Ruden AS

IAH høstmøte 2026

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Hei PER!! Er du der ☺

Vannprøver fra Karoo i Tukyu,
Lake Nyasa, Tanzania, 1985

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WORK IN PROGRESS

Preparations for Groundwater prospecting

in arid St. Marie Basin

South Madagascar

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PROSPECTING FOR WATER IN AREAS UNDER SEVERE WATER STRESS IS OUR SPECIALTY.

THIS SHORT PRESENTATION WILL ILLUSTRATE SOME OF THE CONCEPTS UNDERLYING THIS PROJECT.

1. The geological context

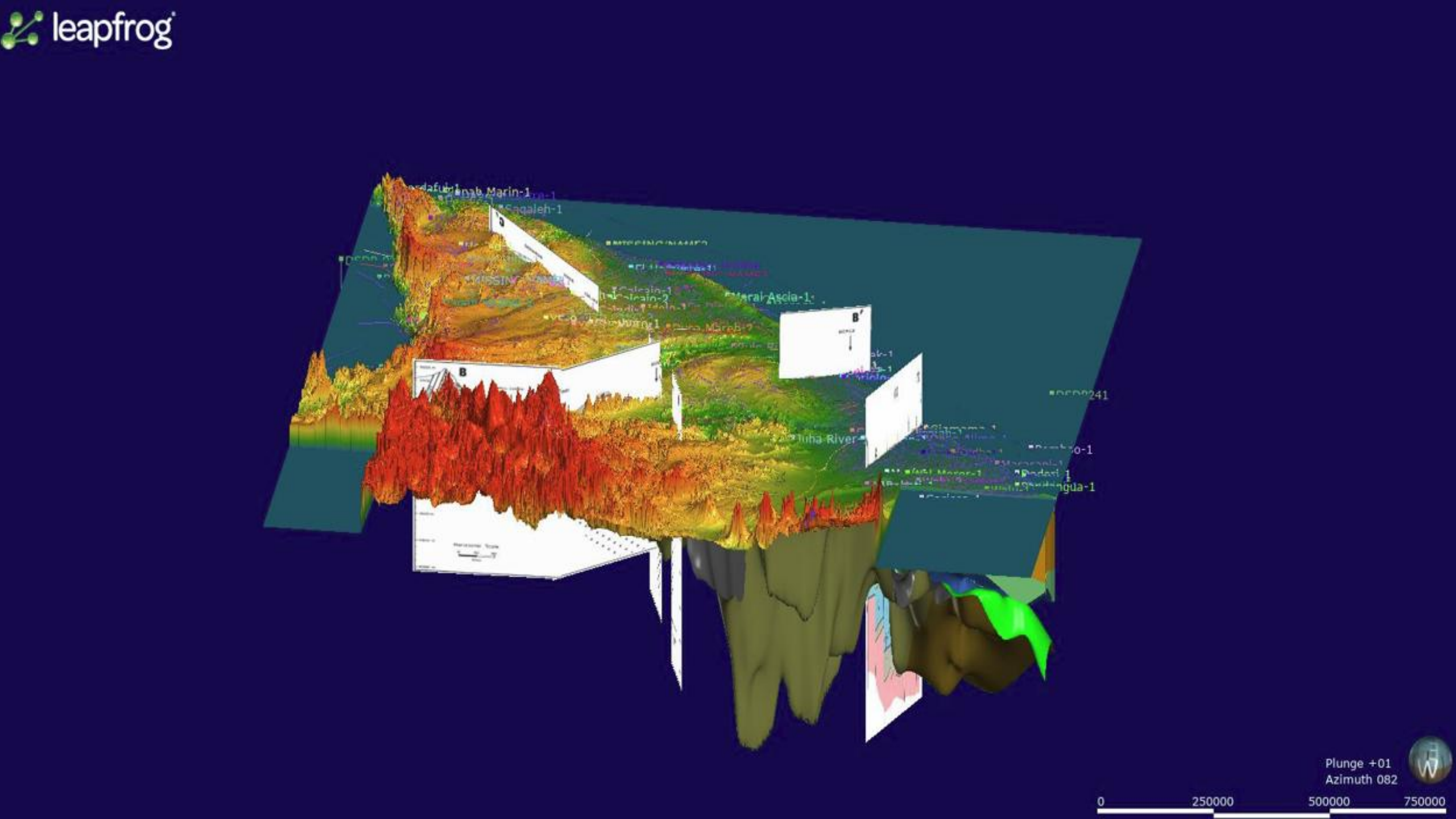
2. Identifying targets for water prospecting

