MAGEMin framework

MAGEMin



- MPI-parallel C code
- Point-wise minimization at given P-T-X



- Metapelite (White et al., 2014)
- Metabasite (Green et al., 2016)
- Igneous (Holland et al., 2018)
- Ultramafic (Evans & Forst, 2021)
- Mantle (Stixude & Lithgrow-Bertelloni, 2010)

MAGEMin_C



- Julia wrapper of the C code
- Flexible programming interface
- Database calibration
- Geodynamic coupling

MAGEMinApp



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- Web browser app (graphic user interface)
- Parallel point-wise minimization
- PT, PX, TX and PT-X phase diagrams
- Auto labelling, contouring
- Fractional melting/crystallization paths

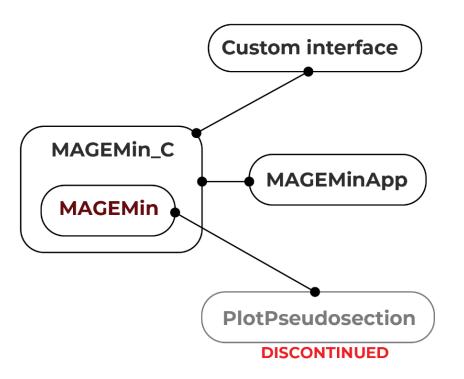
PlotPseudosection



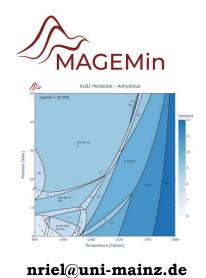
- Matlab app (Graphic user interface)
- Parallel point-wise minimization
- PT, PX, TX diagrams
- Contouring
- PT paths
- Trace element partitioning for mafic to ultramafic systems

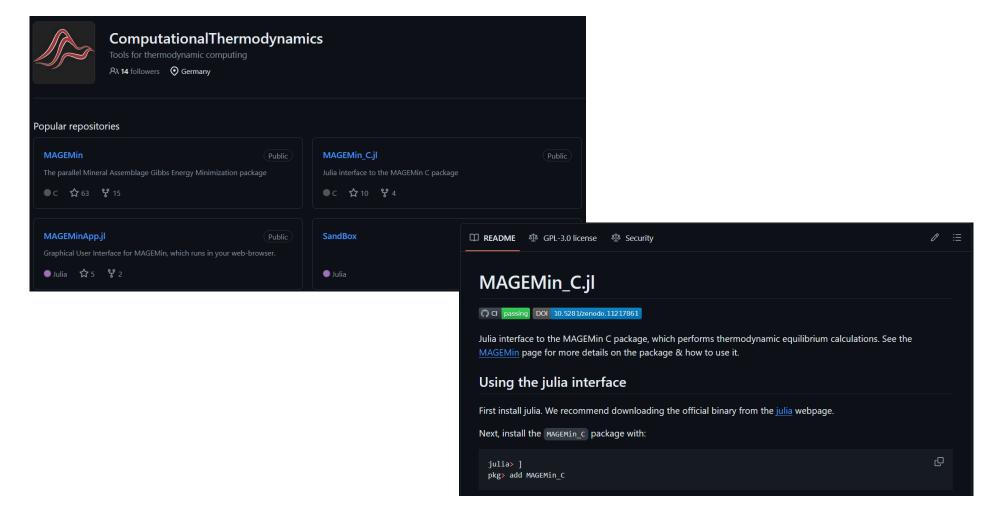
(Mineral Assemblage Gibbs Energy Minimization)

E.G., GEODYNAMIC COUPLING



MAGEMin github: ComputationalThermodynamics







https://github.com/ComputationalThermodynamics

https://github.com/ComputationalThermodynamics/MAGEMin C

https://github.com/ComputationalThermodynamics/MAGEMinApp

Required and optional software for the shortcourse



- https://julialang.org/downloads/
 - Allow to install and use MAGEMinApp and MAGEMin_C



- Visual Studio Code Code editor https://code.visualstudio.com/
 - Allow Windows user to connect to Linux WSL and get the best performance for MAGEMin



