

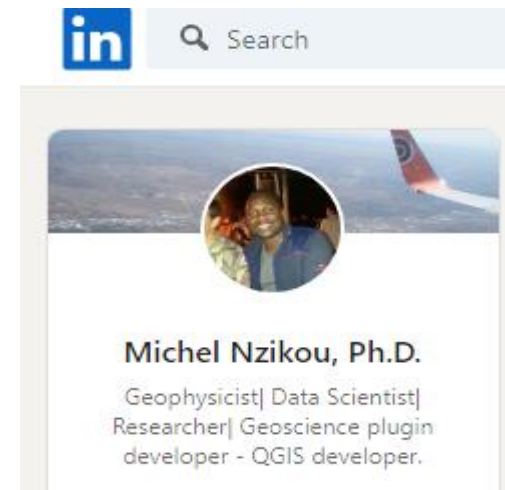
QGIS Plugins Development for 3D Geological modelling

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[Michel Nzikou Mamboukou - Centre for Exploration Targeting \(cet.edu.au\)](http://cet.edu.au)



Geogeeks May 10, 2023
@Riff, Perth, WA

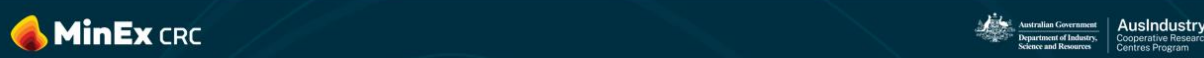
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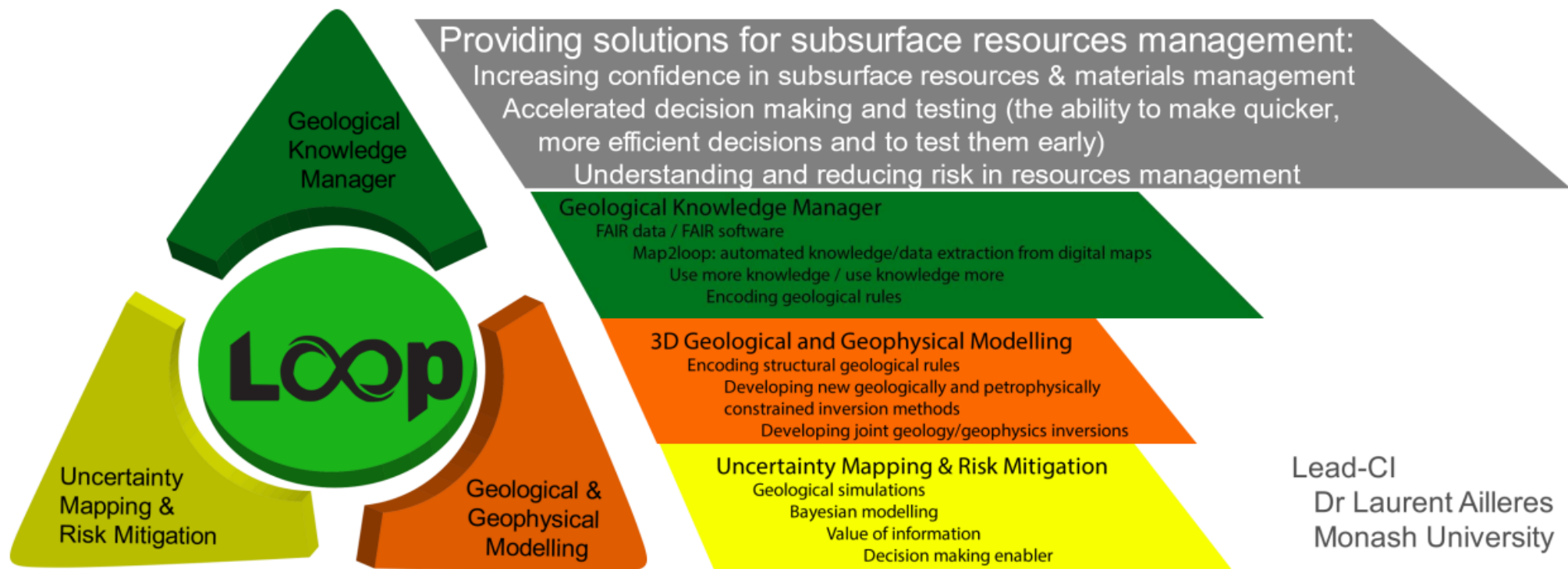


Loop

1. Loop Project

Loop

An integrated and interoperable platform enabling 3D stochastic geological modelling





