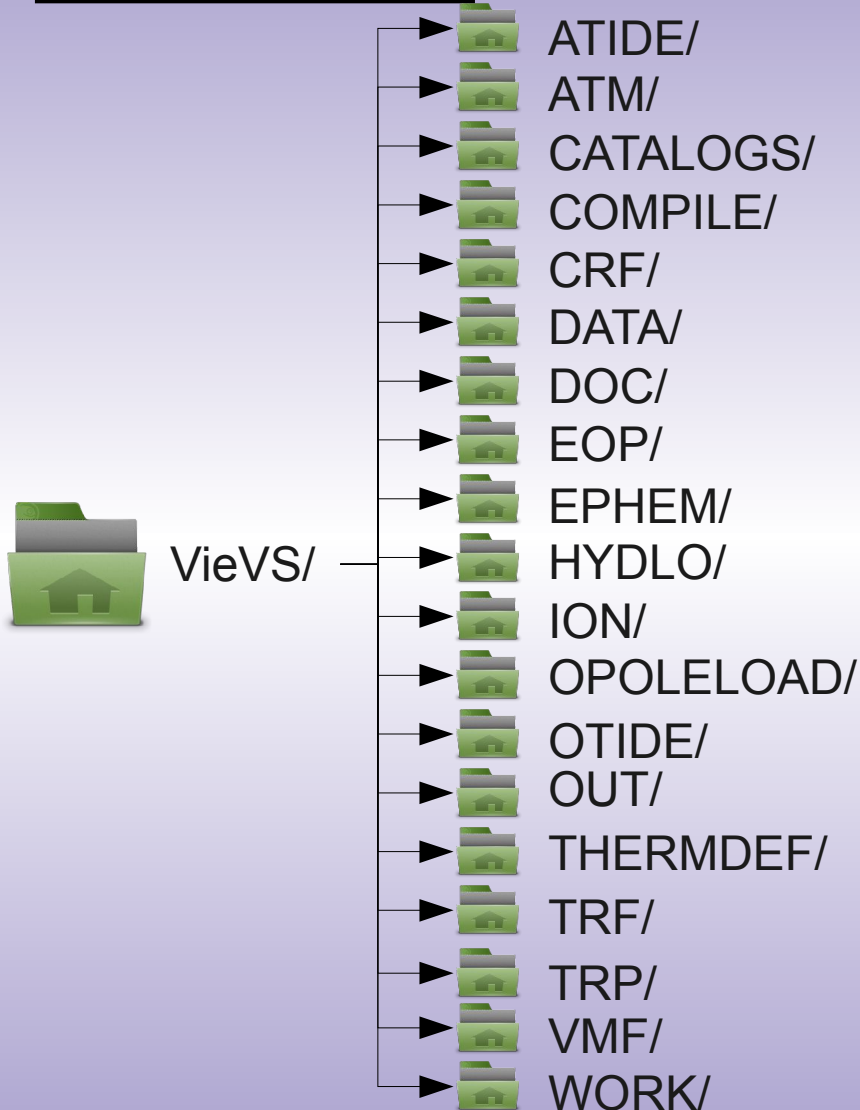


 Log in to *views.hg.tuwien.ac.at* with your favourite sftp client (e.g. Filezilla).

