The influence of basement structure and drainage networks on prospectivity in the East African Rift System

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Passion for Geoscience

NPA Satellite Mapping – Unique Insight

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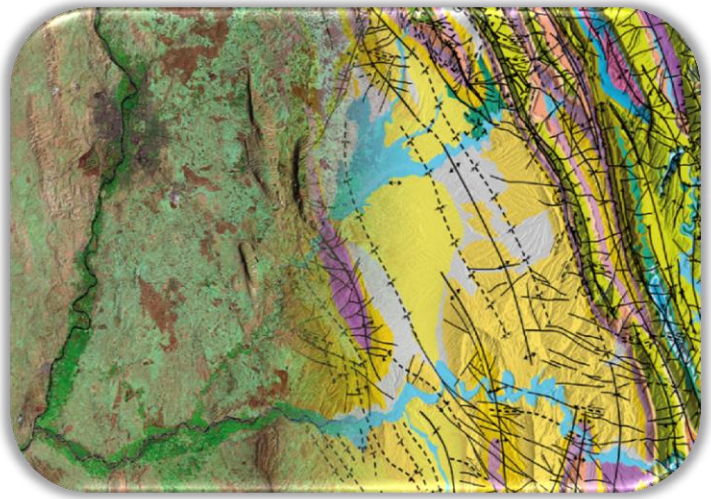
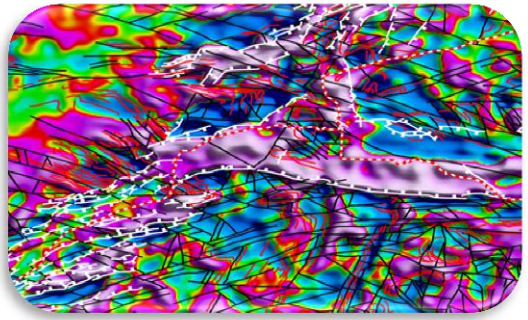
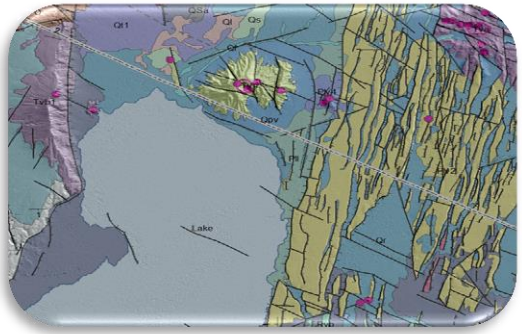


Map Suite



PlateMap

Global plate-scale mapping – multiple basins, across all country borders – 1:500,000+ scale

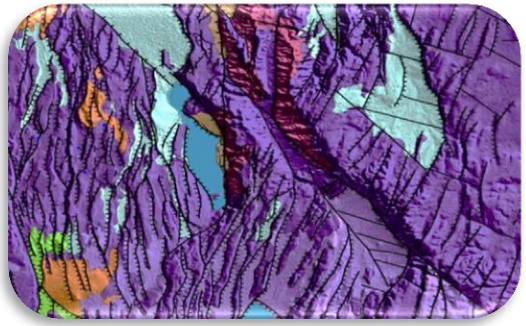


BlockMap

Lead/prospect mapping – License or individual lead or prospect mapping – 1:50,000 scale

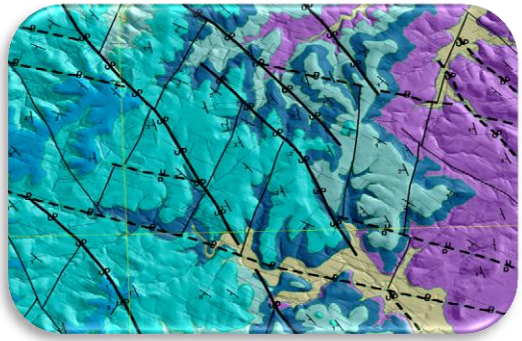
BasinMap

Basin-scale mapping – within one basin, one country or collection of licenses – 1:200,000 scale

