

Witnessing the birth of a new ocean? The first 6 years of the Dabbahu rifting episode (and other activity in Afar)

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Plus collaborators from the Afar Rift Consortium



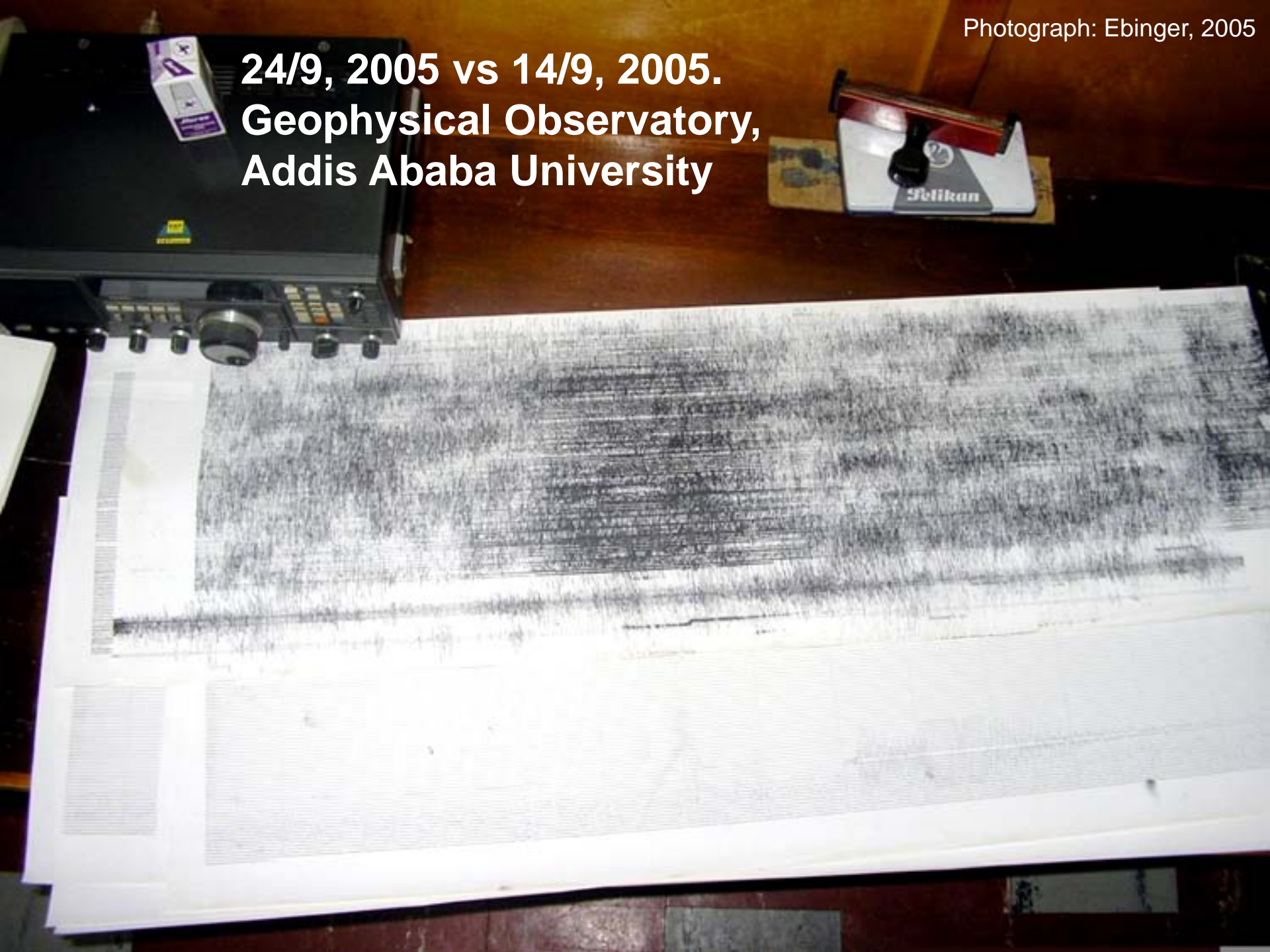


Anthony Philpotts, October 2005