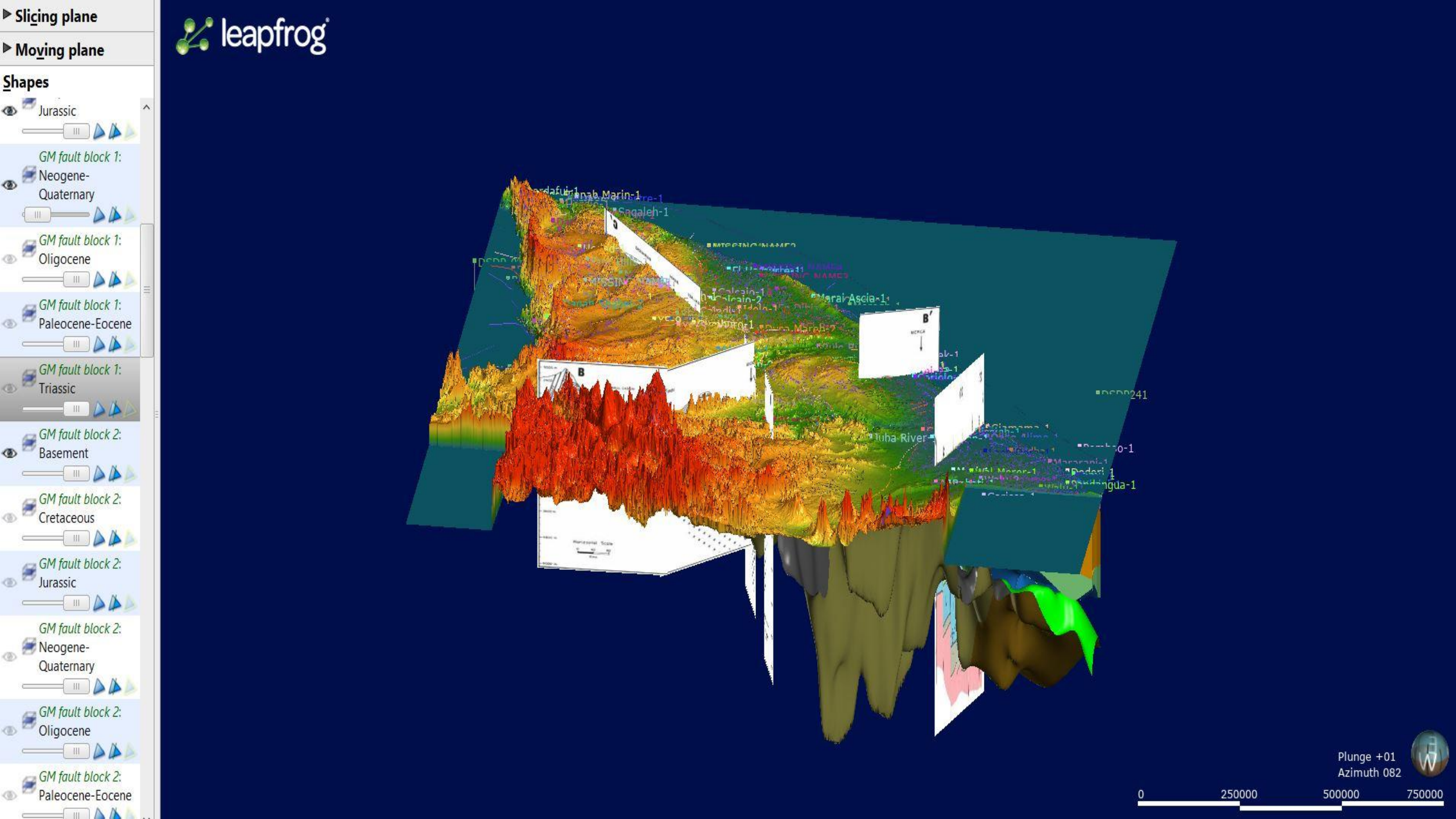
3. Integrated data aquisition procedure

1. **The geological context**

2. Identifying targets for water prospecting

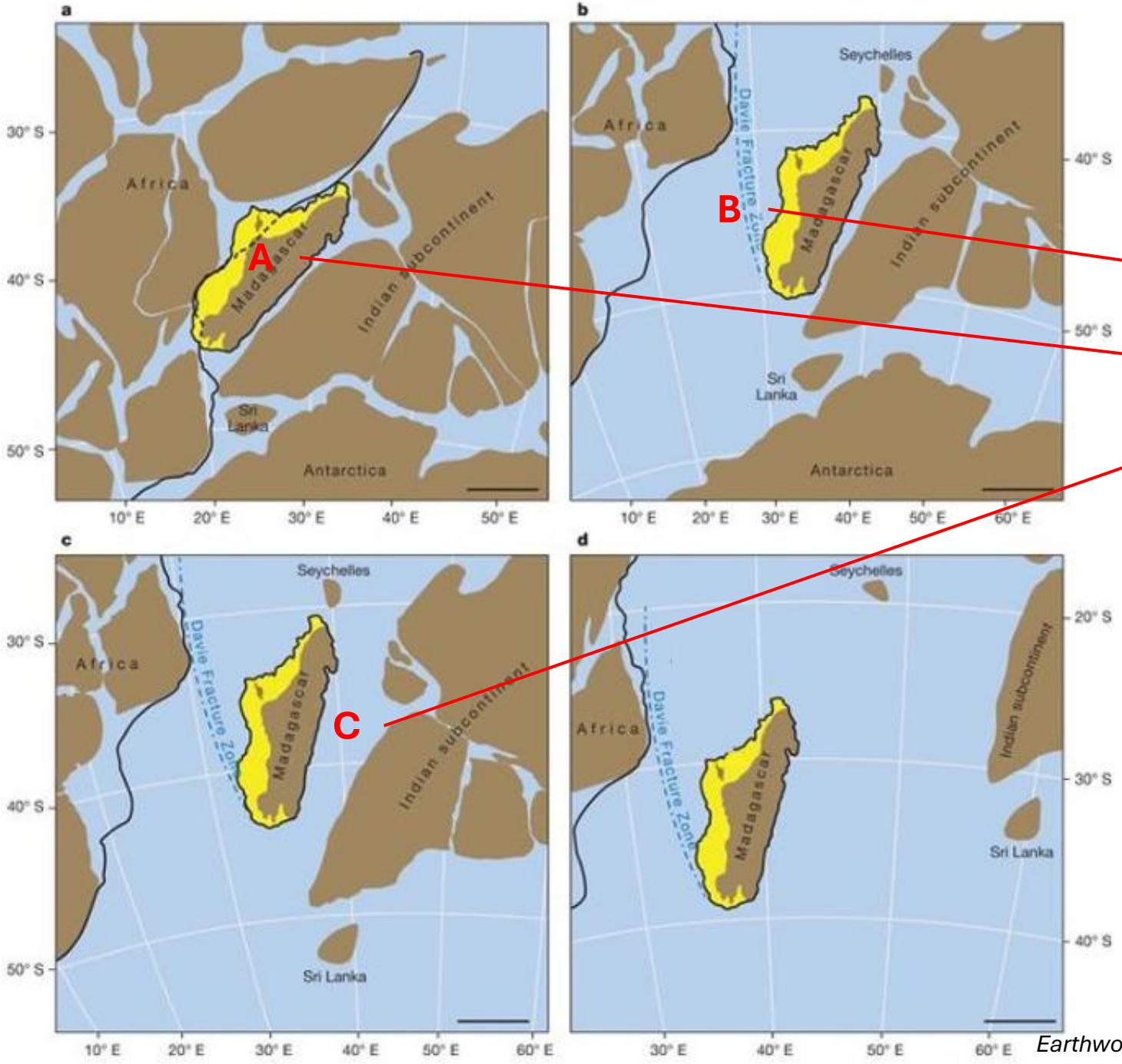
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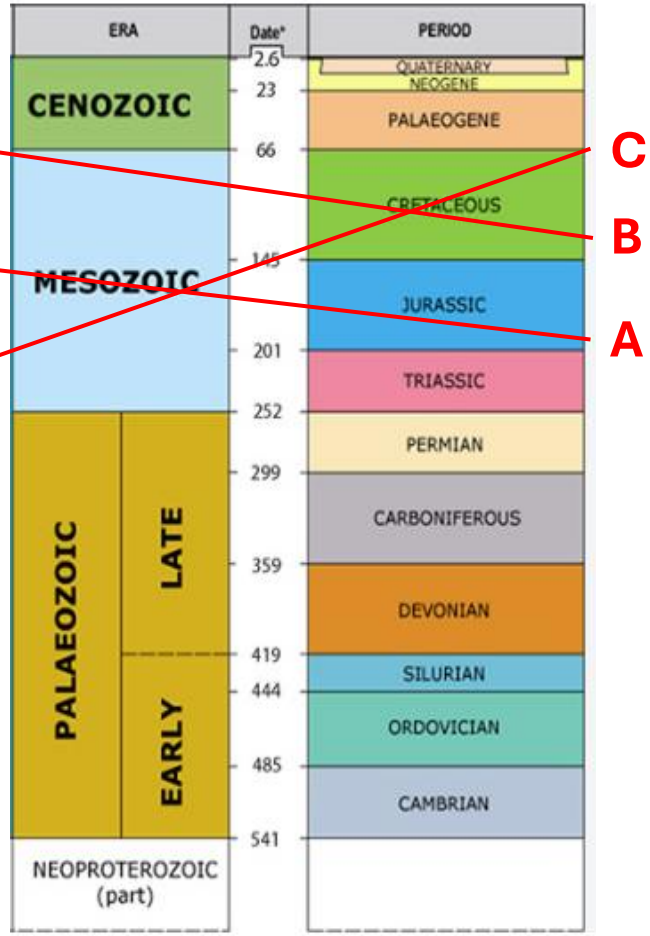