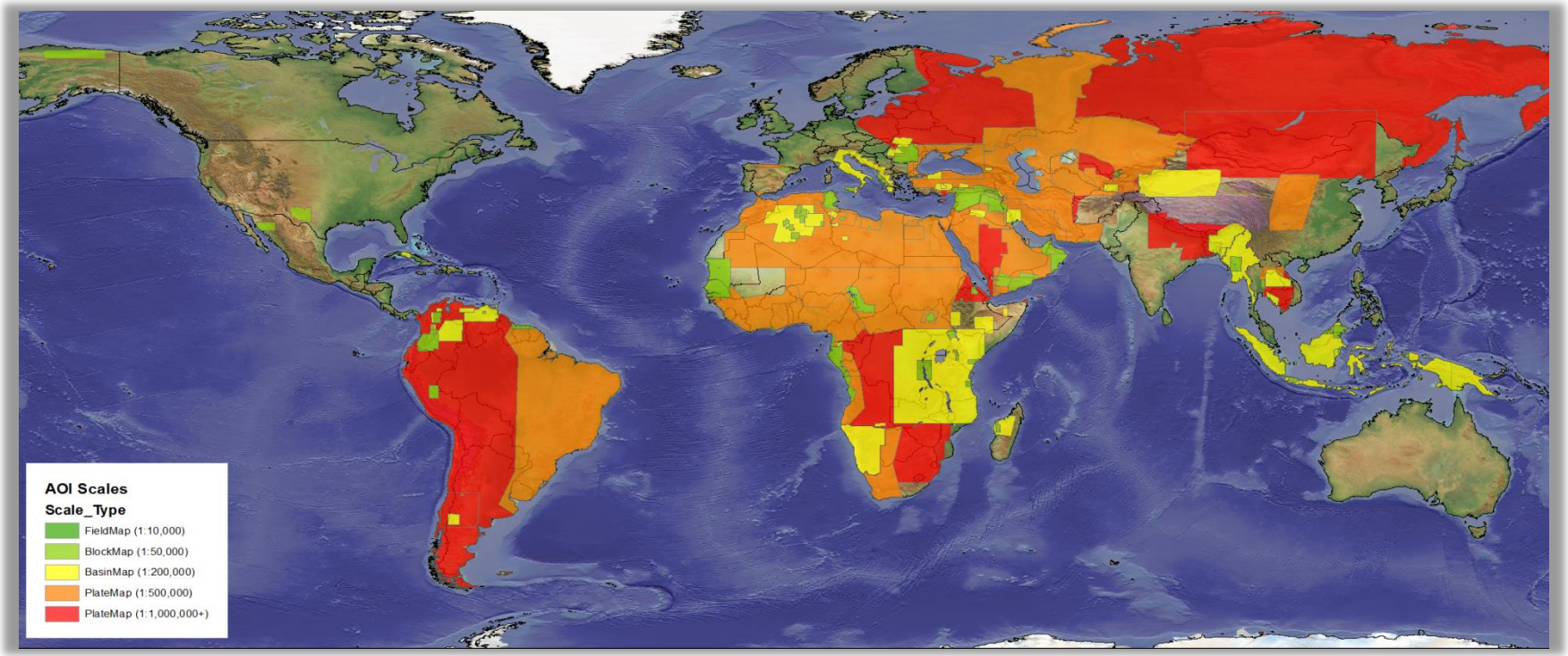


FieldMap

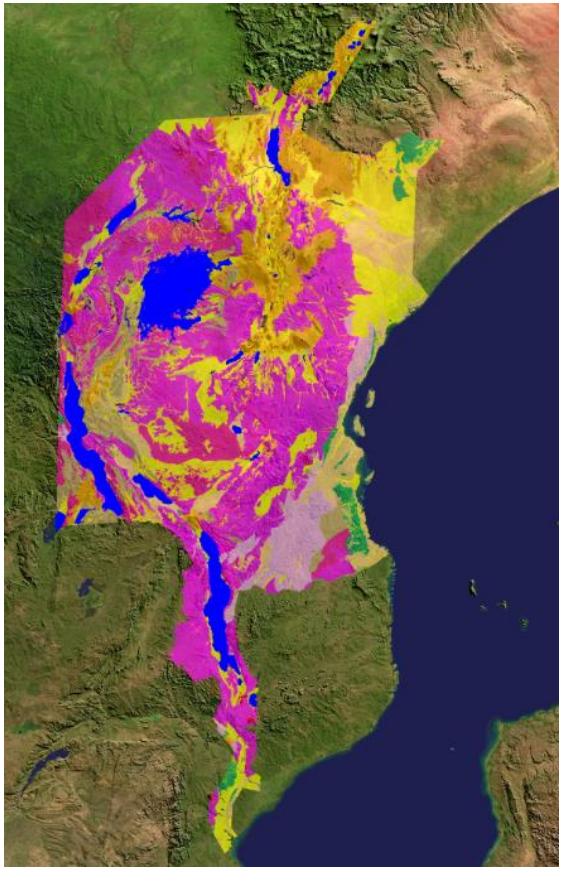
Field mapping/verification - Detailed license scale fieldwork and sampling - 1:10,000 scale



