

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

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NPA Satellite Mapping – Unique Insight

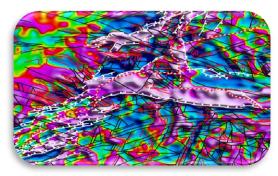
Intelligence from Imagery

- Solutions to support Oil & Gas, Mining, Engineering and Environmental markets
- Expertise spanning diverse land and marine applications
- Actionable information derived from advanced satellite image processing, expert interpretation and innovative tools



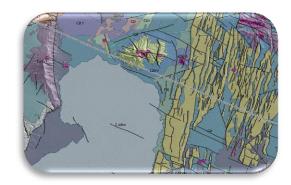


Map Suite



PlateMap

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

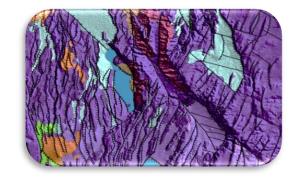


BlockMap

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

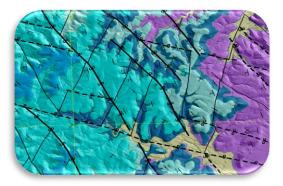
BasinMap

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



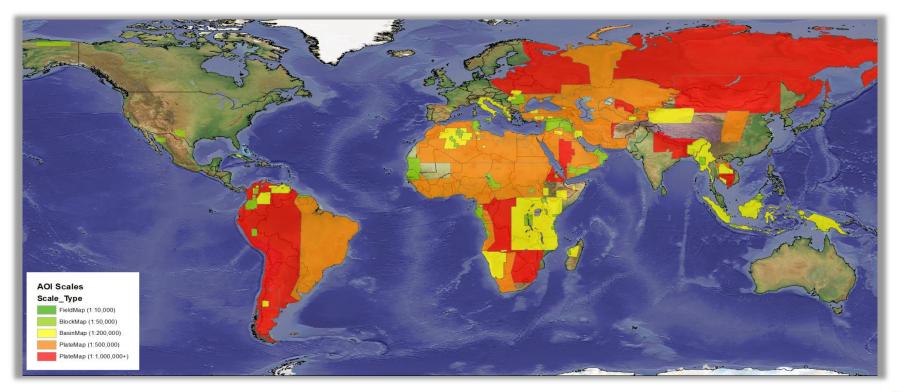
FieldMap

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



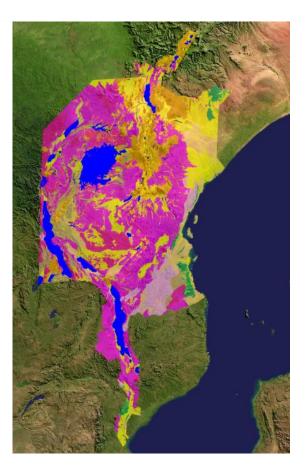


Map Suite coverage





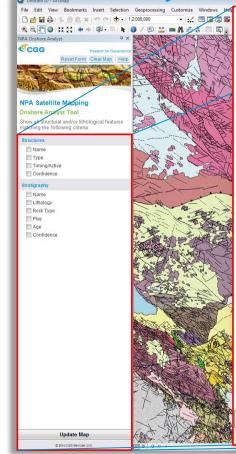
EARS: Data utilised



- 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)



Show Features

Show all structural and/or lithological features matching the following criteria:

Structures

Name

Include Unknown
Adang Briwah Anticline
Ahus Arch
Ampa Anticline
Arip-Pelagau Anticline
Bakong Anticline

Туре

Include Unknown
 anticline
 thrust_uncertain
 Anticline
 Anticline (Uncertain)
 Buried High

Active during time period(s)

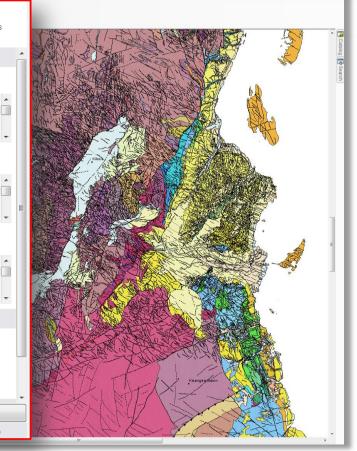
Include Unknown
 Holocene [Present to 0.0117 Ma]
 Pleistocene (Upper) [0.0117 to 0.126 Ma]
 Pleistocene (Unidel) [0.126 to 0.781 Ma]
 Pleistocene (Lower) [0.781 to 2.588 Ma]
 Pliocene (Upper) [2.588 to 3.6 Ma]

Stratigraphy

- Name
 Lithology
- Description
- Hydrocarbon/Play Component
- 🔲 Age

Update Map

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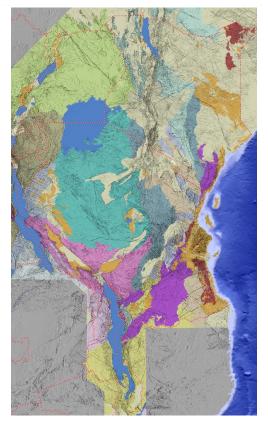
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EARS regional evolution