leapfrog
Plunge +01
Azimuth 082
0
250000
500000
750000


Slicing plane
Moving plane
Shapes
Jurassic
GM fault block 1: Neogene-Quaternary
GM fault block 1: Oligocene
GM fault block 1: Paleocene-Eocene
GM fault block 1: Triassic
GM fault block 2: Basement
GM fault block 2: Cretaceous
GM fault block 2: Jurassic
GM fault block 2: Neogene-Quaternary
GM fault block 2: Oligocene
GM fault block 2: Paleocene-Eocene
leapfrog
Juha River
Plunge +01
Azimuth 082
0
250000
500000
750000

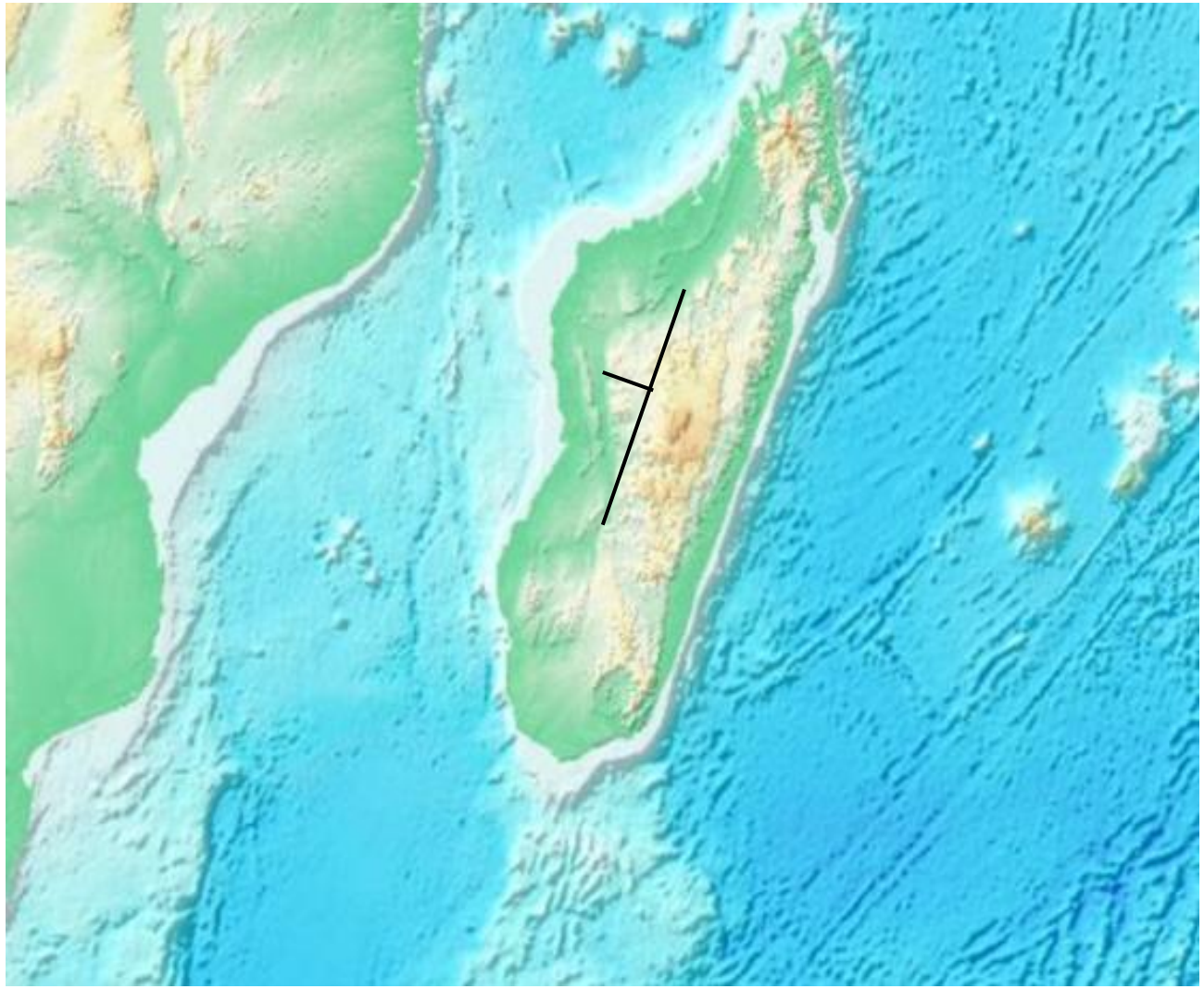
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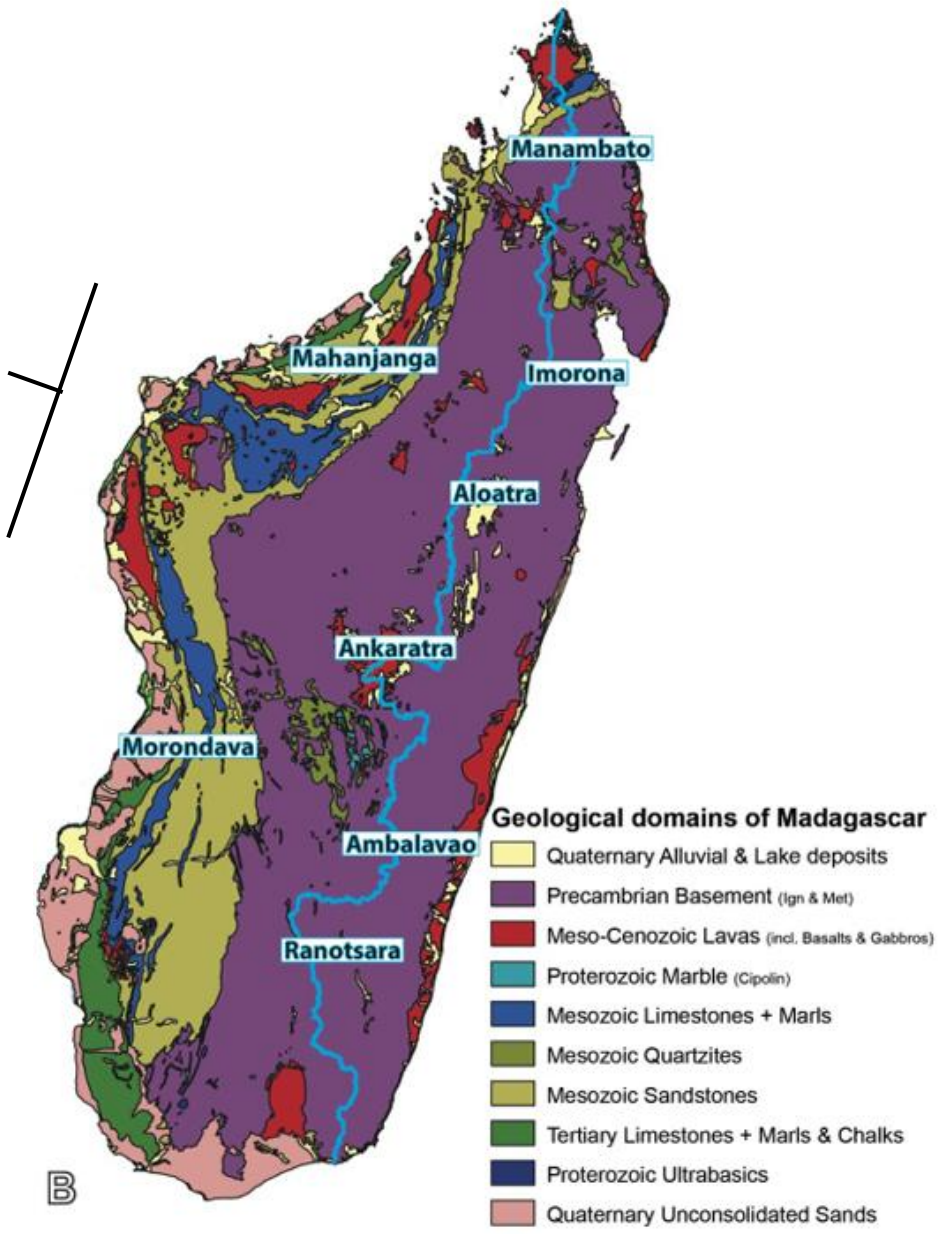
Fun fact: 400 km over 200 million years