- https://inkscape.org/fr/
 - Allow to open MAGEMinApp figure vector format (svg)



- WINDOWS users
- Recommended to install and use WSL (Windows sub-system for Linux)
- Connect to WSL and Linux Via VSCode (see next slides)
- MAGEMin performs twice faster on Linux/Mac than native Windows

Julia installation
 Mac and Linux

Julia installation MAC LINUX



Install the latest Julia version (v1.10.5 August 27, 2024) by running this in your terminal:

\$ curl -fsSL https://install.julialang.org | sh

COPY

For Windows instructions click here

Once installed julia will be available via the command line interface.

This will install the Juliaup installation manager, which will automatically install julia and help keep it up to date. The command juliaup is also installed. To install different julia versions see juliaup --help.

Please star us on GitHub. If you use Julia in your research, please cite us. If possible, do consider sponsoring us.

curl -fsSL https://install.julialang.org | sh

Julia installation Windows

Julia installation WINDOWS

Not the favoured way for performances, but faster to install and have MAGEMin up and running



Install the latest Julia version (v1.10.5 August 27, 2024) from the Microsoft Store by running this in the command prompt:

> winget install julia -s msstore

COPY

It looks like you're using Windows. For Linux and MacOS instructions click here

Once installed julia will be available via the command line interface.

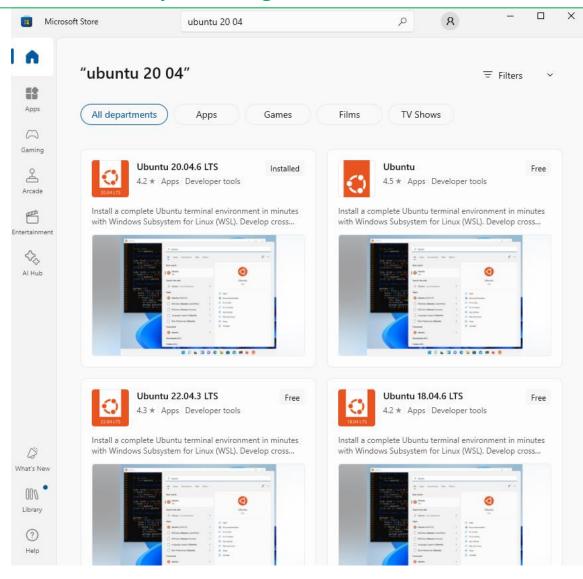
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winget install julia -s msstore

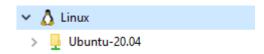
MAGEMinApp installation (Windows with WSL)