Map Suite coverage



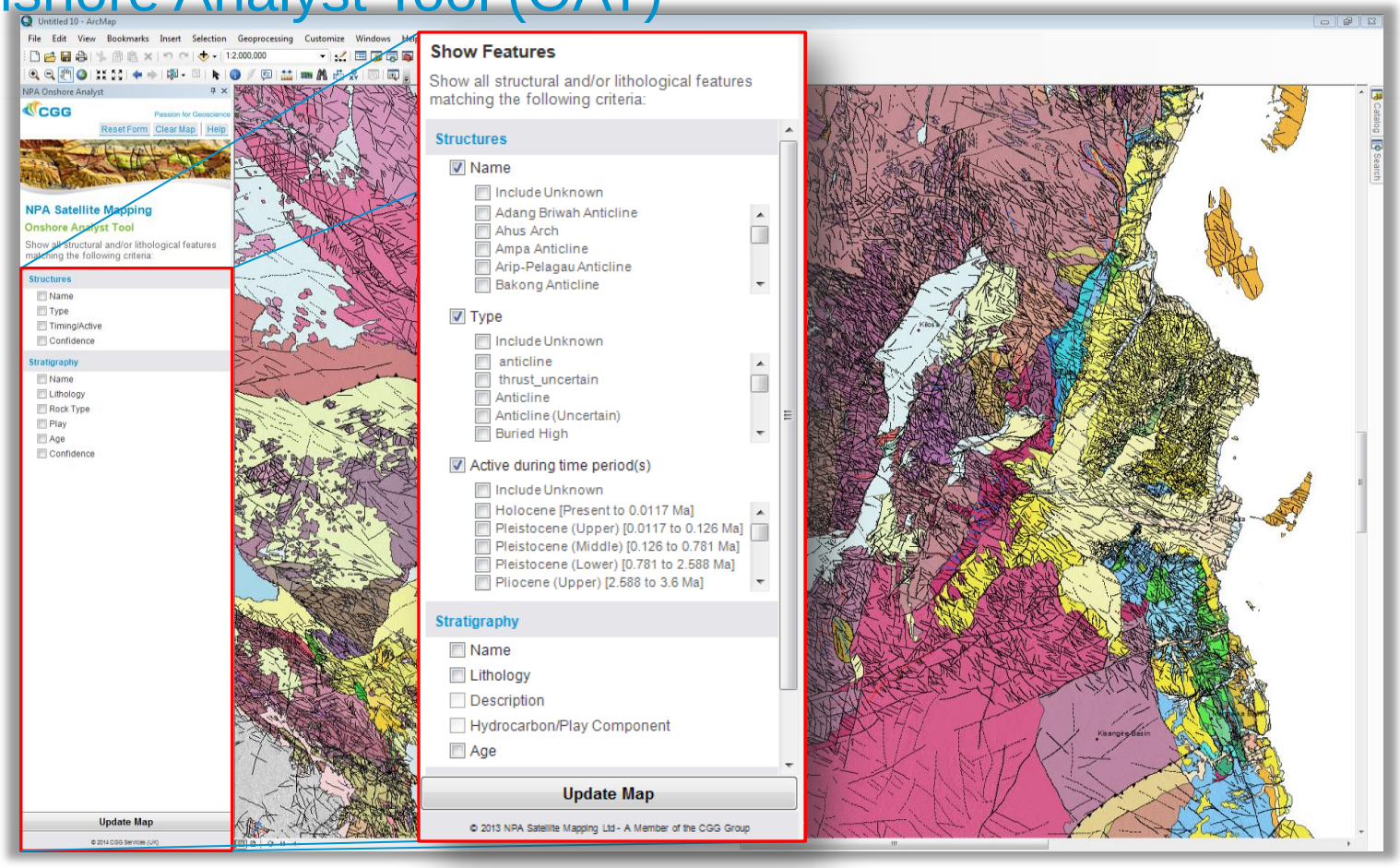
EARS: Data utilised