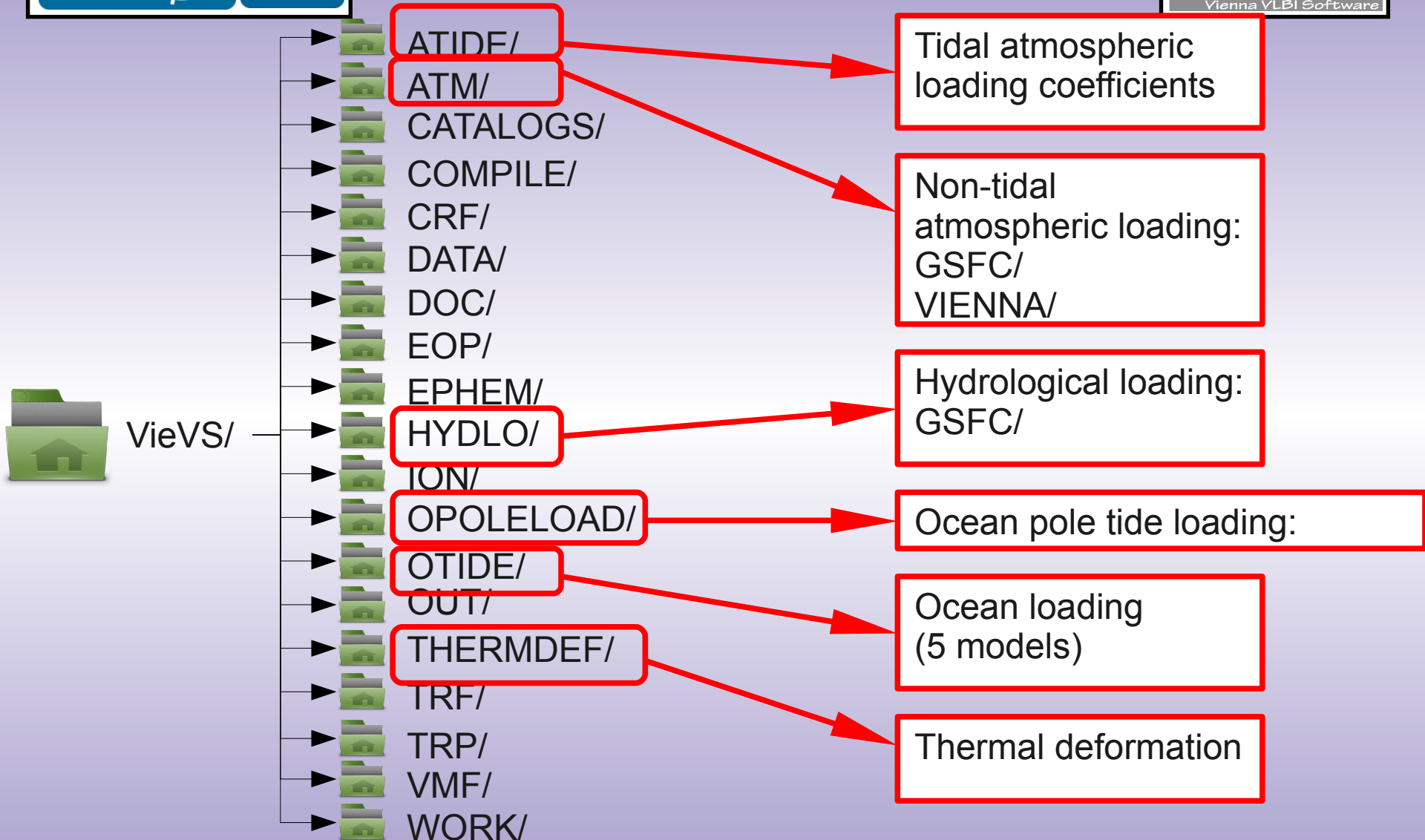
 Download the **VieVS** directory

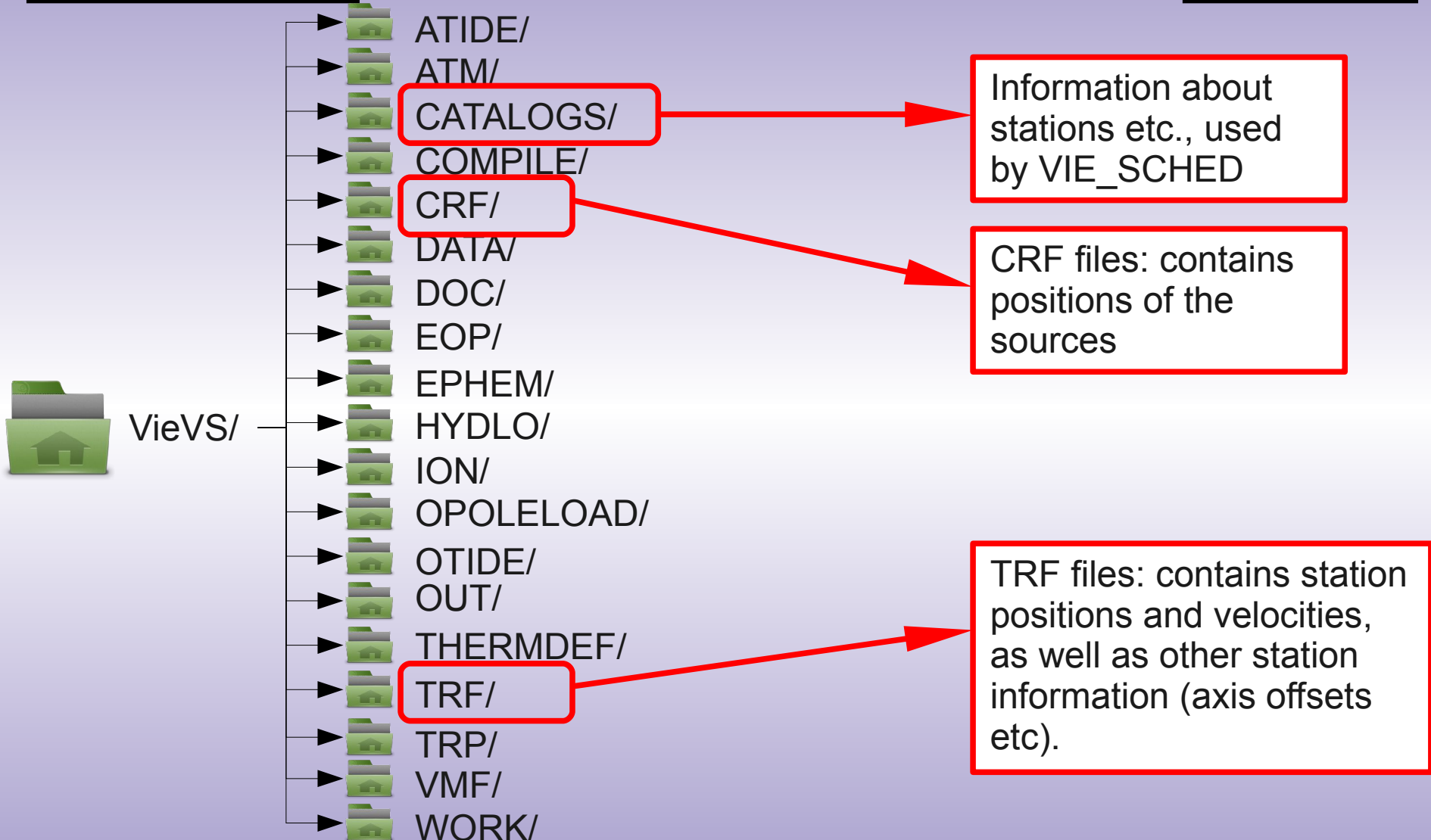
Updating VieVS