DARE
Leonardo Portes dos Santos

Navigating tipping points in complex dynamical systems



Guillaume Pirot
Uncertainty analysis & hydrogeology



Mark Jessell
Project Leader



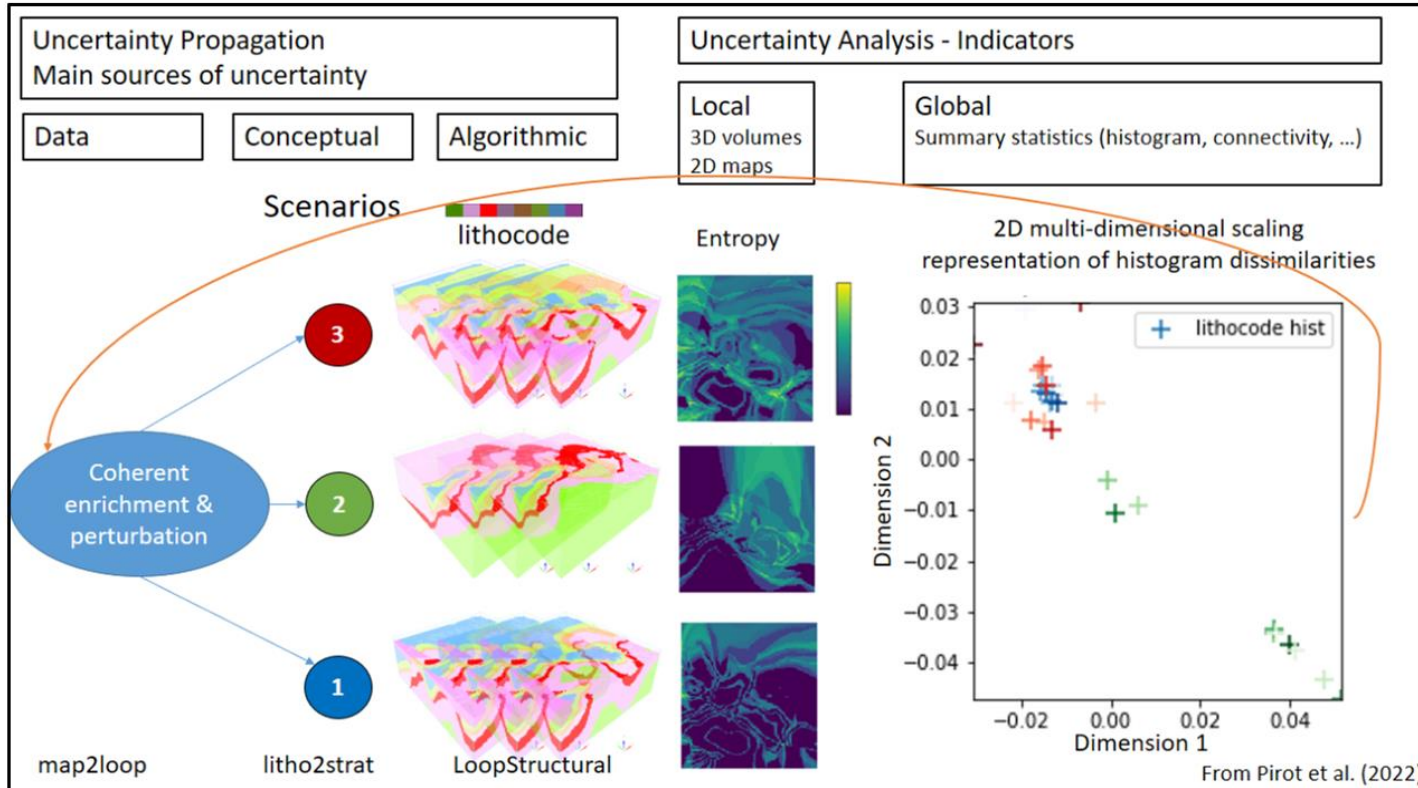
Vitaliy Ogarko
Geophysical Inversion & Stratigraphy from Lithology



MinEx
Michel Nzikou
Useability

1.1. Uncertainty Analysis: loopUI

- Open Source indicators
- Localize geological uncertainty
- Identify dissimilarities across ensemble of models