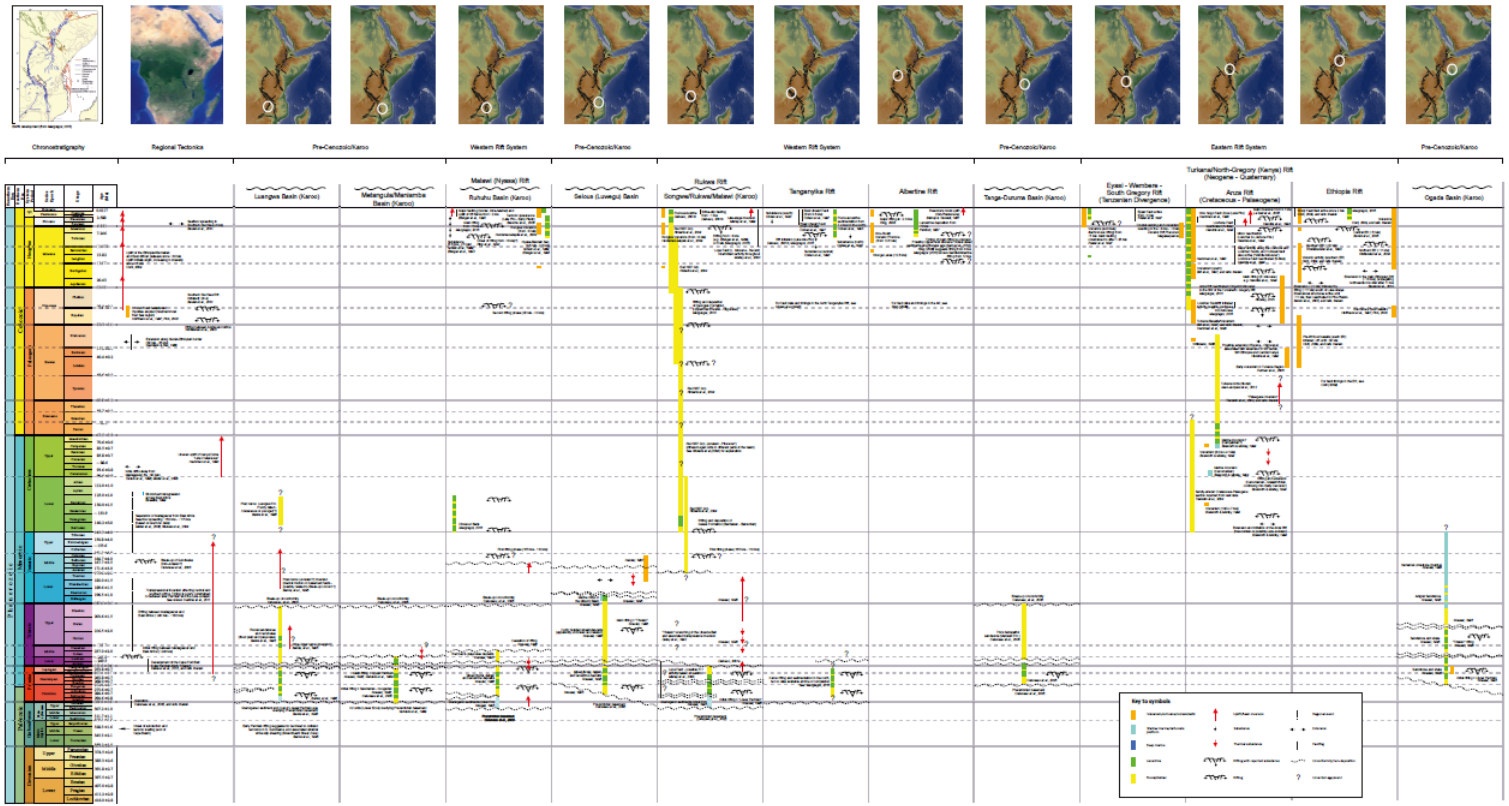
- Structural Mapping:
  - Landsat 8: 15m resolution
  - SRTM DEM: 30m resolution.