Earthworks (ww.reeves.nl)





Fick and Hijmans (2017)

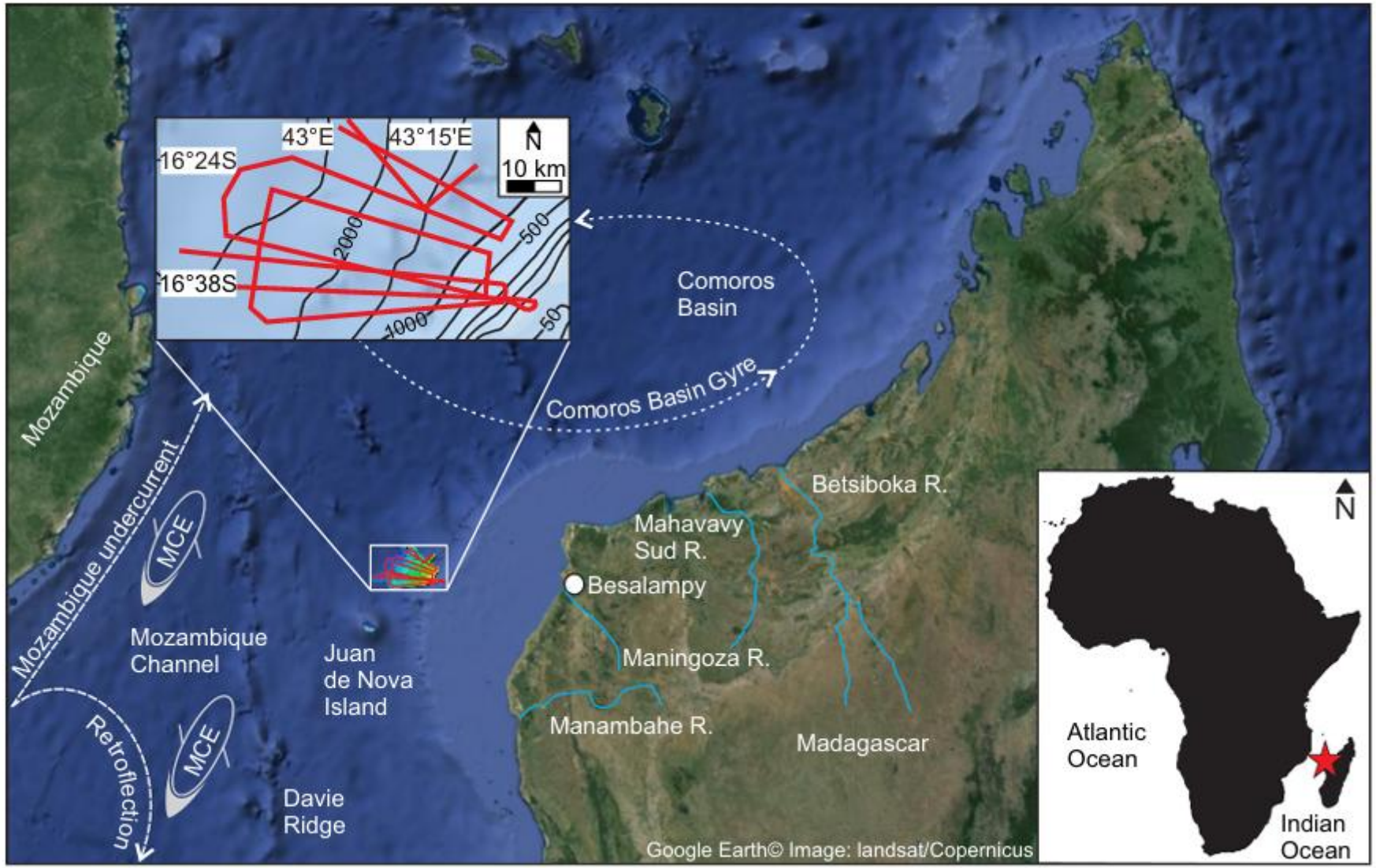
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