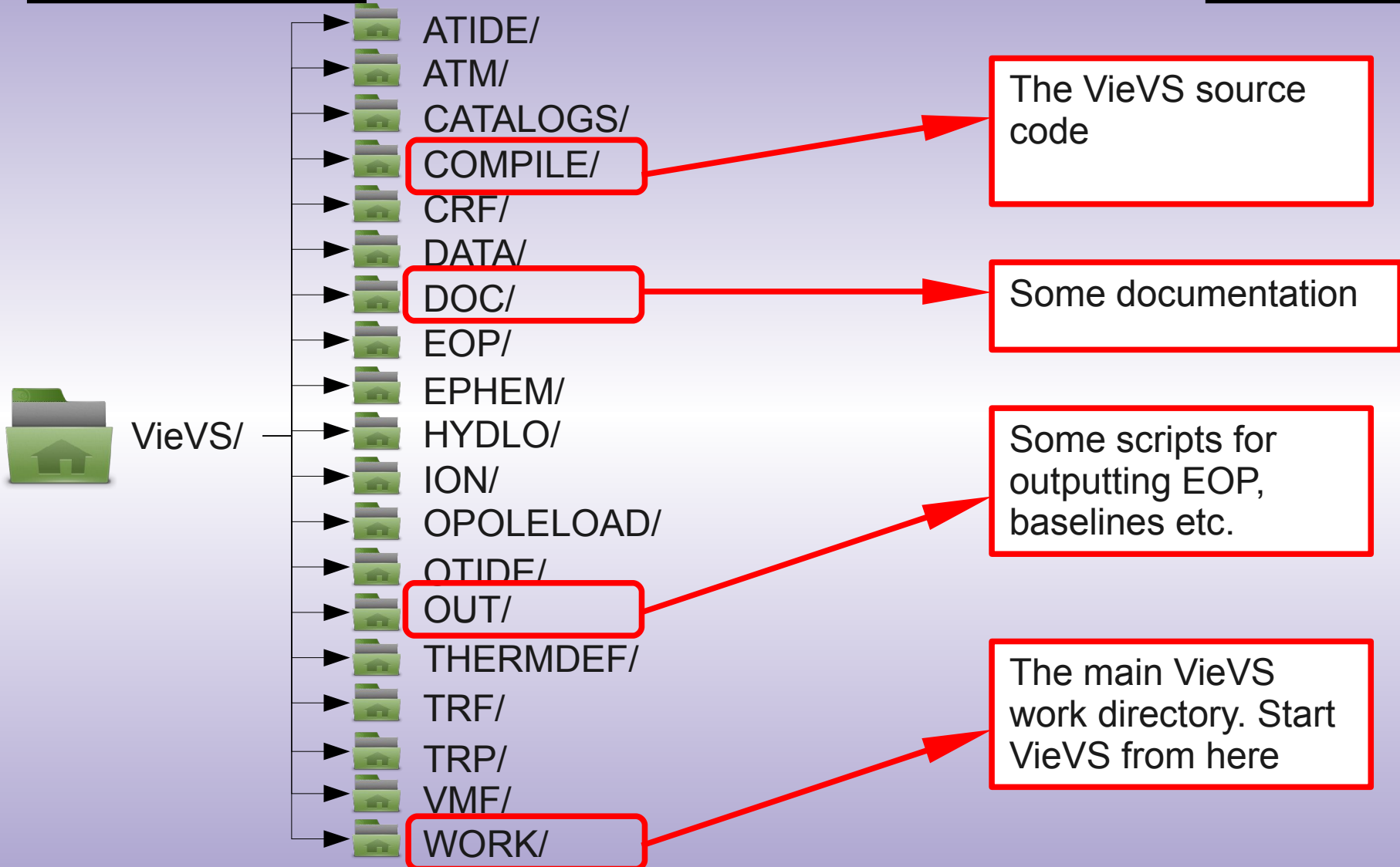
- Regularly update (to be able to analyse the latest sessions):
 - **VieVS/DATA/NGS/**
 - **VieVS/ATM/ , VieVS/VM1/ and VieVS/HYDLO/**
 - **VieVS/EOP/**
- When a new version is released:
 - **VieVS/COMPILE/**
 - **VieVS/OUT/**
 - **VieVS/WORK/**
 - Possible other directories...

