PICKGUI: Tracing radar reflectors in MATLAB

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2014 SHARAD–MARSIS Data User's Workshop

Supported by:







Motivation for a MATLAB solution

Recognizing that is no clear winner as a comprehensive tool for tracing a large amount of radiostratigraphy and then doing something with it

- KU Greenland radar data already available in MATLAB's .mat format
- Challenges associated with importing/exporting into various seismic software packages
- Recent development of novel methods for predicting reflector morphology
- Relatively easy GUI development
- Fear the black box
- Need for efficient workflow between reflector tracing, dating, ice-flow modeling and echo-intensity analysis

Ultimately, we are tracing lines on images, which isn't that hard, but organizing those lines making geophysical sense of them *is* hard

PICKGUI pros/cons

Pros

- Free as in MATLAB
- Flexible and user-extensible
- Reasonably documented and commented, but not exhaustively so
- Emphasis on QC: Anyone can pick a layer, but believing a layer is harder
- Code repository on Github makes forking/merging easy
- Traced lots of Greenland radiostratigraphy successfully, i.e., it works
- Could easily be extended to include cluttergrams

Cons

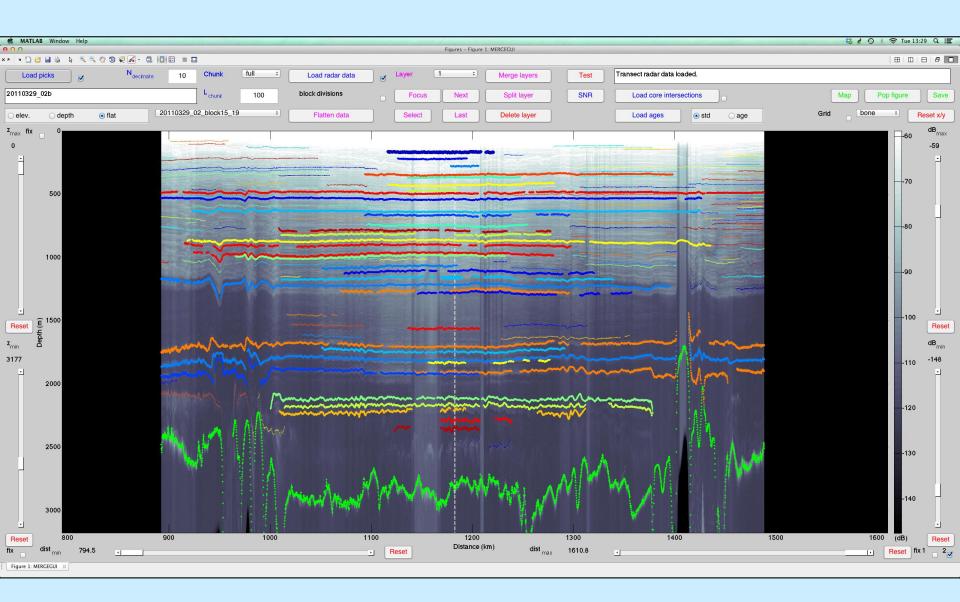
- I am currently the only developer
- Functionality satisfies current interests (terrestrial IPR data)
- Modification to work with SHARAD data requires support (\$) or a suitably motivated researcher
- Mapping, Signal Processing and Image Processing Toolboxes strongly recommended