- Stratigraphic Mapping:
  - More than 200 geological maps, used to redefine stratigraphic boundaries
  - A common cross-border stratigraphic template generated
  - All information is built into a database with the structure & stratigraphy being fully attributed.

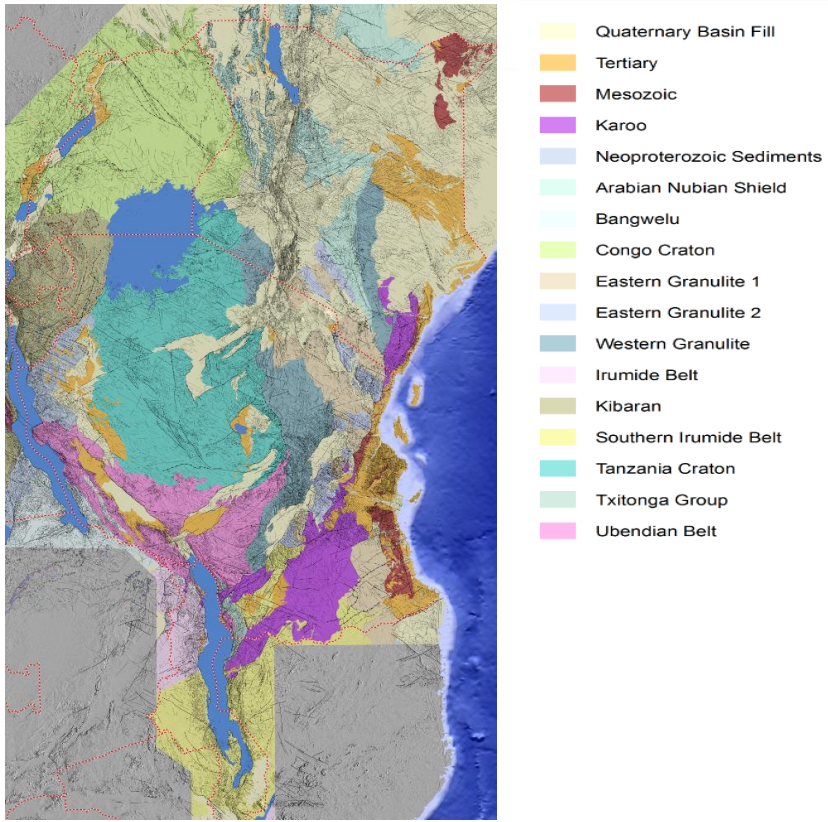
Onshore Analyst Tool (OAT)