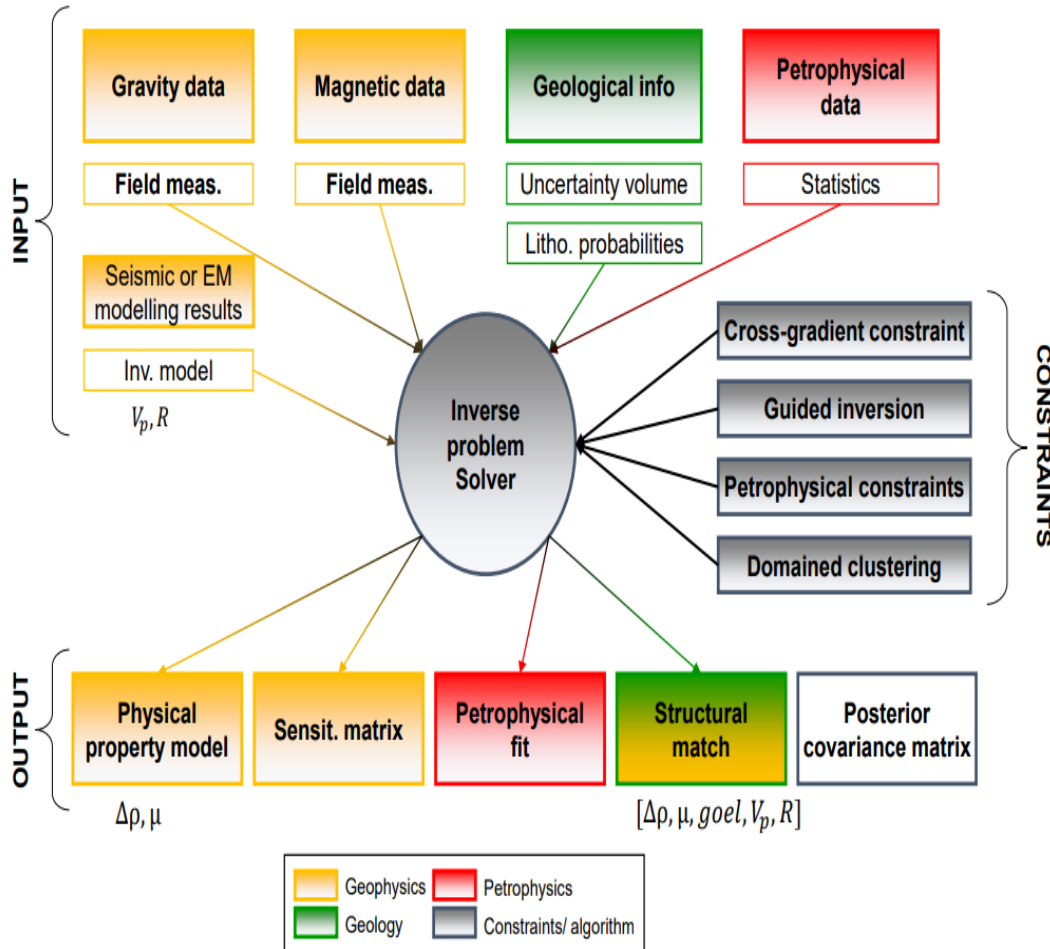


Working on two main themes:

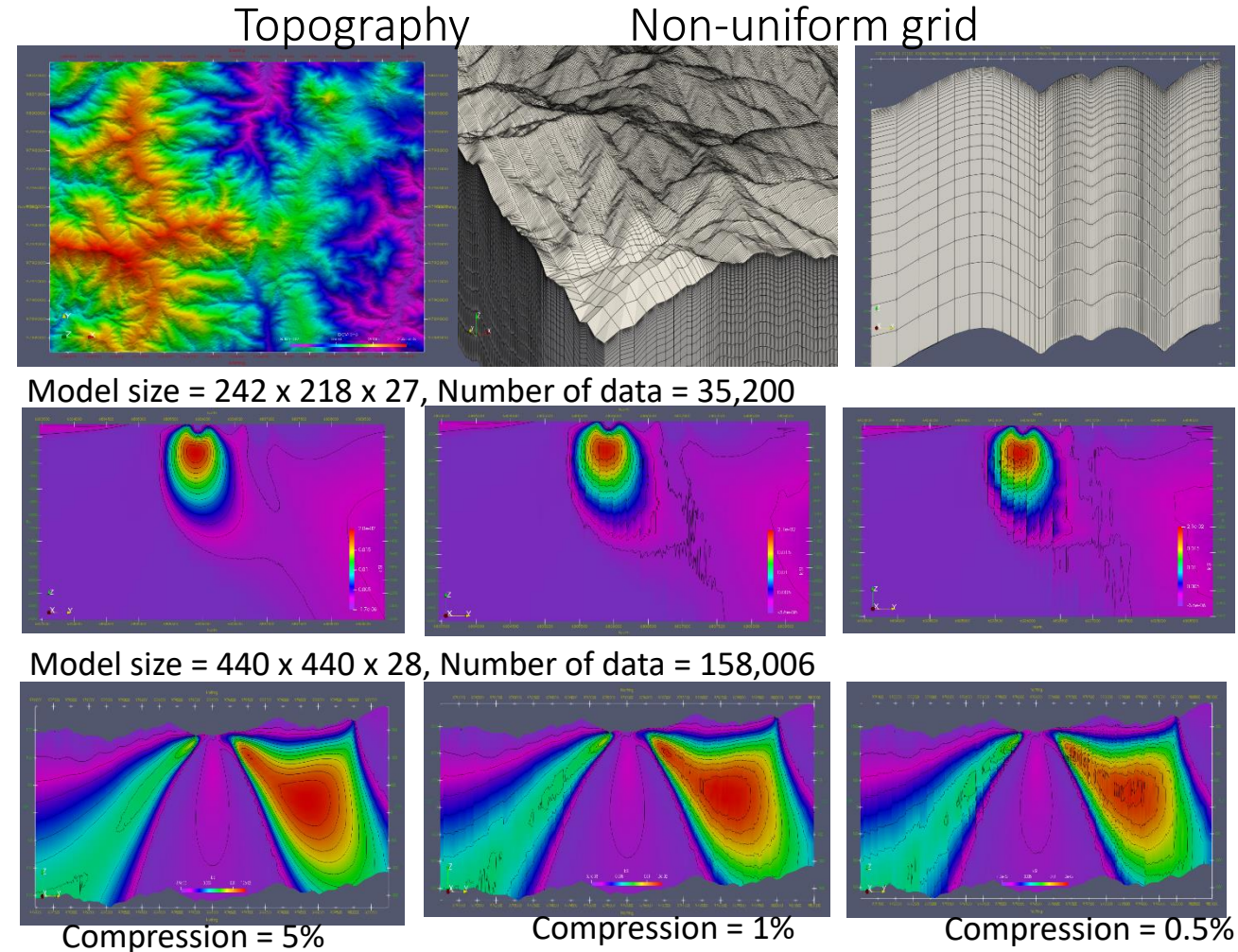
- 1) Improving uncertainty propagation through the modelling workflow
- 2) Characterizing prediction or outcome uncertainty to support decision making

