

Scatter-MATPIVoT: A MATLAB script to plot the multi-parameter scatter plots of a PecubeGUI inversion (with NABayes PDFs)

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This Python script has been set up to plot the multi-parameter scatter plots of a PecubeGUI inversion. Users can plot the result alongside the 1D PDFs per parameter as calculated by the method described in Sambridge 1999 (called “NABayes”). The Python counterpart by Isabel Wapenhans et al. can also be accessed on Zenodo.

1. Requirements

This code requires MATLAB installed (R2020a or later recommended).

2. Input

- This script reads the model's name from the folder in which it is placed.
- It reads parameter and misfit values from:
 - **NA/NA_results.csv** (final inversion results).
 - **NA/nab.out** (NABayes PDFs are not calculated in this script and must be separately calculated beforehand and supplied to the **/NA** folder in order to run this script.)
- The script automatically determines the input file locations, so it can be run at any stage after the inversion has started.
- The script also identifies the **best-fit model** (lowest misfit) and marks it on the scatter plots.

3. Folder Structure

```
MATPIVoT/
├── 02_scatter/
│   ├── Code/
│   │   ├── main_scatter.m      # Contains MATLAB scripts
│   │   │   └── # Main MATLAB script
│   │   ├── parse_nab_file.m   # Function to read PDF files
│   │   ├── plot_scatter.m     # Function to generate corner plots
│   │   └── read_csv_results.m  # Function to read NA CSV results
│   ├── Example/
│   │   ├── # Default location for model folders
│   │   └── BAT12/
│   │       ├── # Example model folder, directly from Pecube inversion results
│   │       └── NA/
│   │           ├── NA_results.csv # Final inversion results
│   │           └── nab.out # PDF files from NAB
│   └── Instructions/
│       ├── # User documentation
│       └── 02_scatter_MATPIVoT_instructions.pdf
```

4. Usage

- There are two ways to run the script:
 - **Option A** (idefault):
Copy your inversion model (e.g., **BAT12/**) into the **MATPIVoT/02_scatter/Example/** directory.

Pecube Inversion Visualization Tools (PIVoT) - Part 1: Evolution-MATPIVoT

- **Option B:**

Copy the entire **MATPIVoT/** folder into the main **Pecube/** directory.
Your inversion model (e.g., **BAT12/**) should then be located under **Pecube/**.

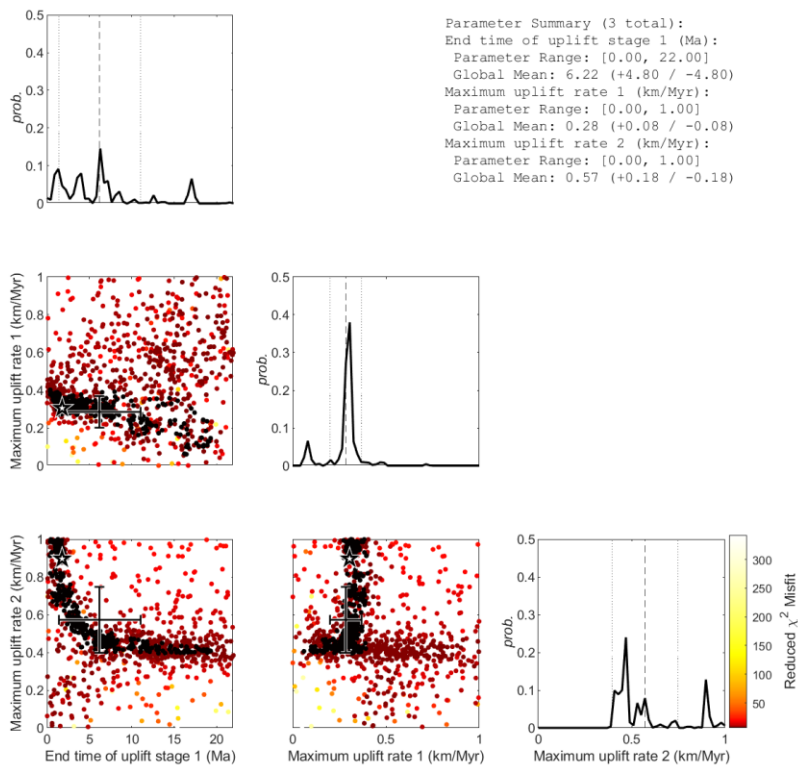
- If you use Option B, uncomment the corresponding lines in the script for **filepath** and **pdf_file**.
- Edit the names of the inversion parameters under **USER INPUT** section:
`titles = {'xxx', 'xxx'}.`
- Run this script from command-line with either:
 - In the MATLAB editor → click **Run**, or
 - In the Command Window:

```
run(main_scatter.m), or simply  
main_scatter
```

5. Example

model directory: **/BAT12**

```
titles = {'End time of uplift state 1 (Ma)', 'Maximum  
uplift rate 1 (mm/yr)', 'Maximum uplift rate 2 (mm/yr)'}
```



6. How to cite

If you use this plotting script, please following DOI: [xxx].

7. Contact

If you have questions or suggestions for improvement, please do not hesitate to contact: Lingxiao Gong - gong@uni-potsdam.de