• Favoured way, a bit longer to install but much faster

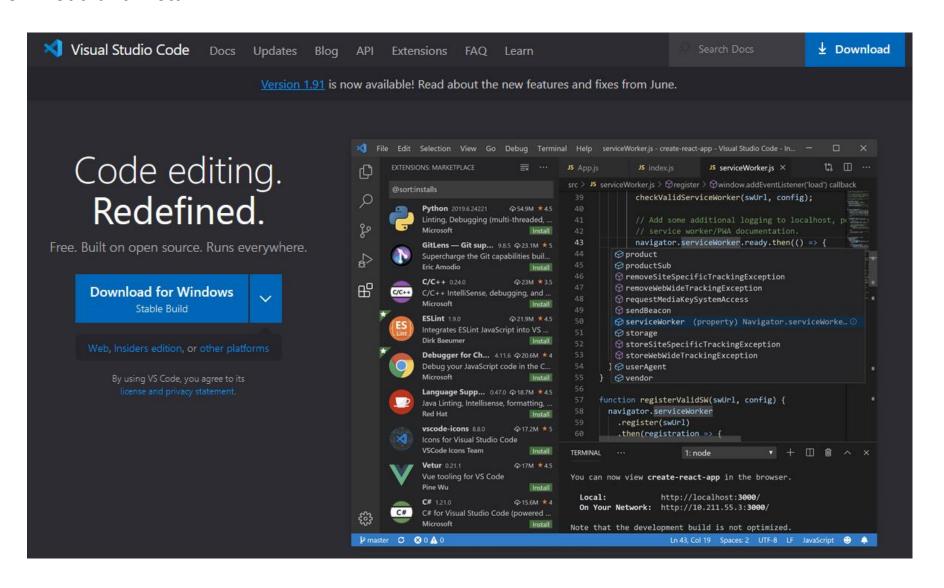


- Open Microsoft store (start-up menu)
- Look for Ubuntu 20 04
- Install Ubuntu 20 04
- Restart computer
- A terminal will open and ask for setting up a Linux username and password to your Ubuntu

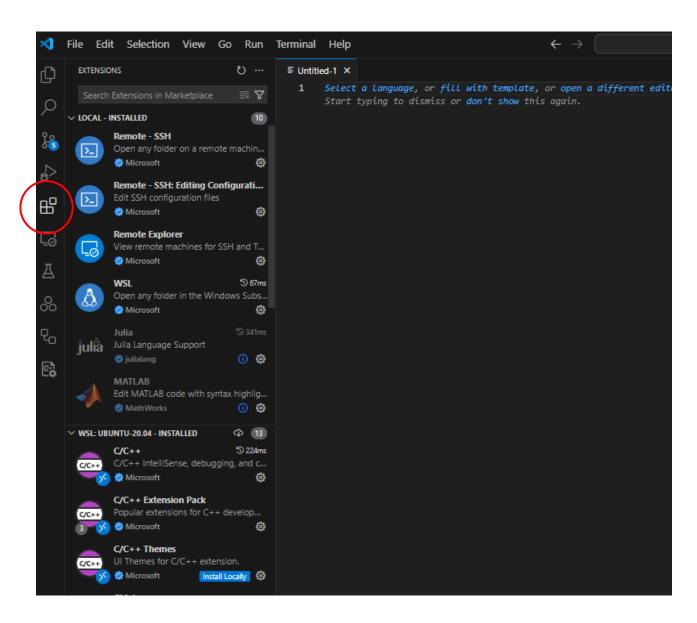
 A new folder in the explorer should appear:



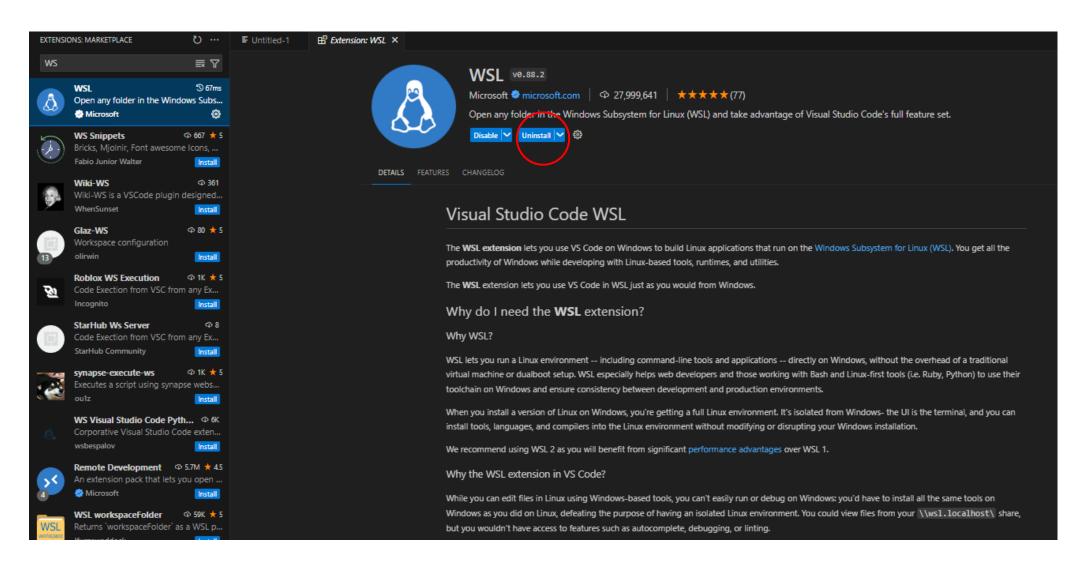
- https://code.visualstudio.com/
- Download and install