1.2. Joint inversion platform: Tomofast-x

- **Open Source**
- **Parallelised 3D Inversion Code**

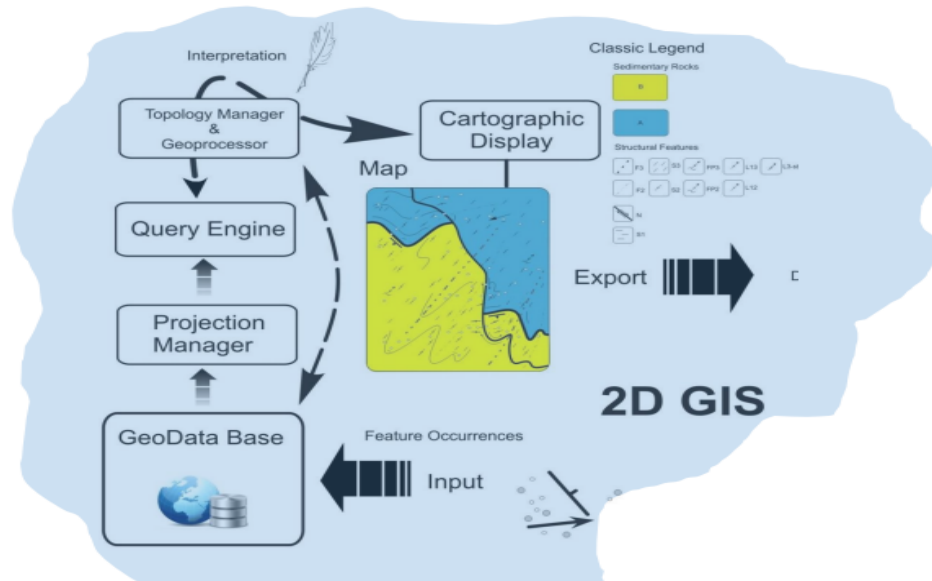


Some of the features added in Tomofast-x 2.0



1.3. Map Deconstruction: **map2loop**

- Open Source
- Automated extraction of geological information from maps
- Unbiased repeatable process