Example tracing of a ~50-km segment

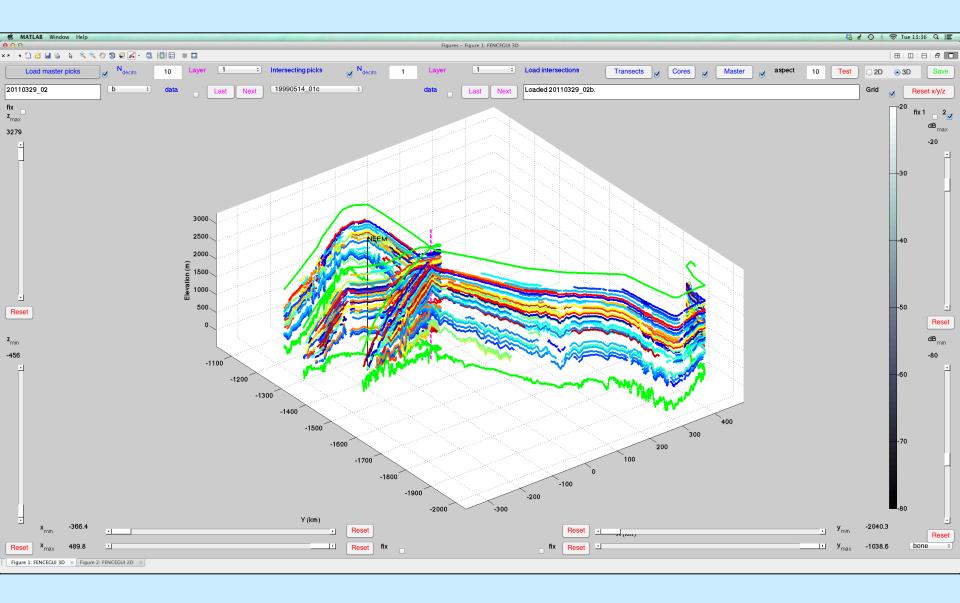
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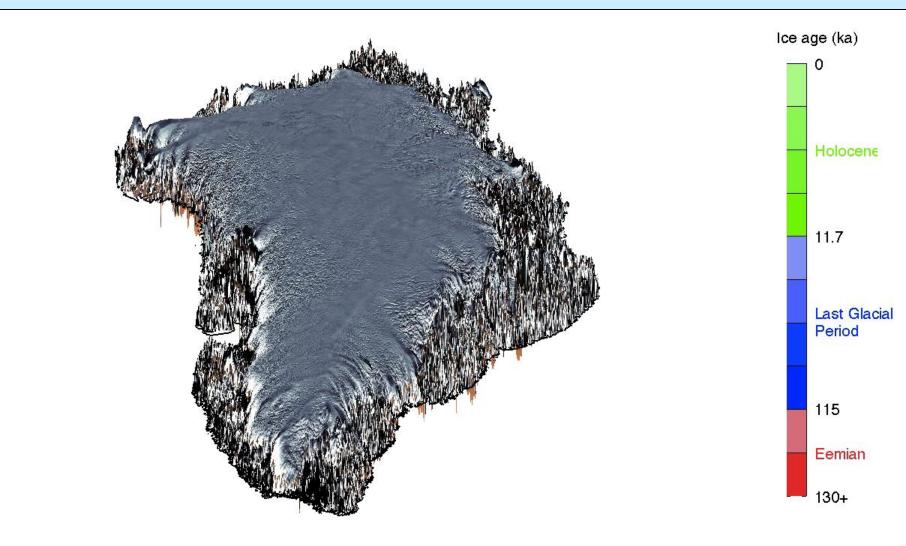
#### Example QC of hundreds of kilometers of data



#### **Example matching of layers between transects**



#### Age structure of the Greenland Ice Sheet



Ice-sheet surface and bed elevation and masks from *Bamber et al.* [2013, The Cryosphere] MODIS Mosaic of Greenland from J.A. Bohlander and T.A. Scambos

### Interested?

#### Two options:

- Contact me: joemac@ig.utexas.edu
- Download from Github: https://github.com/ joemacgregor/pickgui

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	radarint.m	fencegui	- bug fixes, improved master	layer matching/coloring, aspect	11 months ago
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#### README.md

#### pickgui

MATLAB scripts/functions for tracing reflectors in ice-penetrating radar data.

See either misc/pickgui_man.pdf or run "help FUNCTION_NAME" in the MATLAB command line to learn more about each script/function.