EARS regional evolution

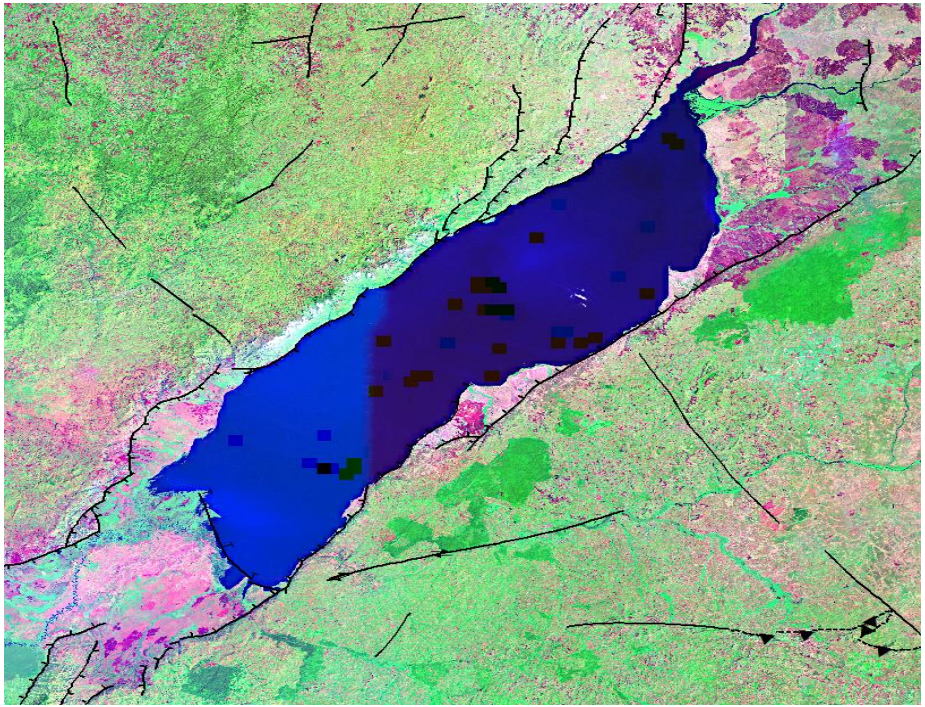


Rifts reactivate older structures

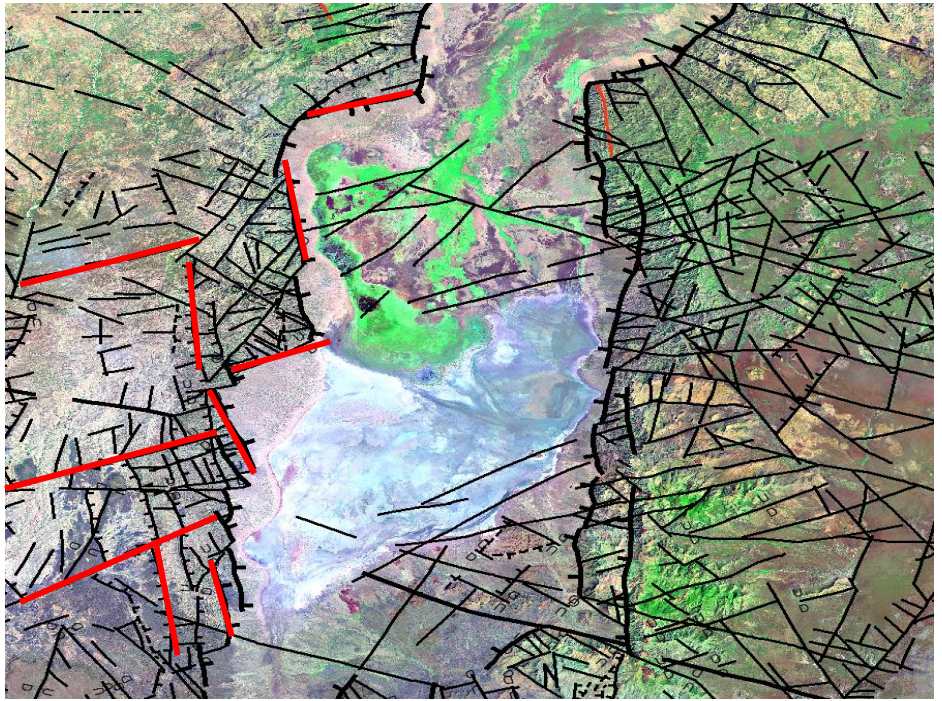


- The EARS is formed within and around several different basement terranes
- Some act to deflect stress, resulting in wrap around rifts, e.g. Tanzanian Craton
- Others act as points of weakness for rifts to exploit and form within e.g. Mozambique Belt, Ubendian Belt
- In both cases the orientation and geometry of faults can be heavily influenced.