map2loop

Simple translation

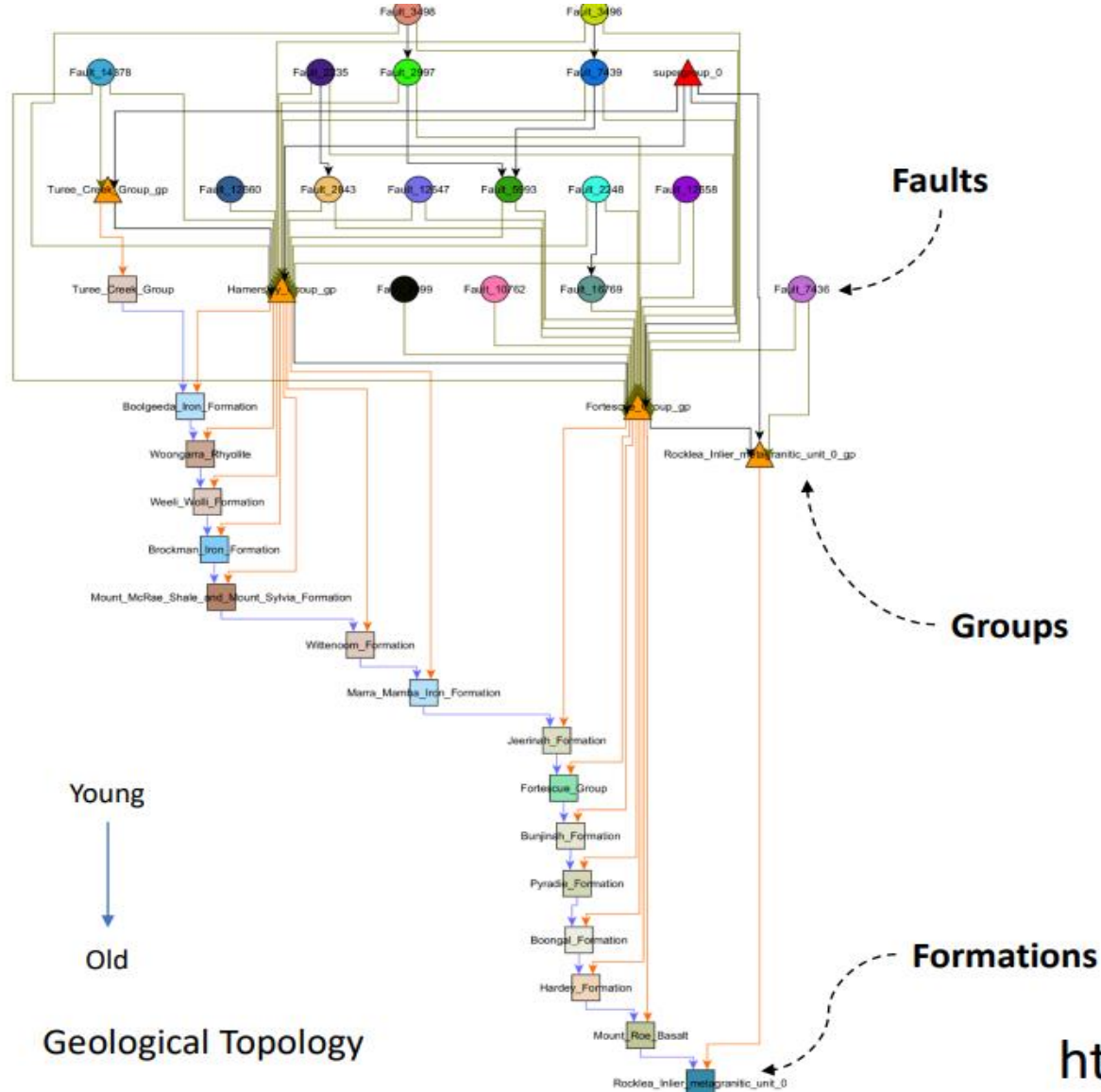
Map Analytics

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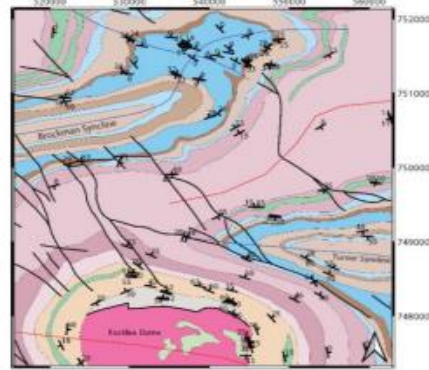
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Current Usage: manual method with one model built
map2loop: automated which allows multiple hypotheses