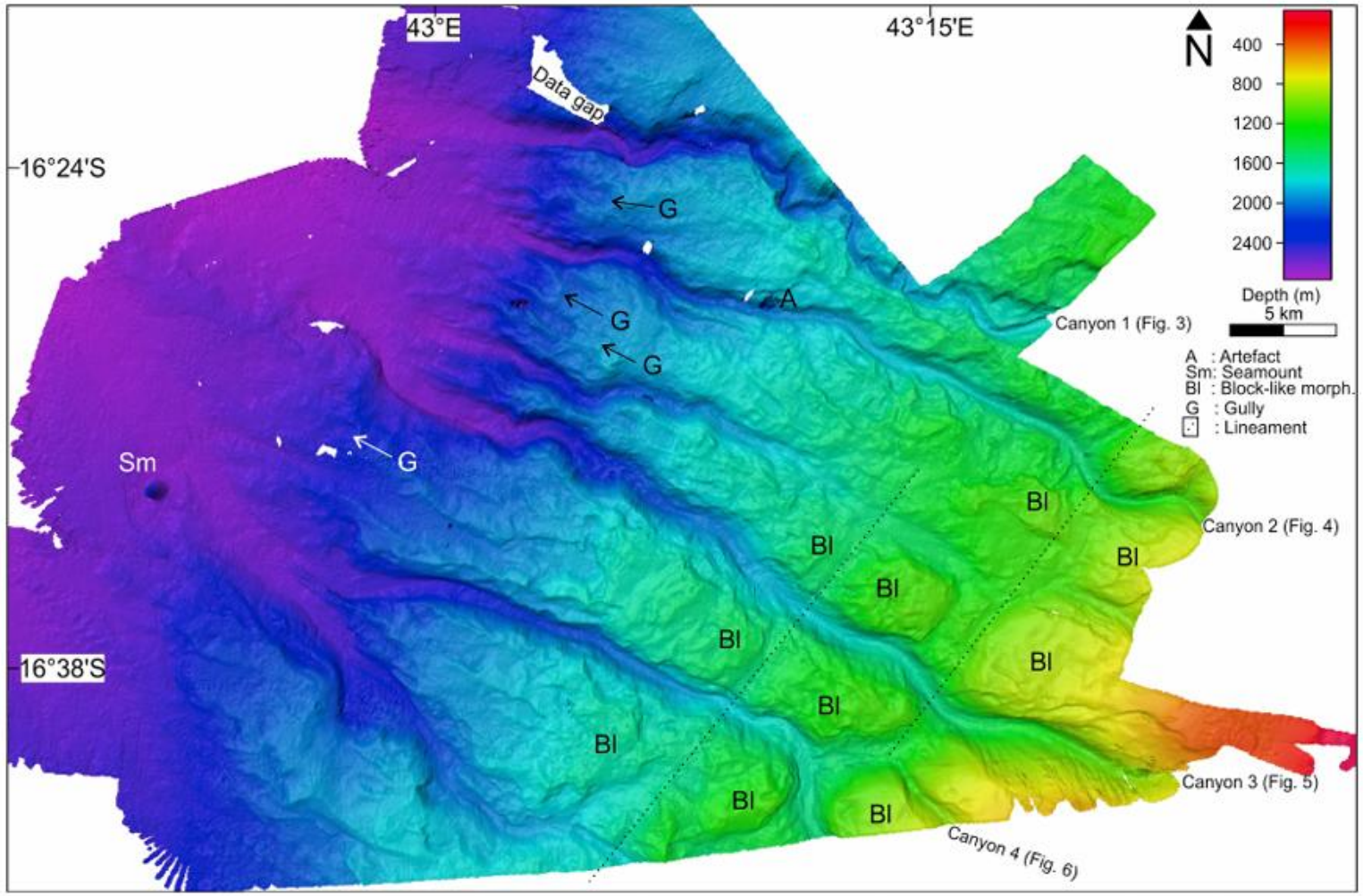
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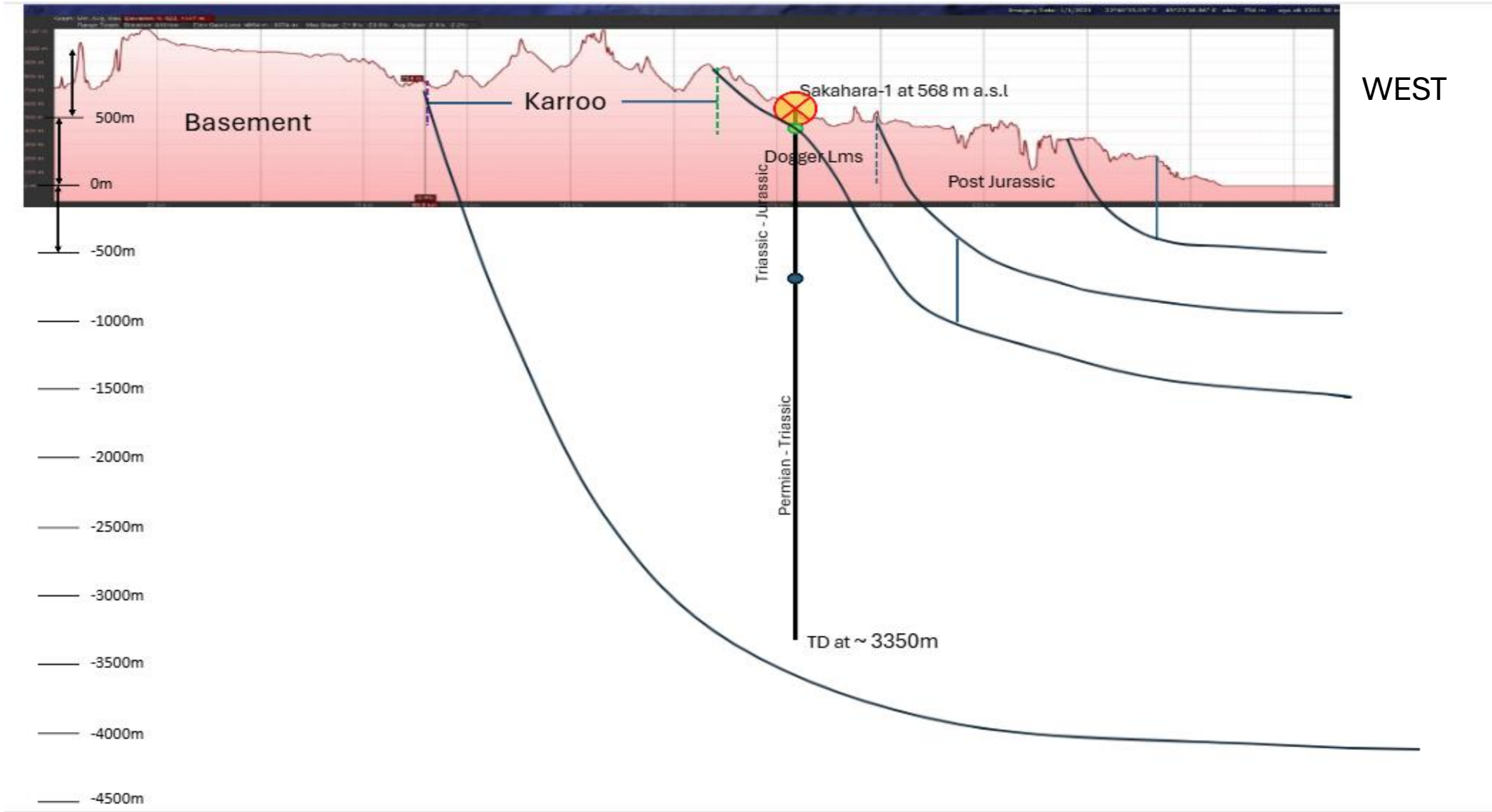
3. Integrated data aquisition procedure