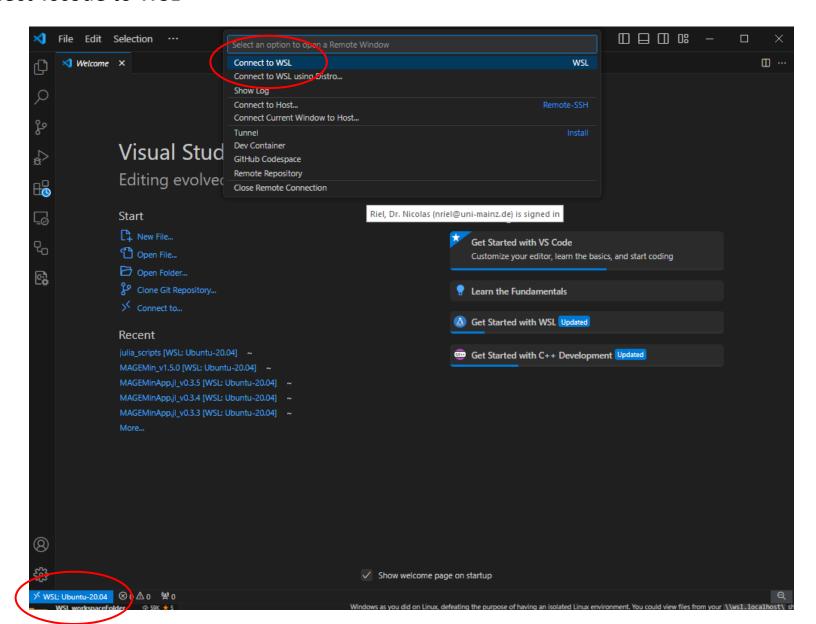
Install WSL plugin



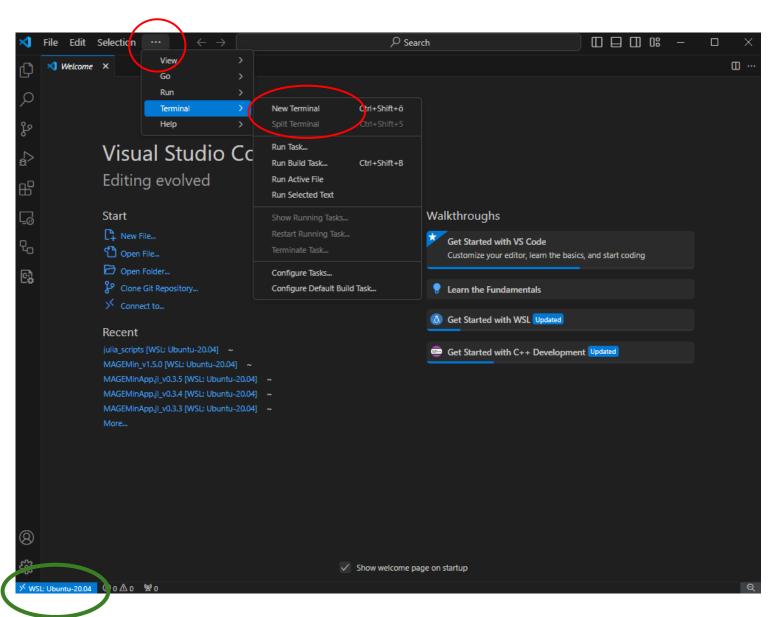
Install WSL plugin



Connect vscode to WSL



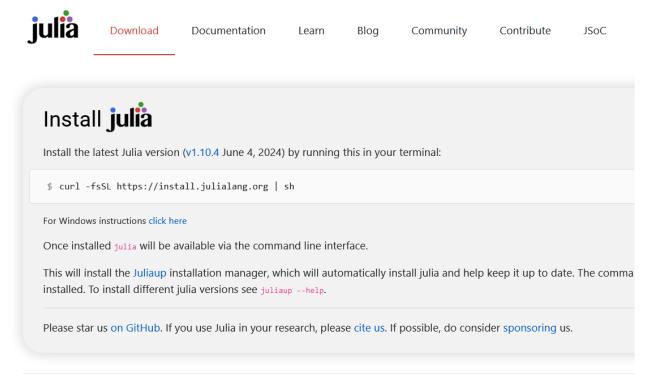
Open a new terminal



Julia installation WSL (Windows)