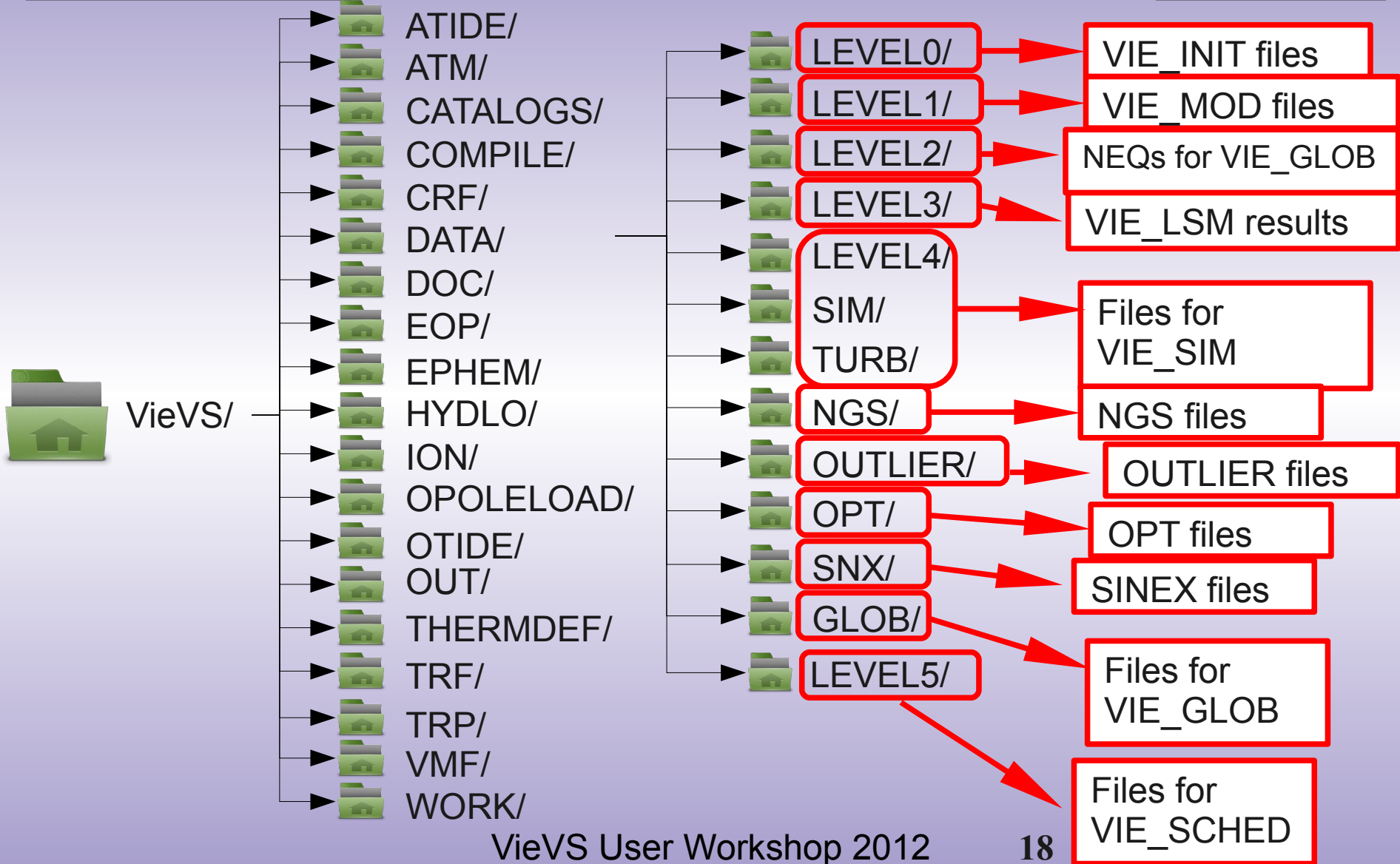


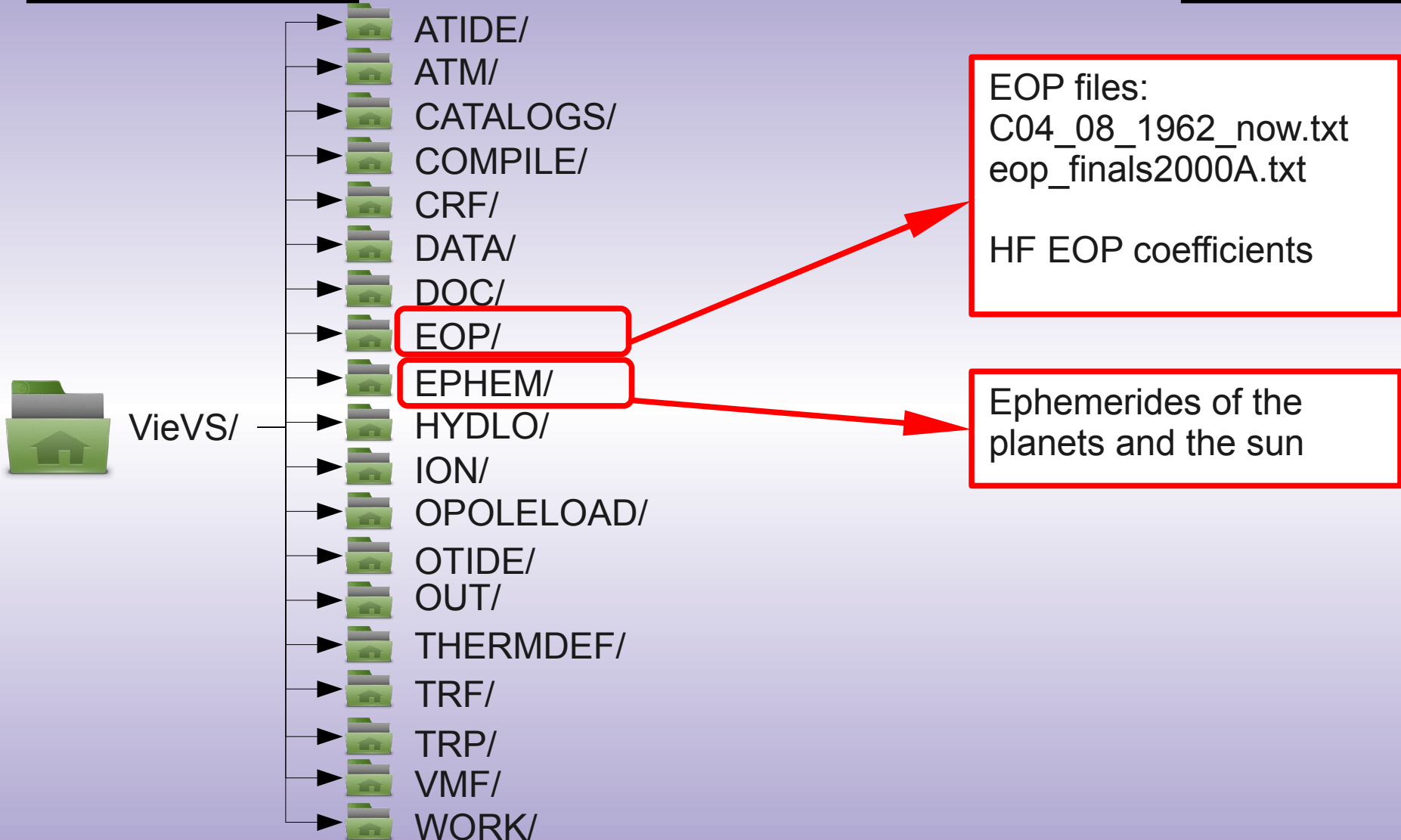
VieVS directories

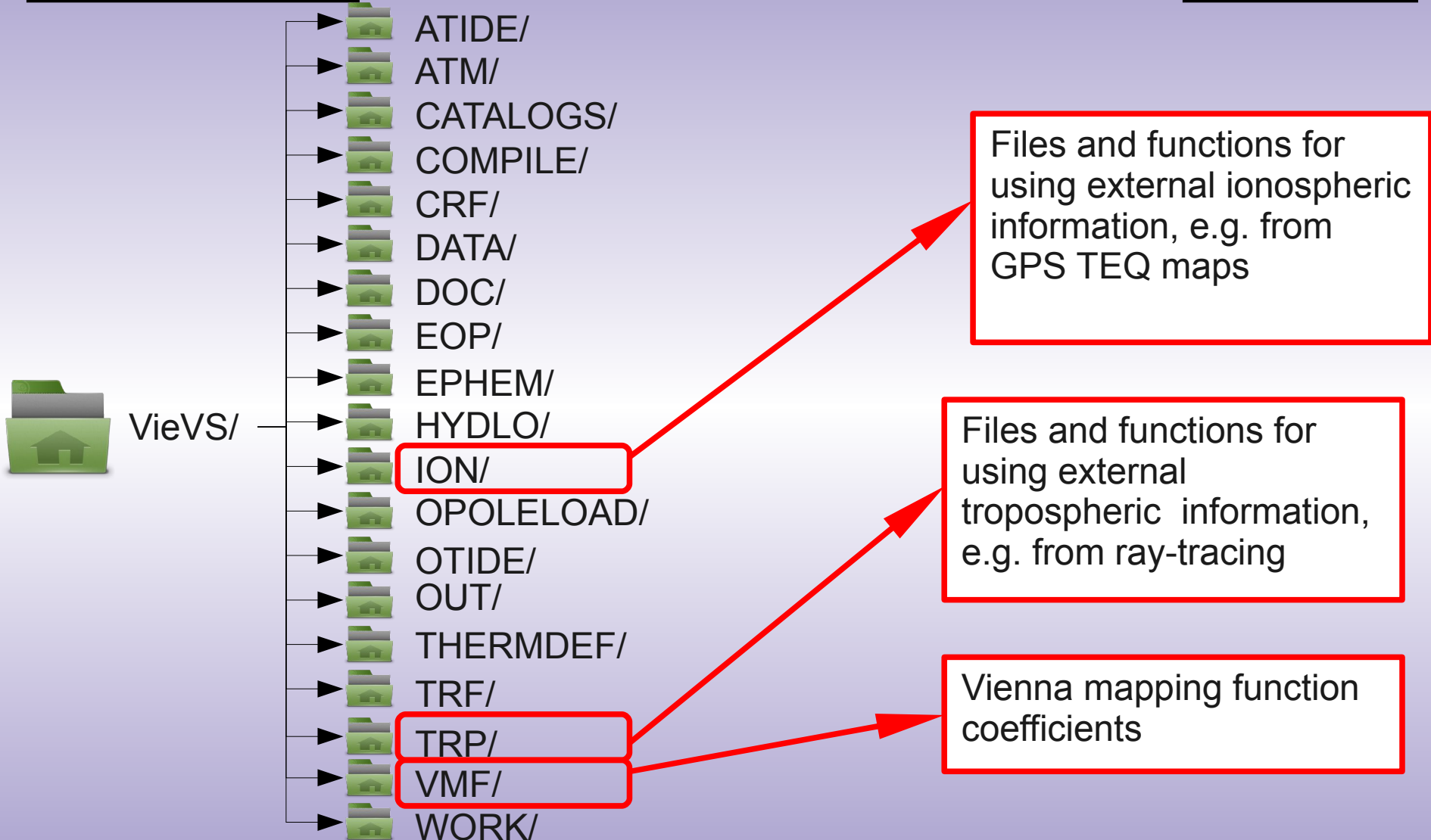






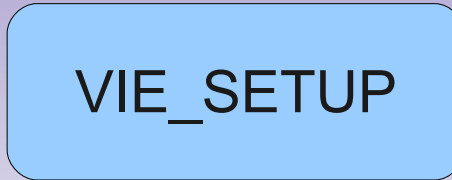








Scheduling software



Graphical User Interface
Allows you to choose the options for the analysis



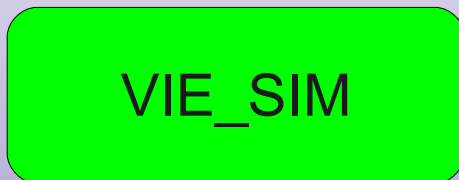
Reads in the data



Calculates the theoretical delay and partial derivatives



Estimates the unknown parameters with the least squares method



Simulation tools




Global solution


Files used and created by different parts of VieVS

VIE_SETUP:

Creates:

 **WORK/process_list.mat**: list of sessions to be processed


 **WORK/runp.mat**: Some general information about the processing, e.g. which parts of VieVS to be run.

 Parameter files in the **DATA/LEVEL0/** directory. Contains the options for the analysis. One for each session in the process list. Name: **SESSIONNAME_parameter.mat**, e.g. **08AUG12XA_N004_parameter.mat**.

Files used and created by different parts of VieVS

VIE_INIT:


Reads:

 Parameter file from **DATA/LEVEL0/** directory (e.g. **08AUG12XA_N004_parameter.mat**).

 Outlier file.

 OPT file.

Creates structure arrays saved in **DATA/LEVEL0/**:

 antenna: list of stations in the session (saved as e.g. **08AUG12XA_N004_antenna.mat**).


 sources: list of sources observed in the session (saved as e.g. **08AUG12XA_N004_sources.mat**).

 scan: list of scan (saved as e.g. **08AUG12XA_N004_scan.mat**).


Files used and created by different parts of VieVS

VIE_MOD:

Reads:

-  The parameter, antenna, sources, and scan structure arrays from the **DATA/LEVEL0/** directory.


Creates:

-  Saves the parameter, antenna, sources, and scan structure arrays from the **DATA/LEVEL1/** directory (file names same as in **DATA/LEVEL0/**).