Atalay Ayele , Addis Ababa University

**24/9, 2005 vs 14/9, 2005.
Geophysical Observatory,
Addis Ababa University**



26 September 2005, Da'Ure eruption



Liz Baker, March 2006



Anthony Philpotts, October 2005



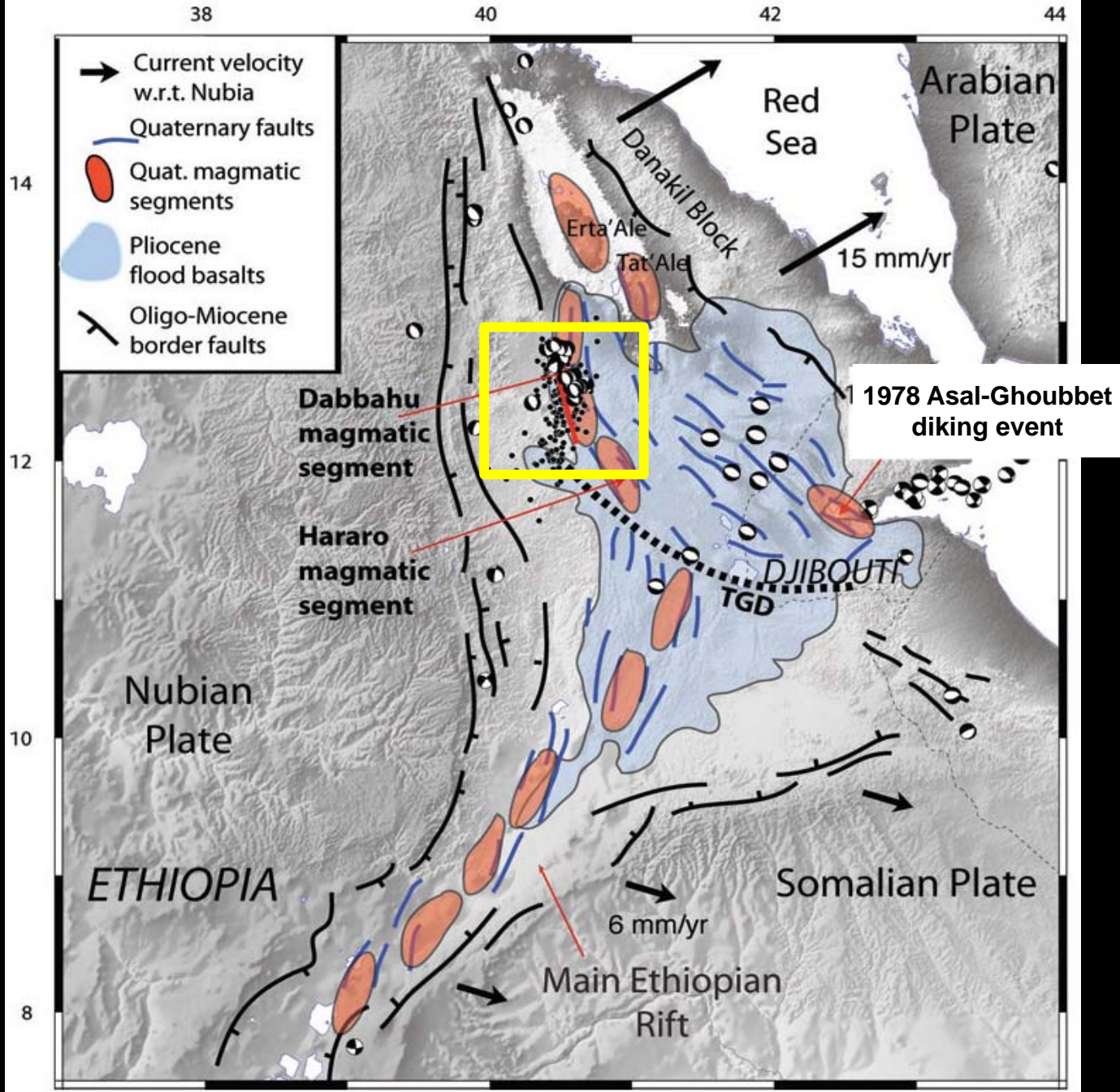
Liz Baker, March 2006



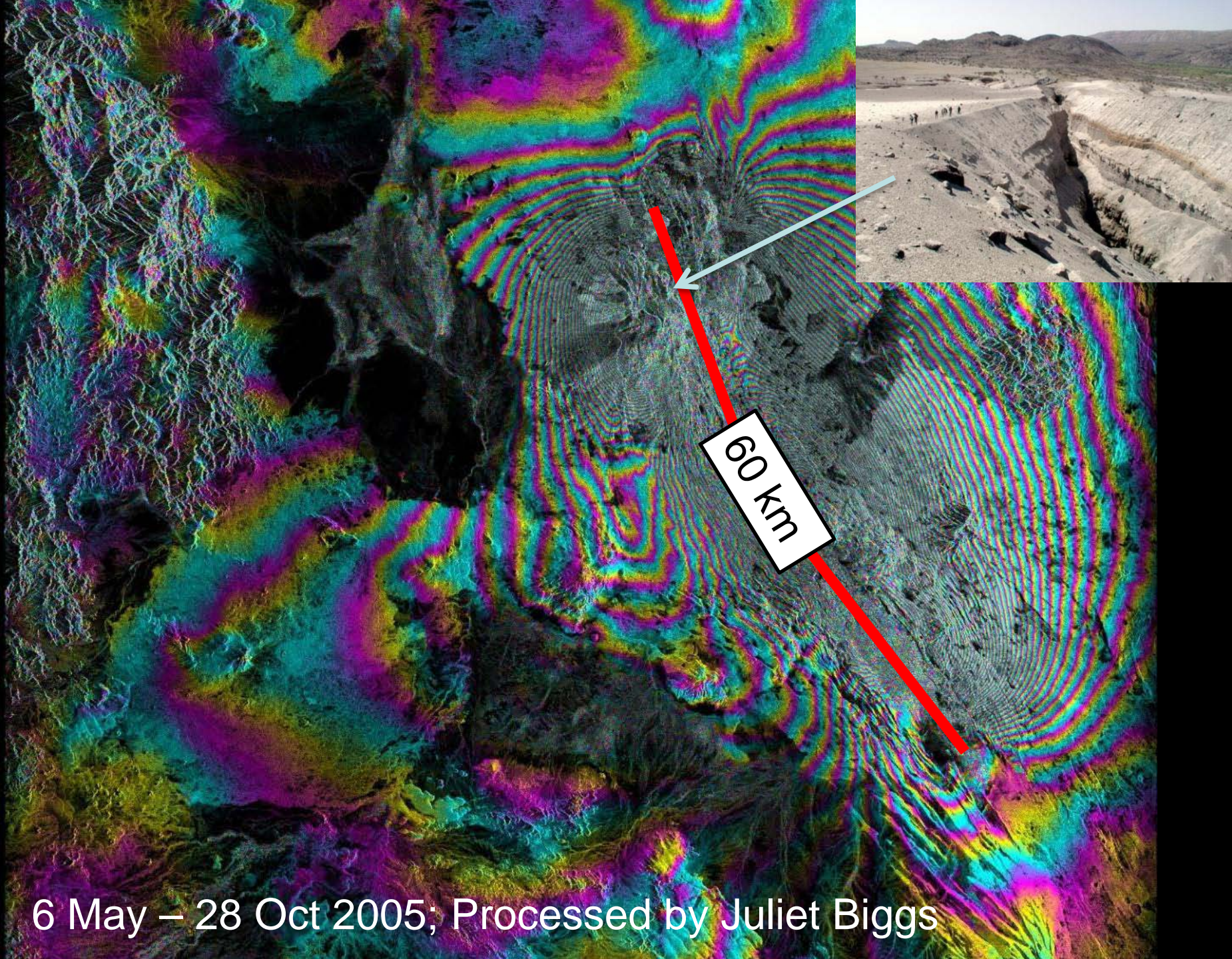