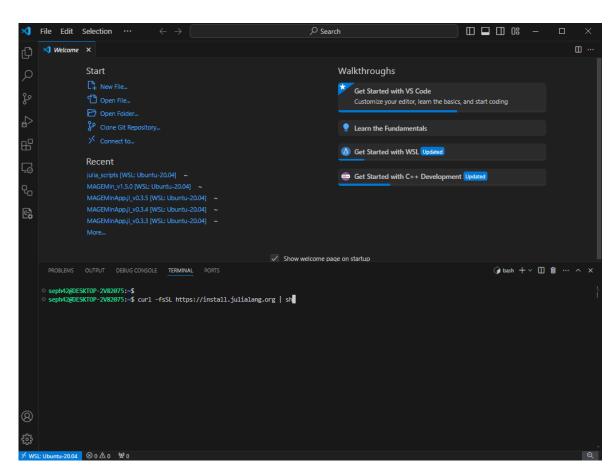
• Get the command to download Julia: curl -fsSL https://install.julialang.org | sh

https://julialang.org/downloads/



Please do not use the version of "Julia" shipped by unix package managers

Many unix package managers ship broken and/or significantly out of date versions of Julia. Please use juliaup or download the c



Execute the command in the terminal

MAGEMinApp & MAGEMin_C installation

Windows Mac and Linux

Install MAGEMinApp

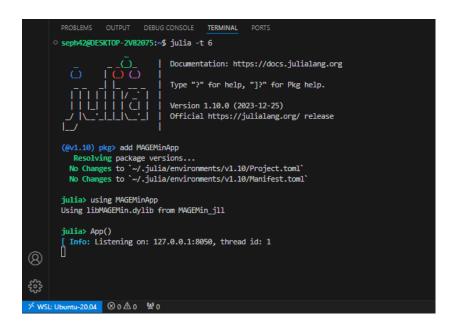
- Open a new terminal (vscode for those who use it, or terminal/powershell for others)
- Type:
 - julia –t 6 # where 6 is the number of core you want to use (depends on your machine, type # 'versioninfo()' to get more informations)

- In the terminal type ']', this will open the package manager
- Type 'add MAGEMinApp', this will download and install MAGEMinApp
- Once installed, quite the package manager by typing 'BACKSPACE' key

Launch MAGEMinApp

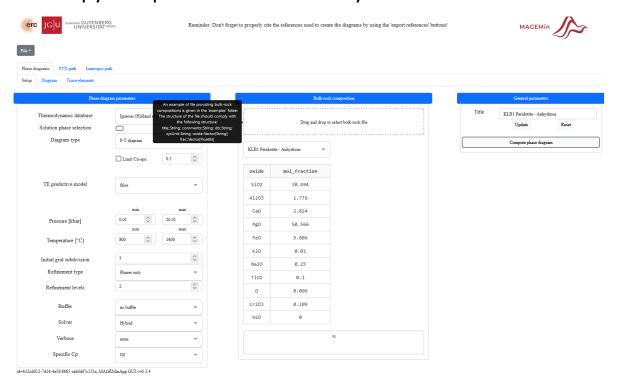
- In the Julia terminal, type: 'using MAGEMinApp'

 Then
 'App()'
- The following text will be displayed in the terminal:





• Copy and paste the address in your web-brower:



MAGEMin_C, the julia interface: installation



https://github.com/ComputationalThermodynamics/MAGEMin_C.jl

Install MAGEMin C



Load MAGEMin_C

julia> using MAGEMin C # load MAGEMin C