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Onshore Fractured aquifers		
		PC Basement
		Karoo clastics
		Post rift shelf formations
		Saprolitic aquifers (all)
Shelf onshore aquifers		
		Alluvial innfill drainage channels
		Carbonates (karst) Karoo saprolites?
Shelf offshore aquifers		
		Alluvial innfill drainage channels
		Dissolution channels (karst)


43°E
43°15'E
16°24S
16°38S
N
10 km
2000
500
1000
50
Comoros
Basin
Comoros Basin Gyre
Mozambique
Mozambique undercurrent
MCE
Mozambique
Channel
Juan
de Nova
Island
Retroflection
MCE
Davie
Ridge
Betsiboka R.
Mahavavy
Sud R.
Besalampy
Maningoza R.
Manambahe R.
Madagascar
Google Earth© Image: landsat/Copernicus
N
Atlantic
Ocean
Indian
Ocean

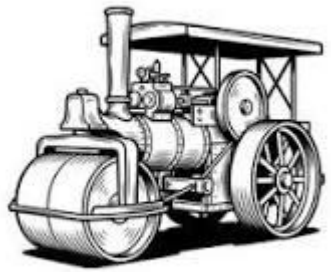

43°E
43°15'E
Data gap
16°24'S
16°38'S
N
400
800
1200
1600
2000
2400
Depth (m)
5 km
A : Artefact
Sm: Seamount
Bl : Block-like morph.
G : Gully
: Lineament
G
A
Sm
Bl
Canyon 1 (Fig. 3)
Canyon 2 (Fig. 4)
Canyon 3 (Fig. 5)
Canyon 4 (Fig. 6)


WEST
Basement
Karroo
Sakahara-1 at 568 m a.s.l
Dogger Lms
Post Jurassic
Triassic - Jurassic
Permian - Triassic
TD at ~ 3350m
500m
0m
-500m
-1000m
-1500m
-2000m
-2500m
-3000m
-3500m
-4000m
-4500m