James Hammond, Jan 2006



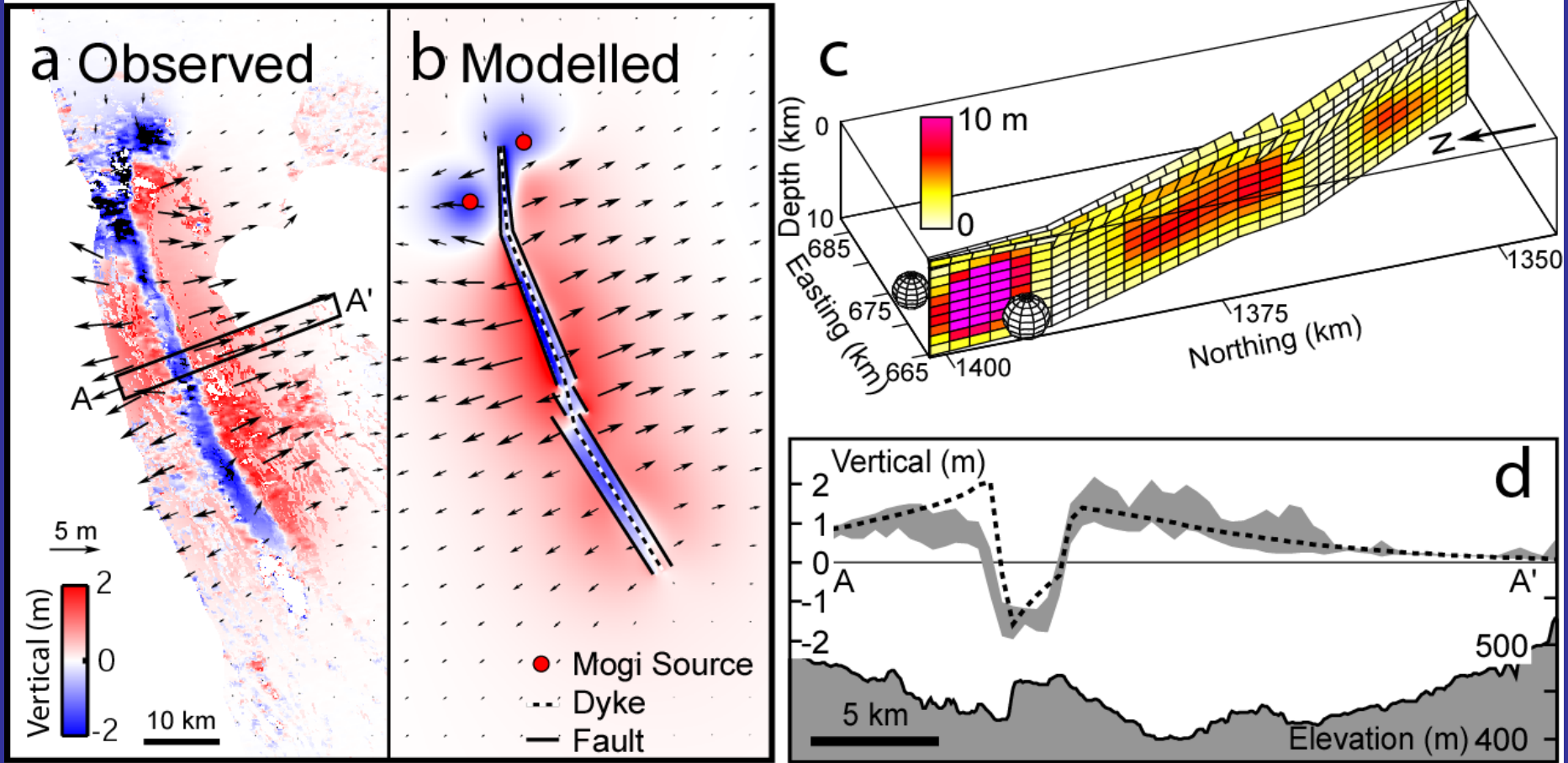
Liz Baker, March 2006



From Ebinger et al., GJI 2008



6 May – 28 Oct 2005; Processed by Juliet Biggs



Wright et al., Nature (2006)

- ~2.5 km³ magma intruded along dyke (Mt St Helens 1980 1.2 km³); 1 tonne of rock for every human on the planet.