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Chronosthatigraphy	Regional Tectorica	Pre-CenczoloNa	#150	Western Rift System	Pre-Cencook/Karoo		Western Rift System		Pre-Cenczold/Karoo		Eastern Rift System		Pre-CenozokoKaroo
				Malavel (Nyasa) Fift		Ruixes Rit				Eyasi - Wembers -	Turkana/North-Gregory (Kenya) Rif (Neogene - Guaternary)		
		Luanges Basin (Karoo)	Metangula/Mariamba Baain (Karoo)	Ruhuhu Basin (Karoo)	Selous (Luvegu) Basin	Songwei/Rukwe/Malawi (Karoo)	Tanganyka RM	Aberire R#	Tanga-Duruma Basin (Karoo)	Eyasi - Wembers - South Gregory Rit (Tenzanian Divergence)	Arus Rif. (Cretacecus - Palaeogene)	Ethiopie Rift	Ogada Basin (Karso)
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Rifts reactivate older structures

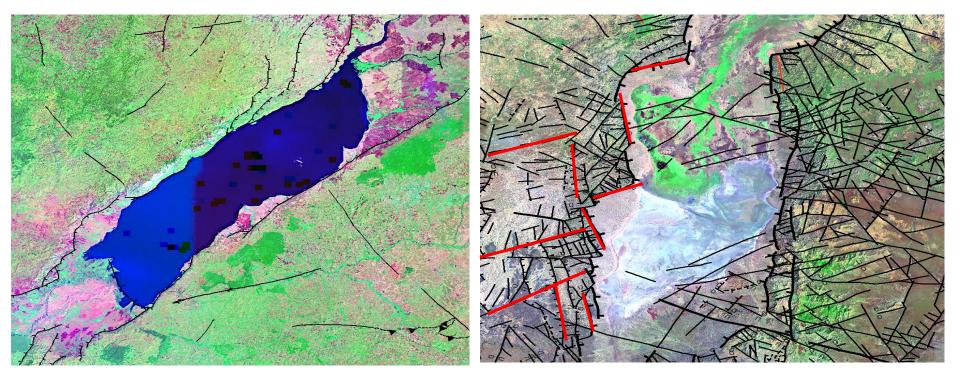




- The EARS is formed within and around several different basement terranes
- Some act to deflect stress, resulting in wrap around rifts, e.g. Tanzanian Craton
- Others act as points of weakness for rifts to exploit and form within e.g. Mozambique Belt, Ubendian Belt
- In both cases the orientation and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



Basement influence on rifts



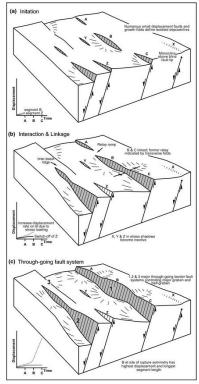
Albertine Graben, Uganda

Chew Bahir Basin, Ethiopia

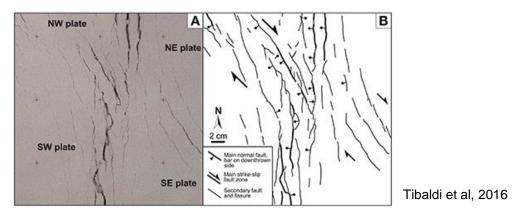


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Normal fault formation



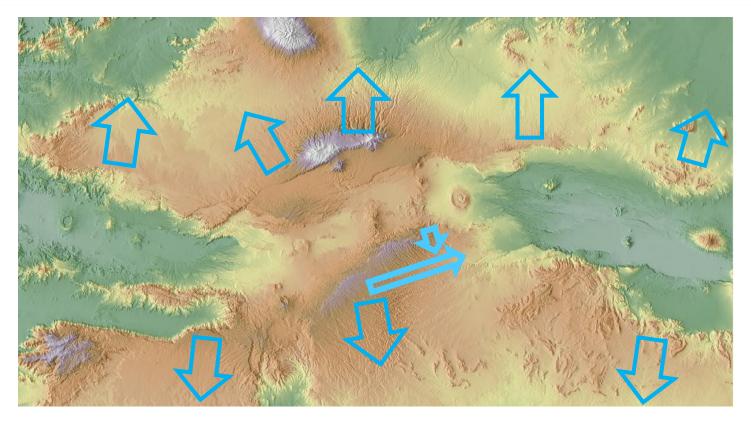
Whipp et al, 2013



- 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

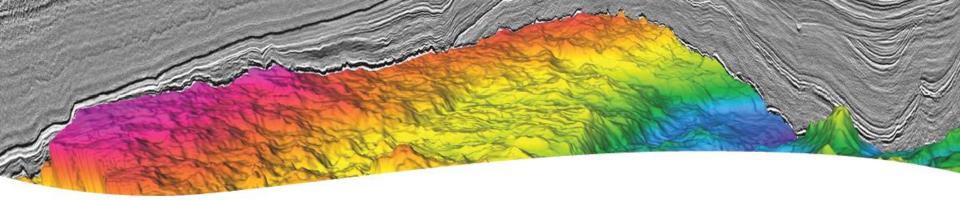




Conclusions

- 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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