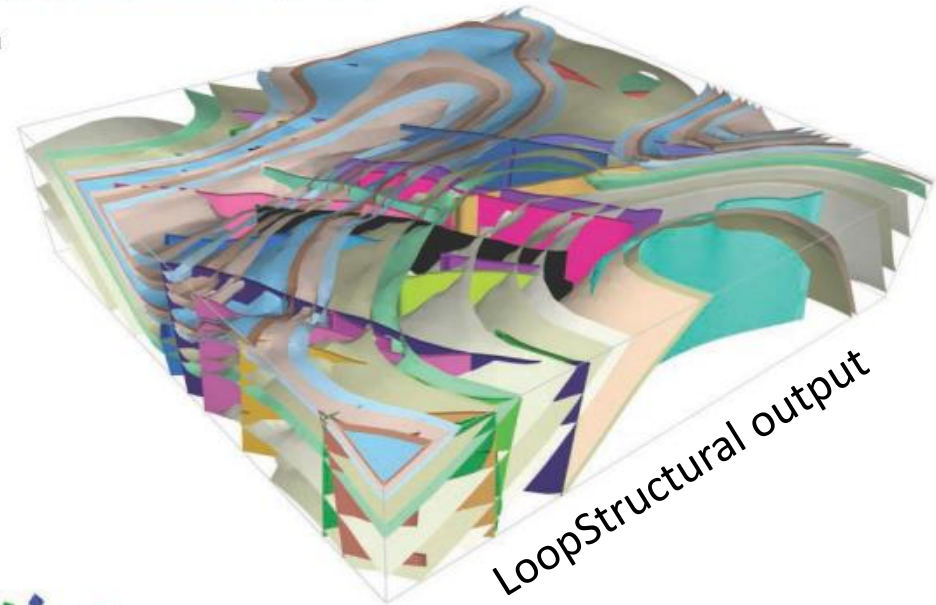
1.3. Map deconstruction



map2loop output



a



LoopStructural output

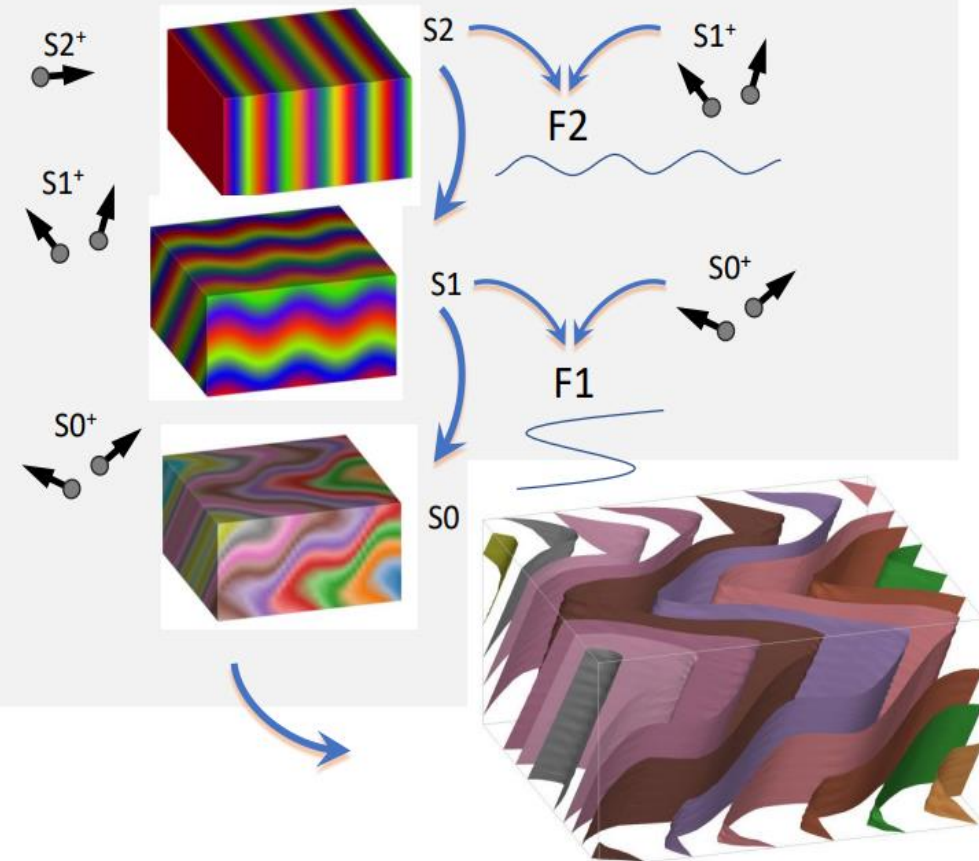
1.4. 3D modelling engine: **LoopStructural**

- **Open Source**
- **Uses full field dataset**
 - **Contacts**
 - **Bedding**
 - **Cleavages**
 - **Fault offsets**
 - **Timing relations**

Time-aware Geometrical modelling – combining structural frames

Poly-deformation:

- Modelling events step by step
- Time-aware process: youngest event is modelled first, then the second youngest, etc... until the primary foliation (most often bedding) is modelled
- Modelling is geometry based (not mechanical)
- Event types:
 - each fault or family of faults
 - Folding event
 - Unconformity
 - Intrusions





2. QGIS Plugin Development

QGIS

A Free and Open Source Geographic Information System

- Free and open source
- Fast and extremely easy installation on both window and Linux & Mac
- Lots of plugins and extensions, reliable and constantly updated
- Design your customized QGIS Plugin
- Very simple and effective GUI to work with
- Seamless to connect with databases and export and import spatial data to and from.
- ..
- ..



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<https://github.com/Loop3D/qgis-loopplugin>

2.1. Proposed Workflow Development

Local PC



QGIS



In dev/testing phase (version v0.5)