- ~0.5 km³ sourced from Dabbahu and Gabho volcanoes at North.
- Rest probably fed from deeper chamber under Ado' Ale at segment centre.

pre-existing scarp



3m

1-2m

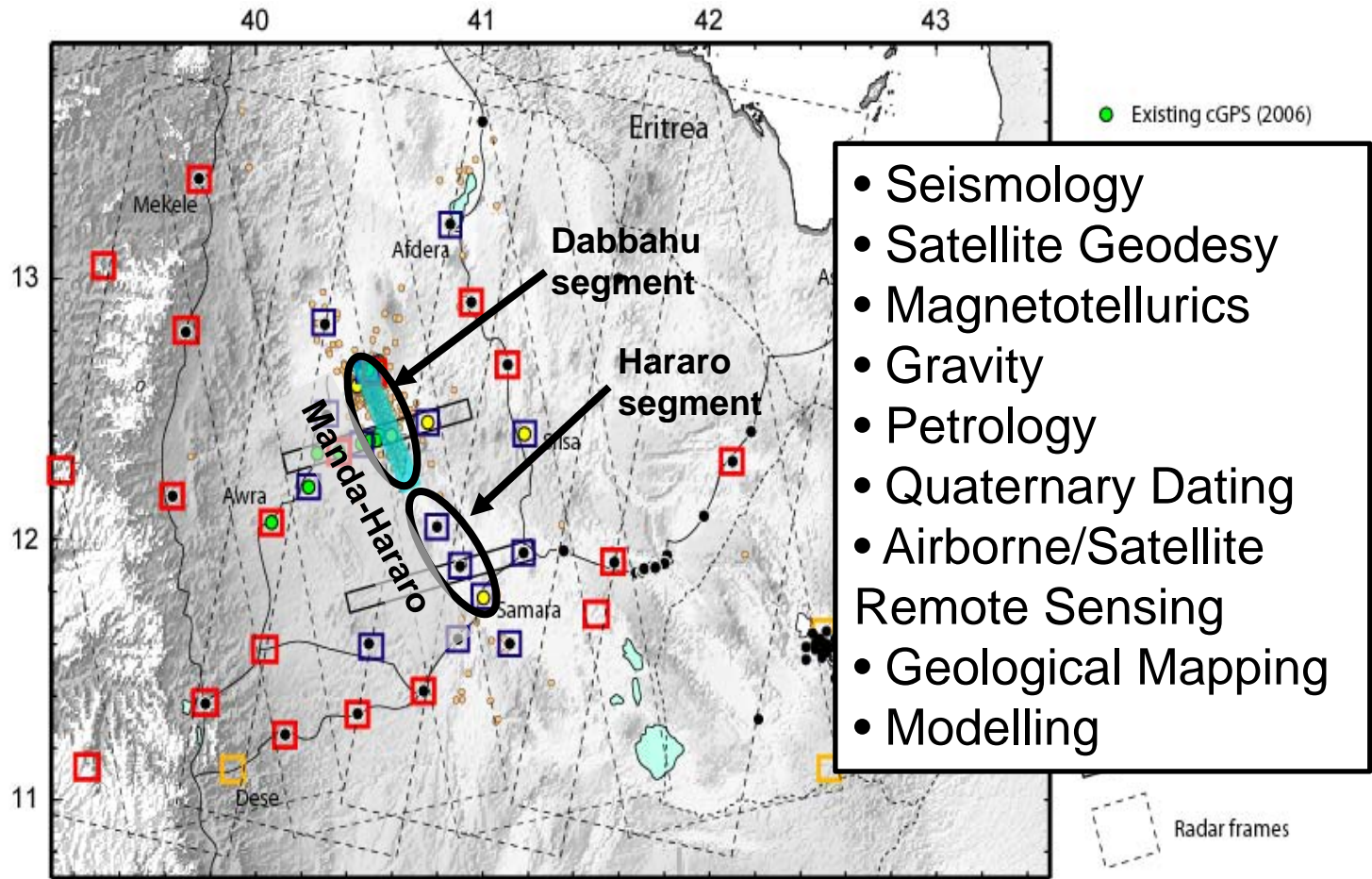
Eastern Flank (courtesy J. Rowland – see Rowland et al., GJI 2007)