1. The geological context

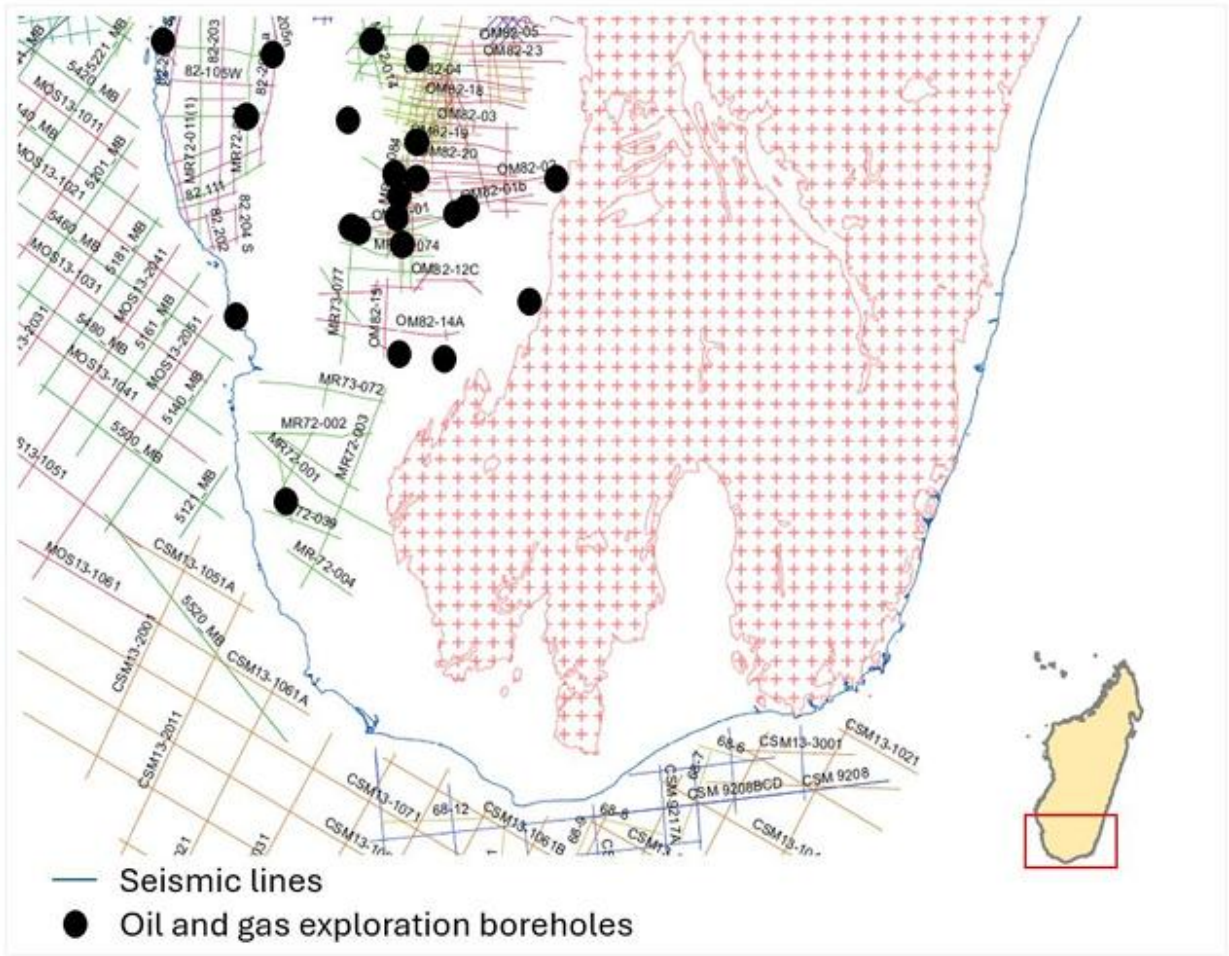
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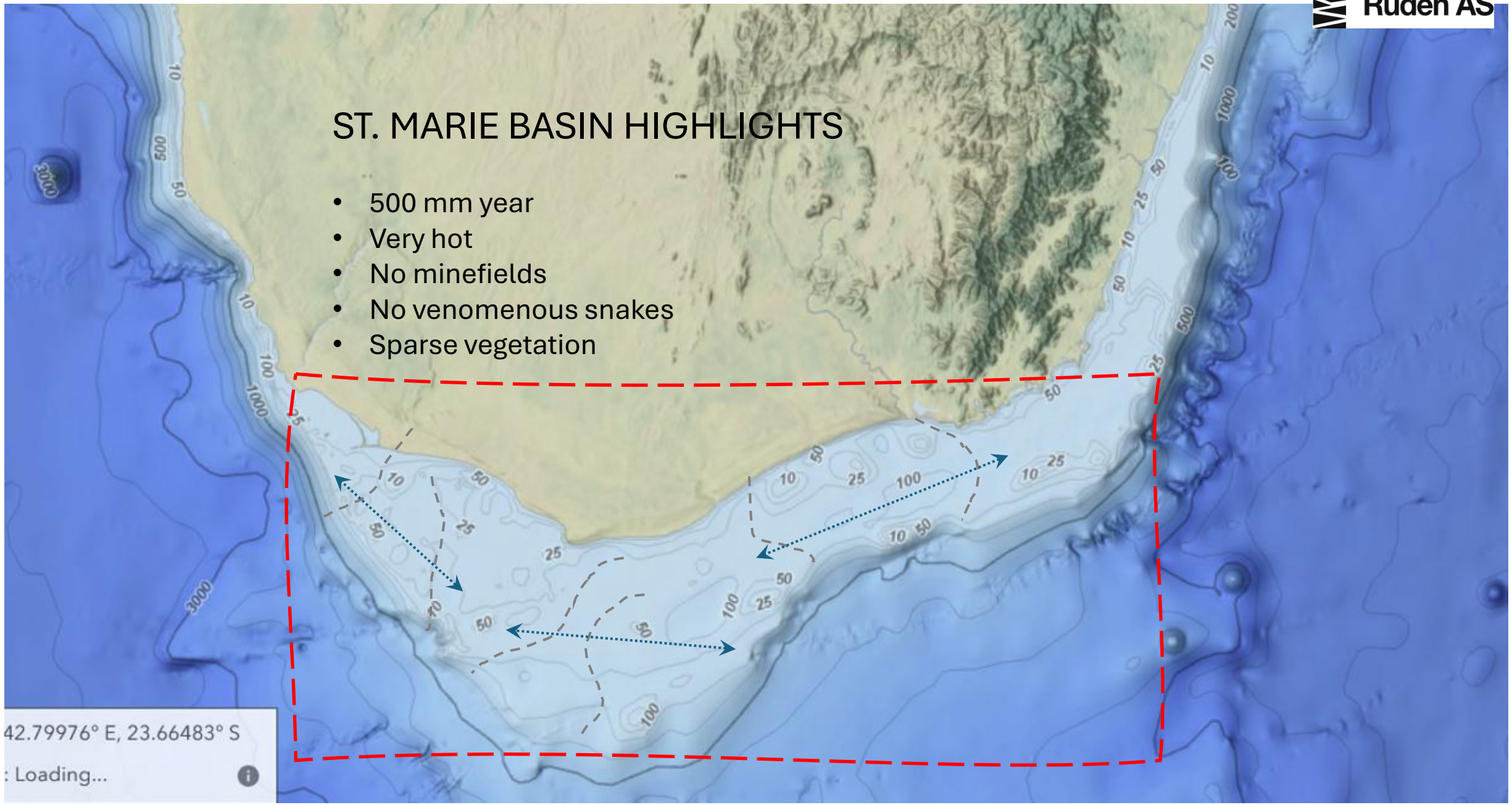
3. **Integrated data aquisition procedure**



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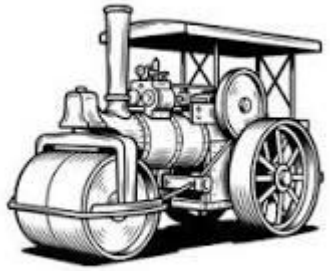
SOME OF THESE OIL WELLS CONTAIN FRESH WATER...




ST. MARIE BASIN HIGHLIGHTS
• 500 mm year
• Very hot
• No minefields
• No venomenous snakes
• Sparse vegetation
42.79976° E, 23.66483° S
: Loading...

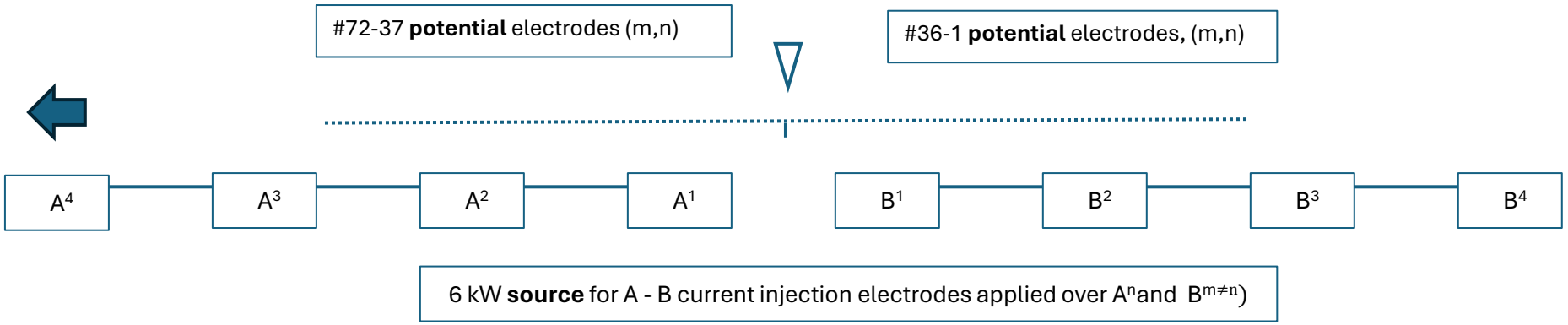
INTEGRATED DATA AQUISITION PROCEDURE

SIMULTANEOUS ACTIVITIES ALONG EACH SURVEY LINE



- **Field reconnaissance, survey planning**
- **Hybrid and/or ERT/IP – reconnaissance mode**
- **Hybrid ERT/IP – focused mode**
- **Water well drilling and installation in selected target locations**
- **Well logging in open mud stabilized hole**
- **Well and aquifer testing**