Files used and created by different parts of VieVS

VIE_LSM:

Reads:

 The parameter, antenna, sources, and scan structure arrays from the **DATA/LEVEL1/** directory.


 OPT file


Creates:

DATA/LEVEL3/:

 x_ (e.g. **x_08AUG12XA_N004.mat**) contains the estimated parameters.

 opt_ (e.g. **opt_08AUG12XA_N004.mat**) contains the lsm options.




 apta_, atpl_: normal equation matrices.


 res_ (e.g. **res_08AUG12XA_N004.mat**) post-fit residuals

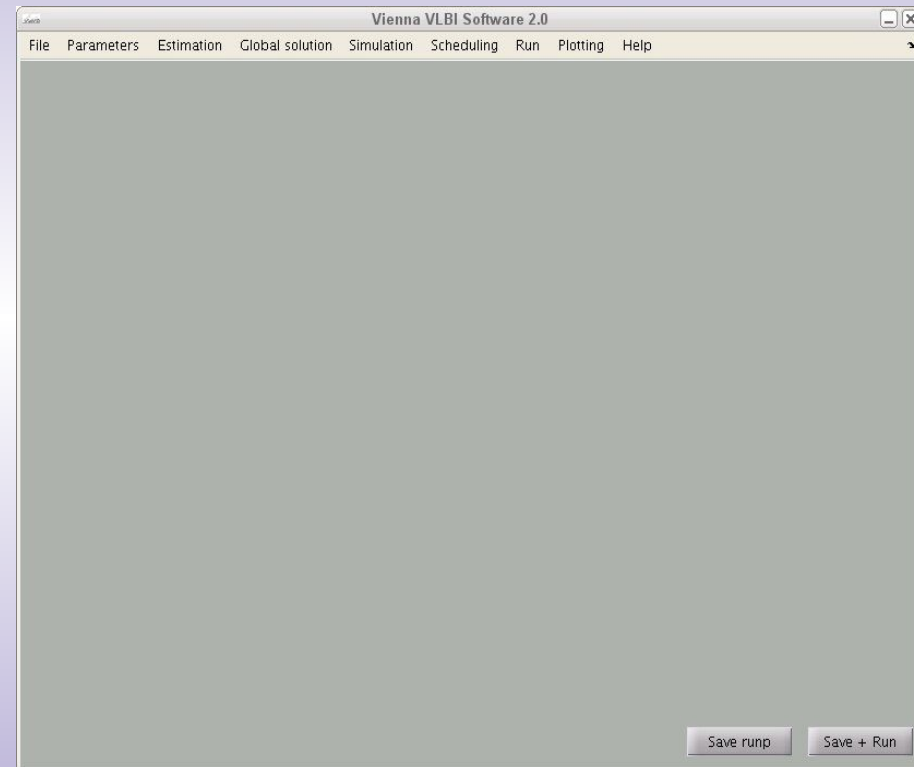
 **DATA/LEVEL2/:** Data for global solution.

 **DATA/OUTLIER/:** Detected outliers

Running VieVS

-  Start MATLAB
-  Change directory to **VieVS/WORK/**
-  Start VieVS with the command:



views
-  The VieVS GUI will now appear



Running VieVS in batch mode

 Run:

```
views('batch')
```

-  Now GUI will be displayed. The processing will start directly.
-  Requires that all option files (process list, parameter files, runp) have already been created.

Run an older version of VieVS

- ❏ To run an older VieVS version, e.g. 1d:

views('1d')






- ❏ To run version 1b in batch mode:

views('1d','batch')

- ❏ Requires that the specific version of VieVS is installed.

- ❏ Never mix different versions!

Documentation

-  Some documentation can be found in the **VieVS/DOC** directory:
-  **views_manual_1c.pdf**: manual for VieVS version 1c, needs to be updated for version 2.0
-  **structures.pdf**, **structures.xls**, and **VieVS_variables.pdf**: Description for the VieVS structure arrays, e.g. antenna, scan, etc.
-  **vie_mod.pdf**: about the models used in VIE_MOD
-  **vie_glob_v1d.pdf**: about VIE_GLOB