The Afar Rift Consortium

<http://www.see.leeds.ac.uk/afar>



- Seismology
- Satellite Geodesy
- Magnetotellurics
- Gravity
- Petrology
- Quaternary Dating
- Airborne/Satellite Remote Sensing
- Geological Mapping
- Modelling

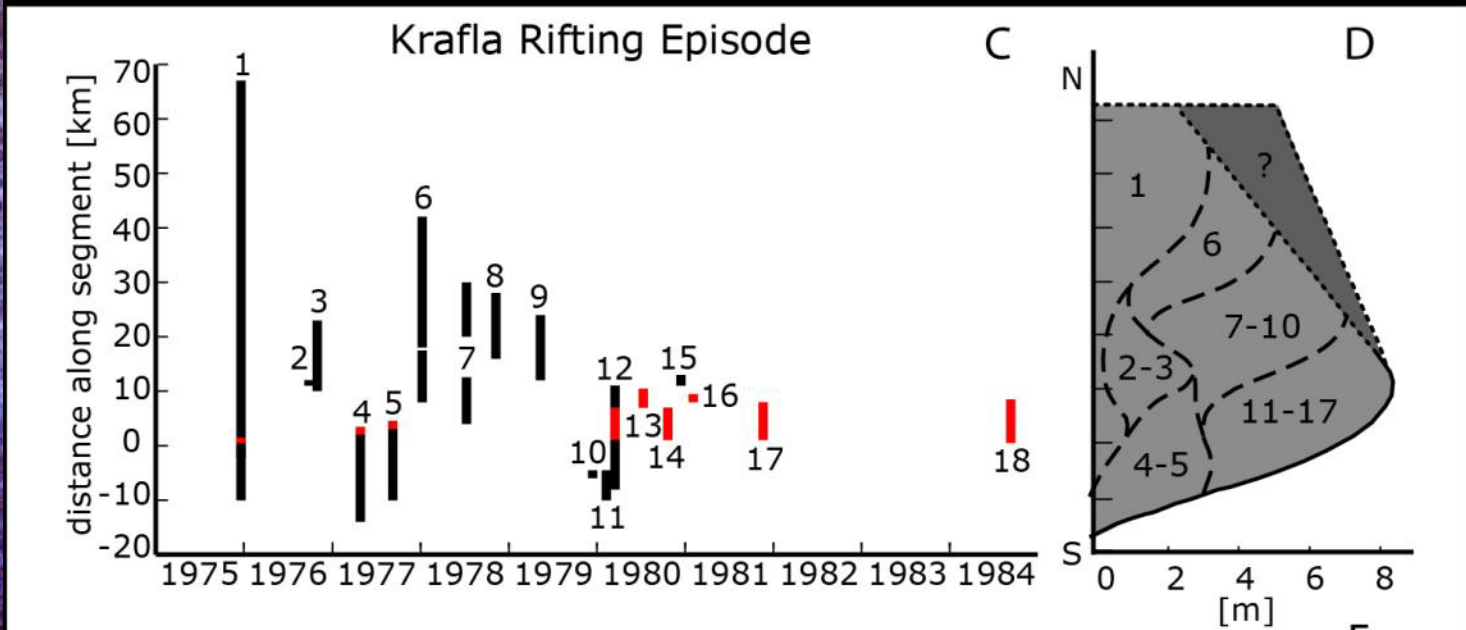
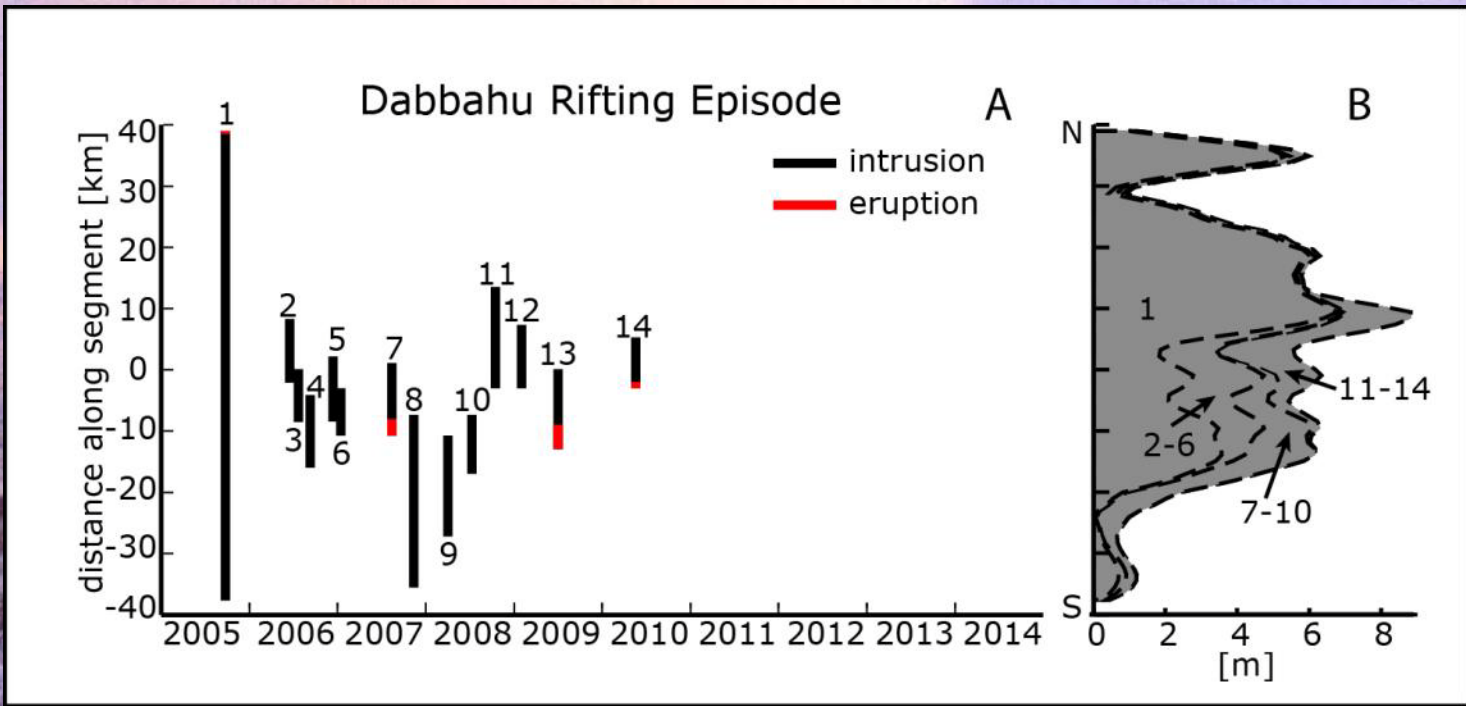