Basement influence on rifts

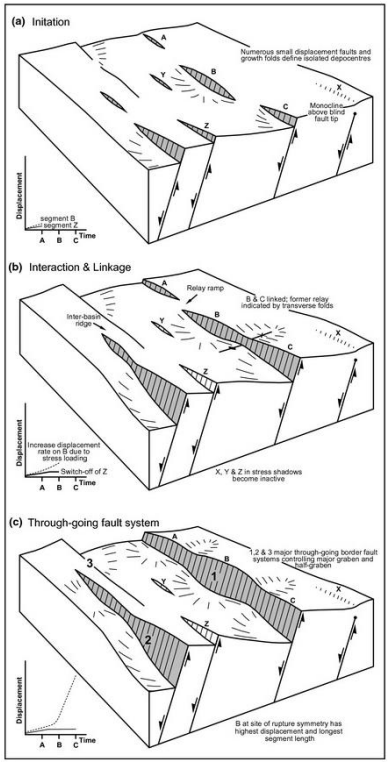


Albertine Graben, Uganda

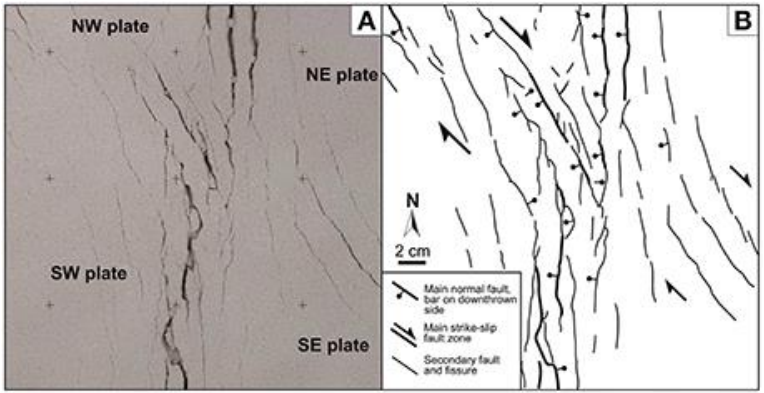


Chew Bahir Basin, Ethiopia

Normal fault formation



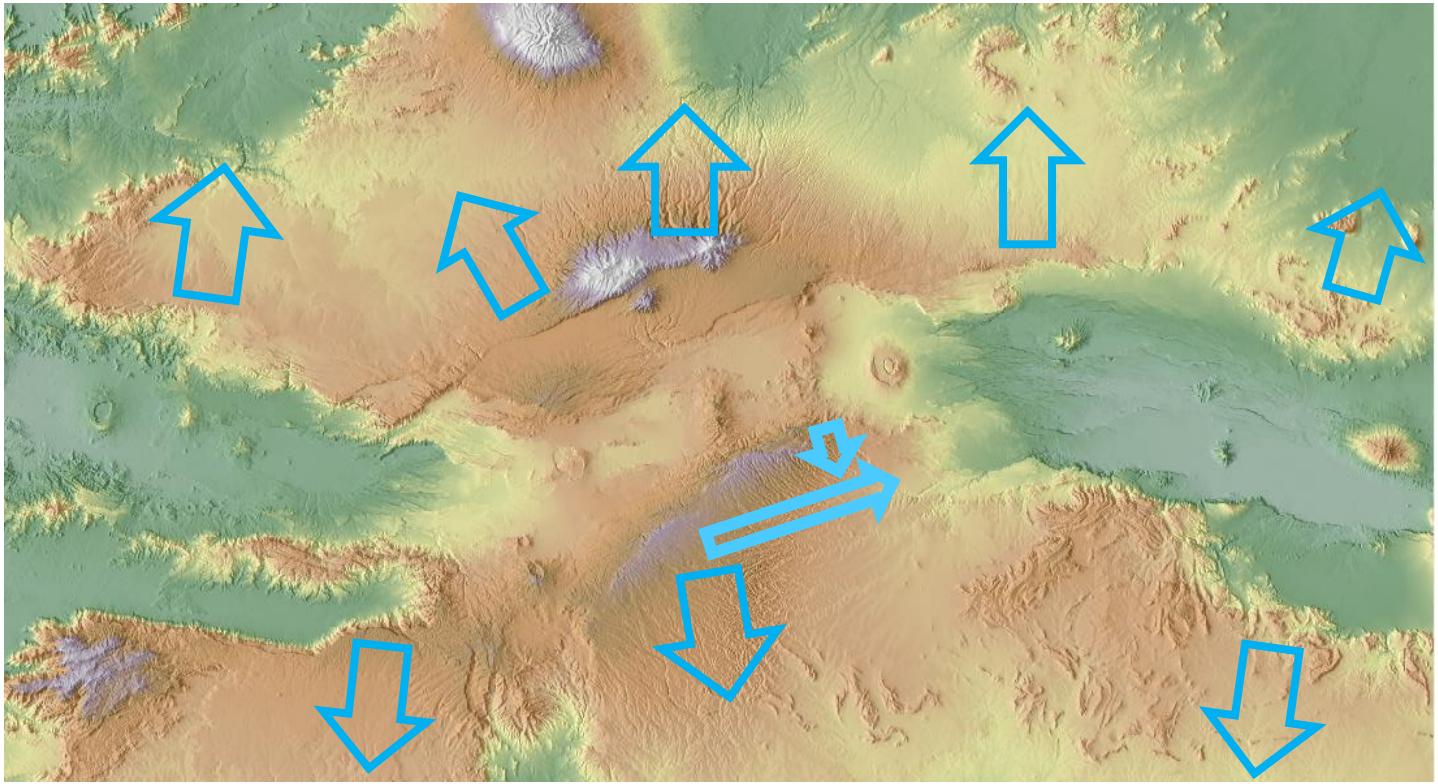
Whipp et al, 2013



Tibaldi et al, 2016

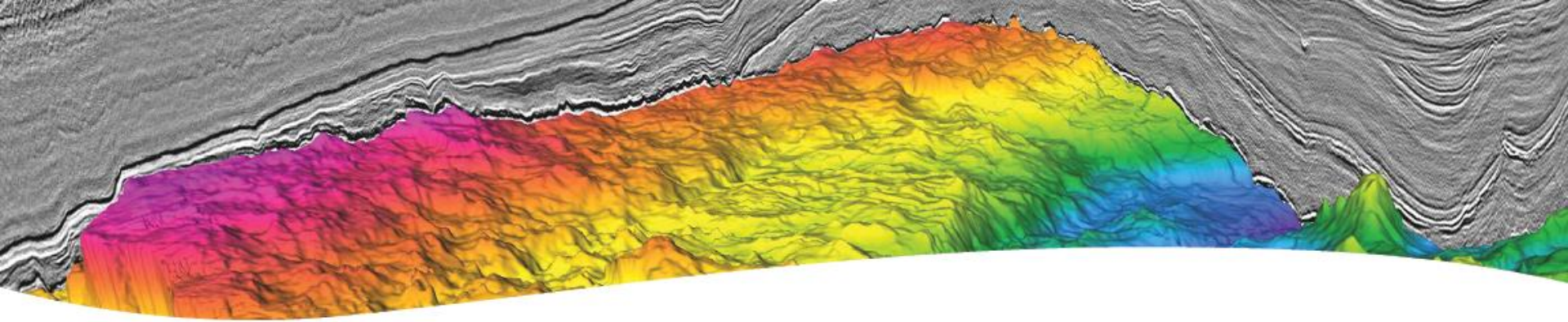
- The interaction and linkage of normal faults is key to the formation of relay structures – soft, hard, breached etc
- Transverse fault zones or basement structures can act to segment these faults heavily impacting fault linkage modes.

Drainage around rift basins



Conclusions

- Length, orientation and geometry of faults can be heavily influenced by basement involvement
- Normal fault length is established early in low stress environments such as EARS
- With establishment of fault length will also be formation of relay structures as displacement increases and fault linkage occurs
- Relay structures are preferential points of sediment input to basins
- Therefore basement influenced fault characteristics potentially have a large effect on facies distribution within a basin.



Thank You

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