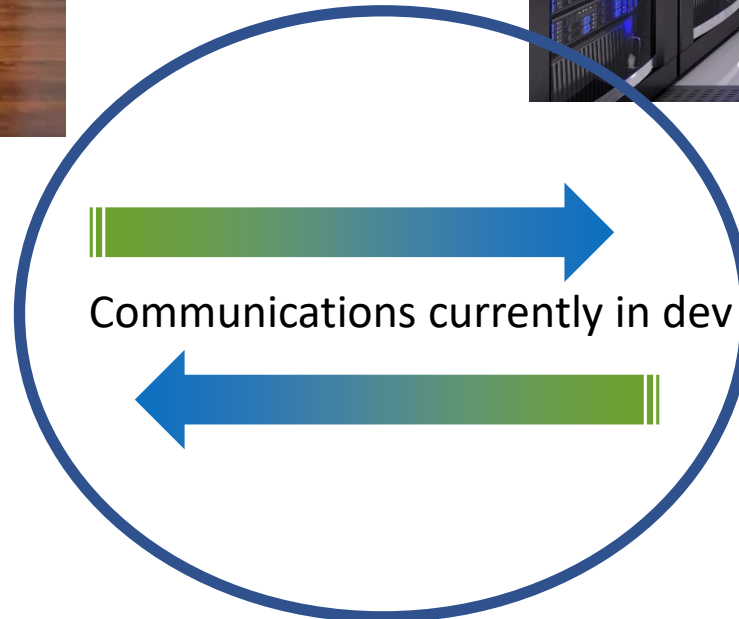


Remote Server

*Map2loop
Remote server*

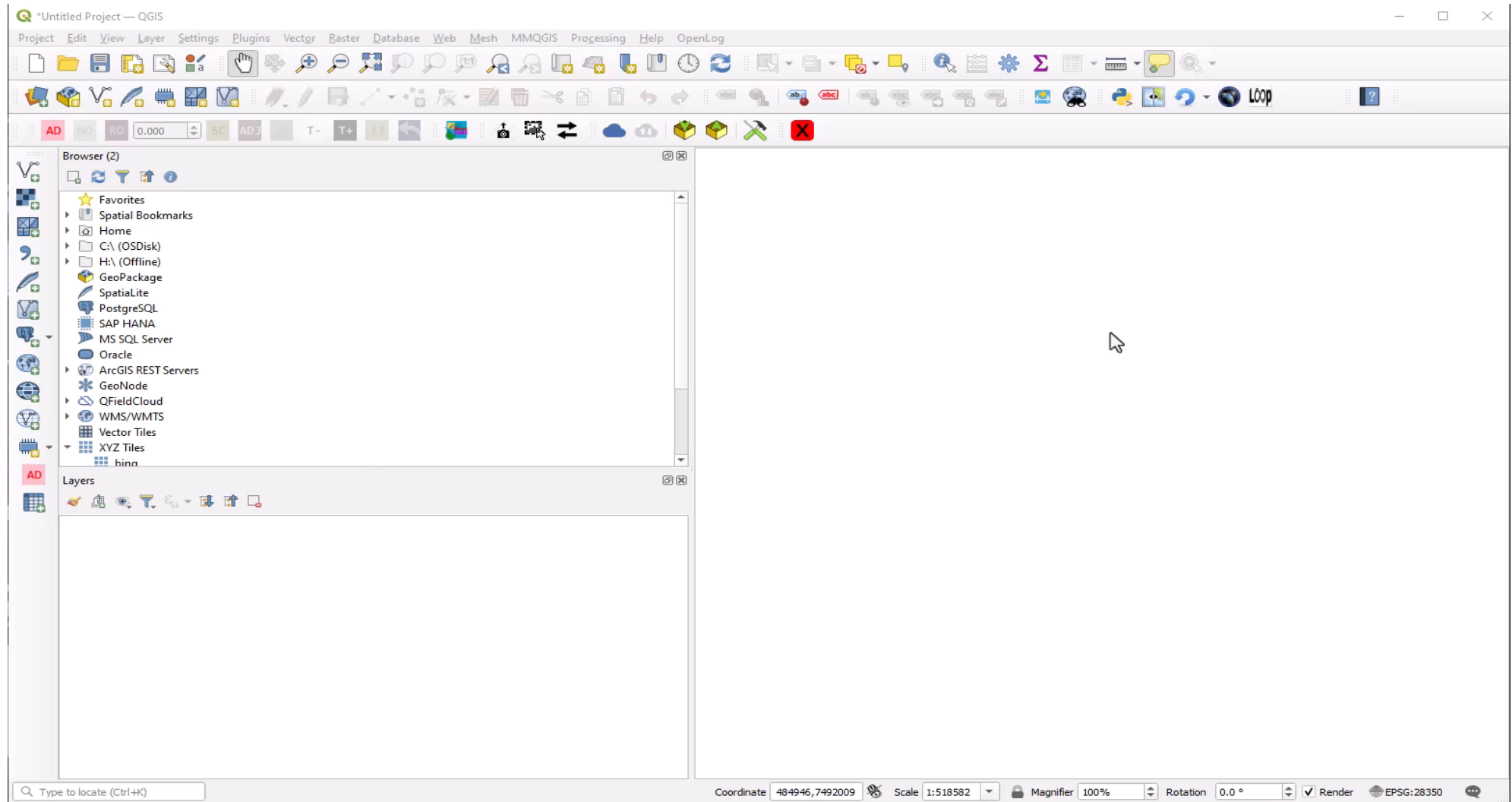


Remote server in testing phase



Working in progress

**Automated
data processing &
data clipping**



Pdf copy to follow this link for animation



<https://github.com/Loop3D/qgis-loopplugin>



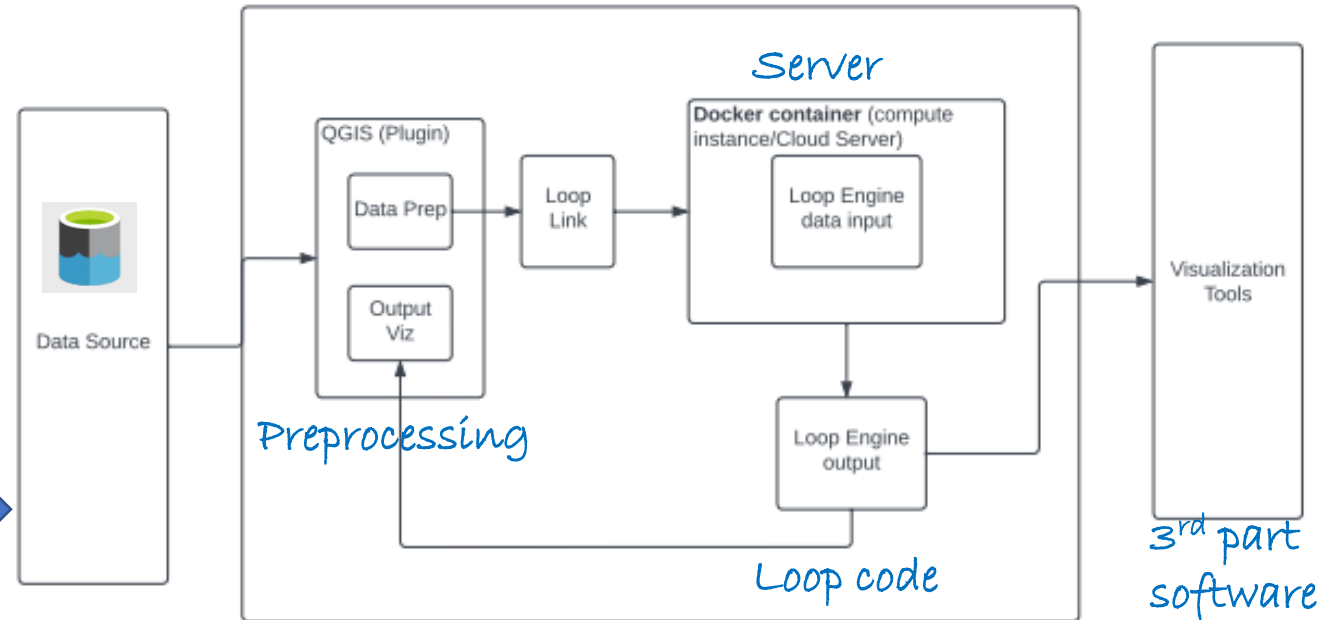
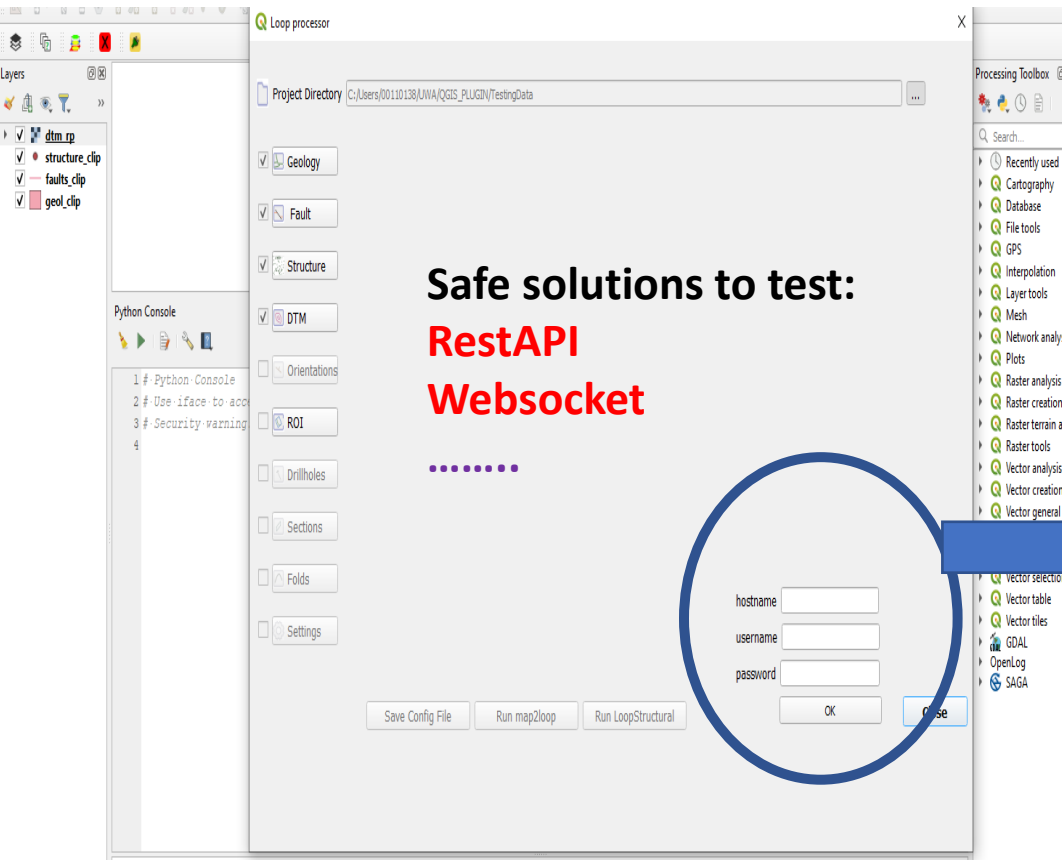
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2.4. What is an end point solution?

- 1- More testing
- 2- Connect Loopstructural
- 3- Save user new dictionary

2.4. What is an end point solution?



Best solution for remote communication



Understanding User needs

Loop3D - usability questionnaire

The Loop team is working towards building an interactive Loop3D WebApp, to increase usability and improve the overall user experience. As such, we want to build on your experience with Loop. Your feedback is invaluable to help us develop tools that are tailored for our users' needs.

 mark.jessell@gmail.com (not shared) [Switch account](#)

* Required

Which organization do you represent? *

Your answer

What is your role in this organization? *

Loop3D - security questionnaire

The Loop team is working towards building an interactive Loop3D WebApp, to increase usability and improve the overall user experience. This questionnaire will help us understand potential security conflicts for users when interacting with Loop and GIS software.

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* Required

Which organization do you represent? *

Your answer

What is your role in this organization? *

3. Upcoming training opportunities

NEW WORKSHOPS AVAILABLE
Visit 6ias.org/workshops/

6ias Workshops

Archean Fault Rocks: 23 – 24 July 2023

3D Modelling and Loop: 22 – 23 July 2023

Archean-Proterozoic boundary core workshop: 25 July 2023





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THANK YOU