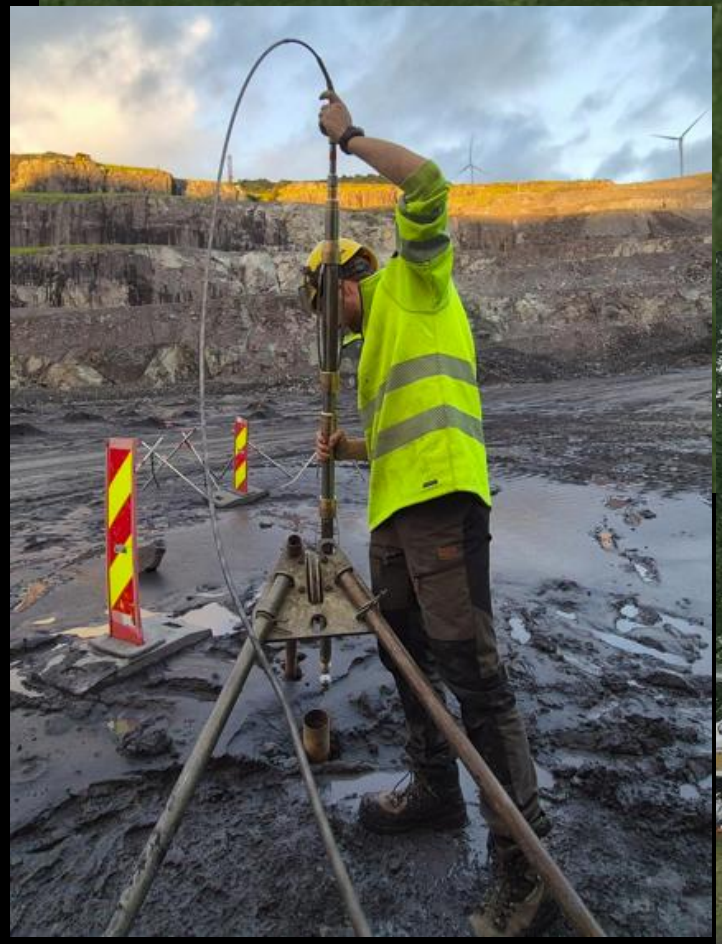
CASE IN POINT: HYBRID ERT/IP SURVEY



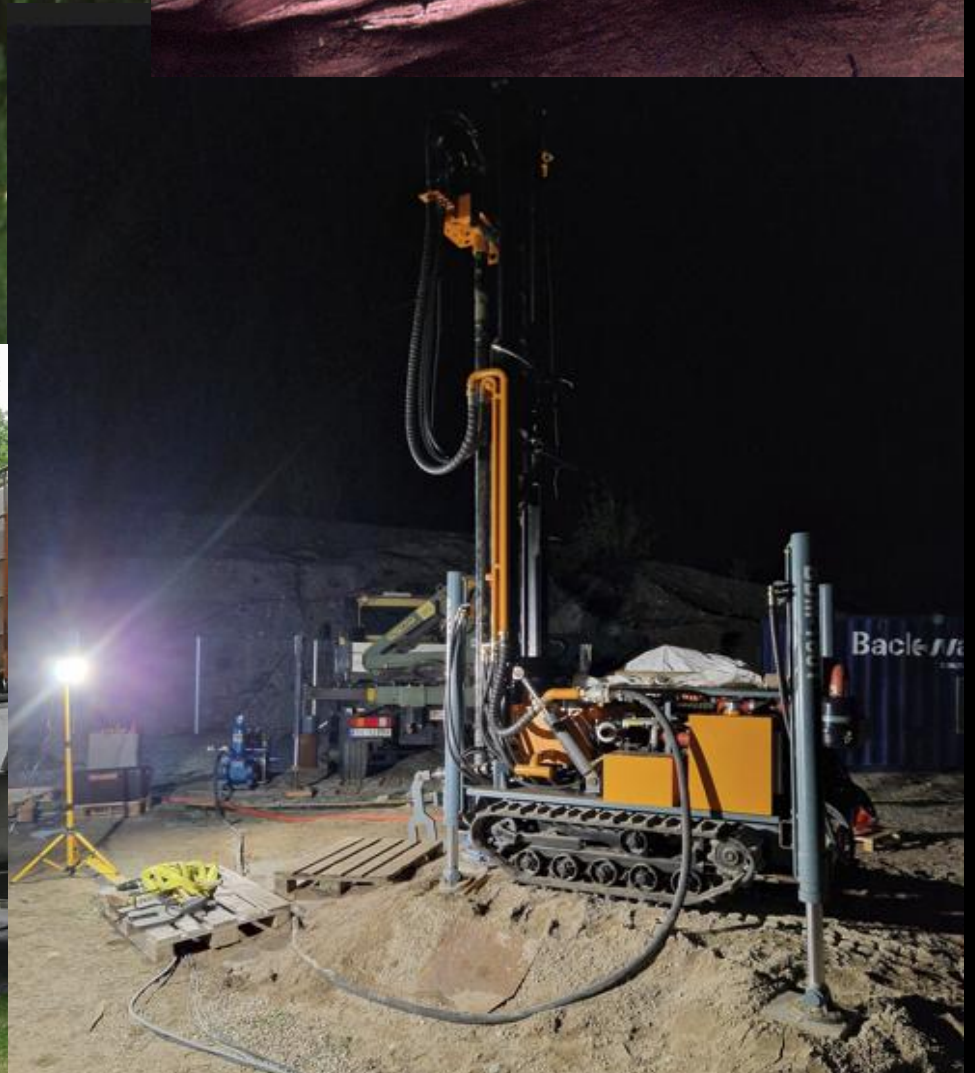
- Hybrid ERT/IP can be used in parallell with standard low power ERT/IP. Both methods can be used as required.
- The advantage of hybrid ERT/IP is flexibility and high S/N (signal-to-noise) ratio.
- Typical DOI depth range is 500-600m, with resolution depending on depth, AB-spacing and number of electrode combinations.











Thank you!

Mvh
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Elizabeth Jordan Quiroga
&
Friends

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