Photo: E. Calais, January 2006

The Krafla rifting episode (Iceland) 1975-1984



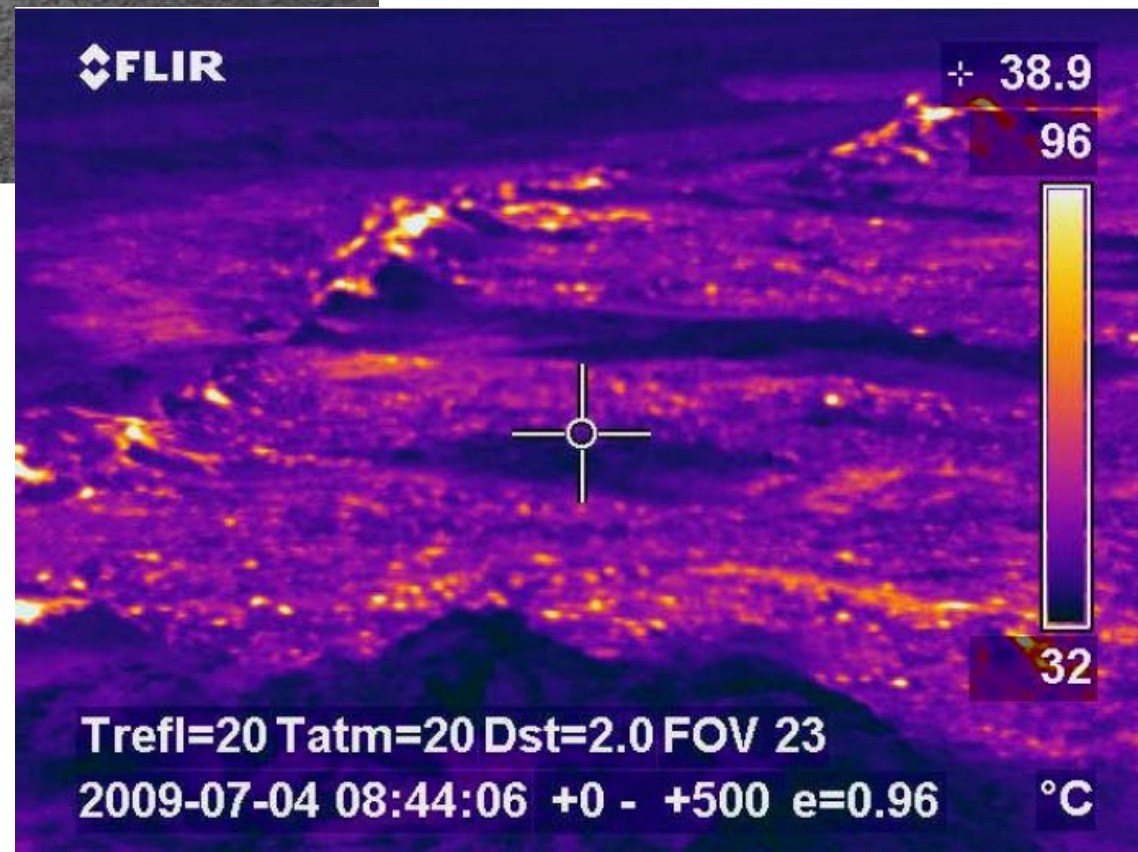
Thorarinsson September 8, 1977

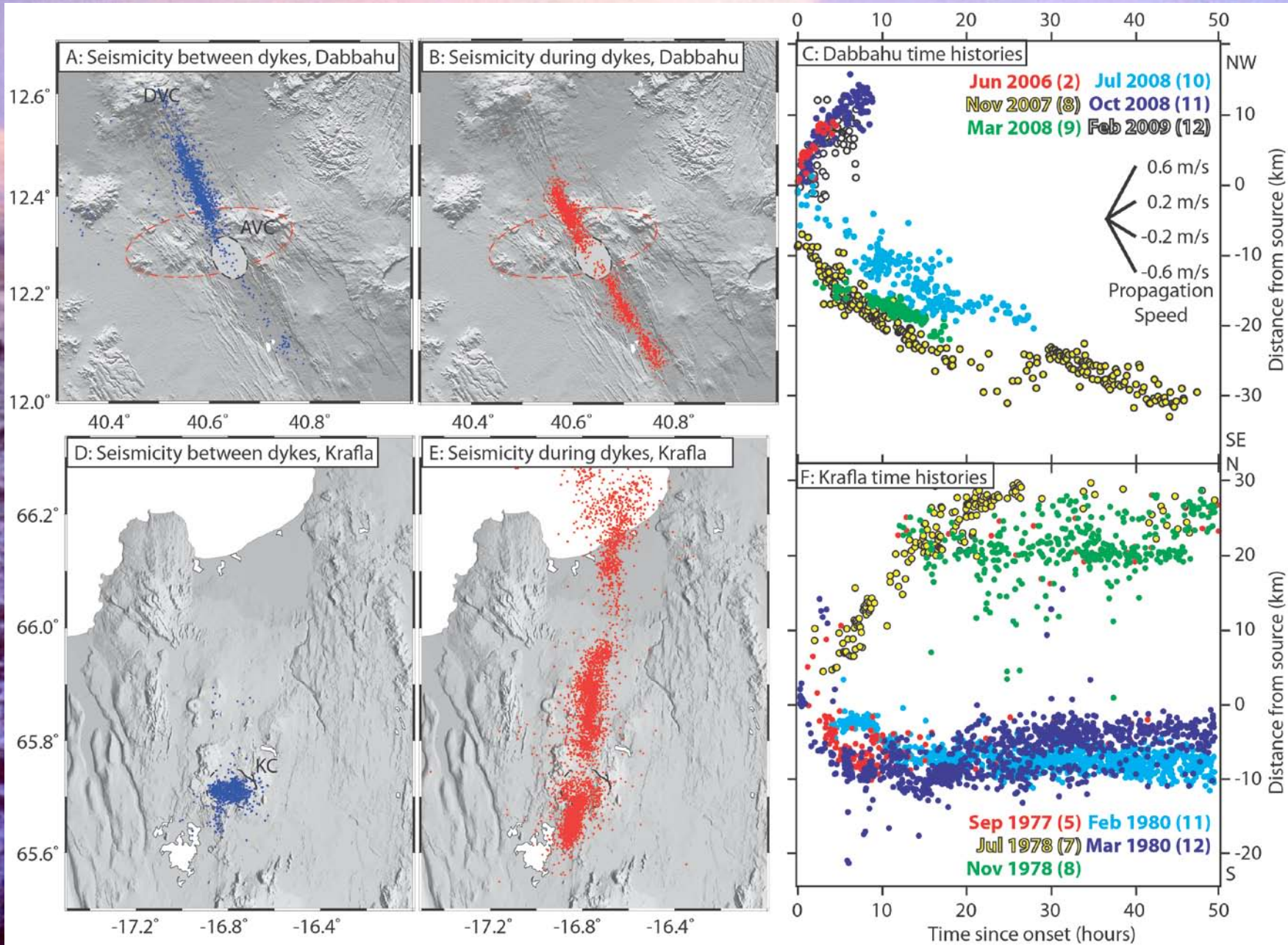


June 2009 dyke and eruption

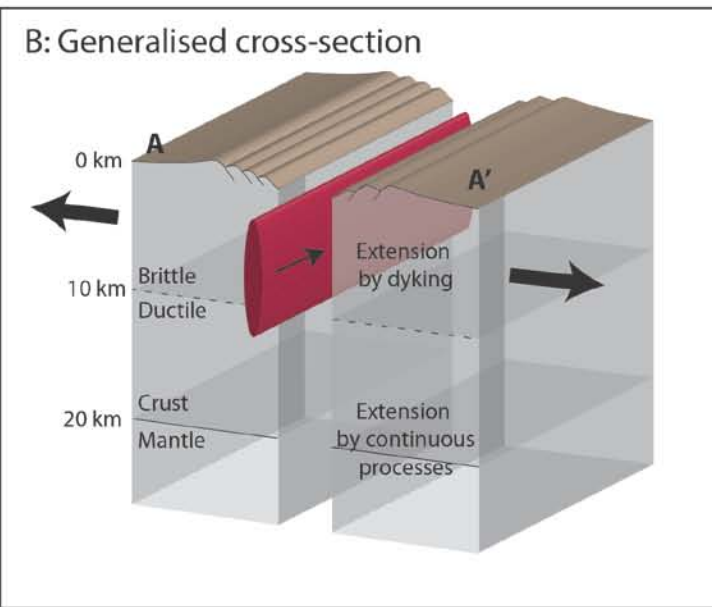
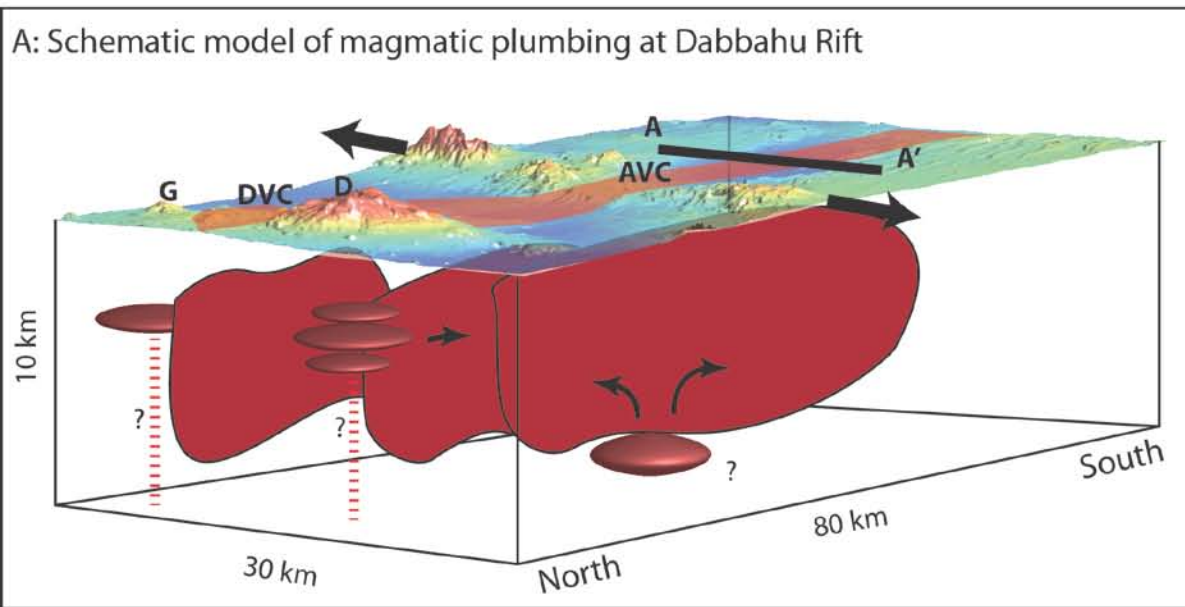


From Field Report,
Yirgu et al, 2009





Magmatic Plumbing at Dabbahu



- Brittle Upper Crust: extension occurs by episodic dyking, intruded laterally
- Ductile Lower Crust and Mantle: extension by continuous processes
- Shallow magma plumbing system is complex

A busy time in Afar...

Dallol dyke intrusion (2004)

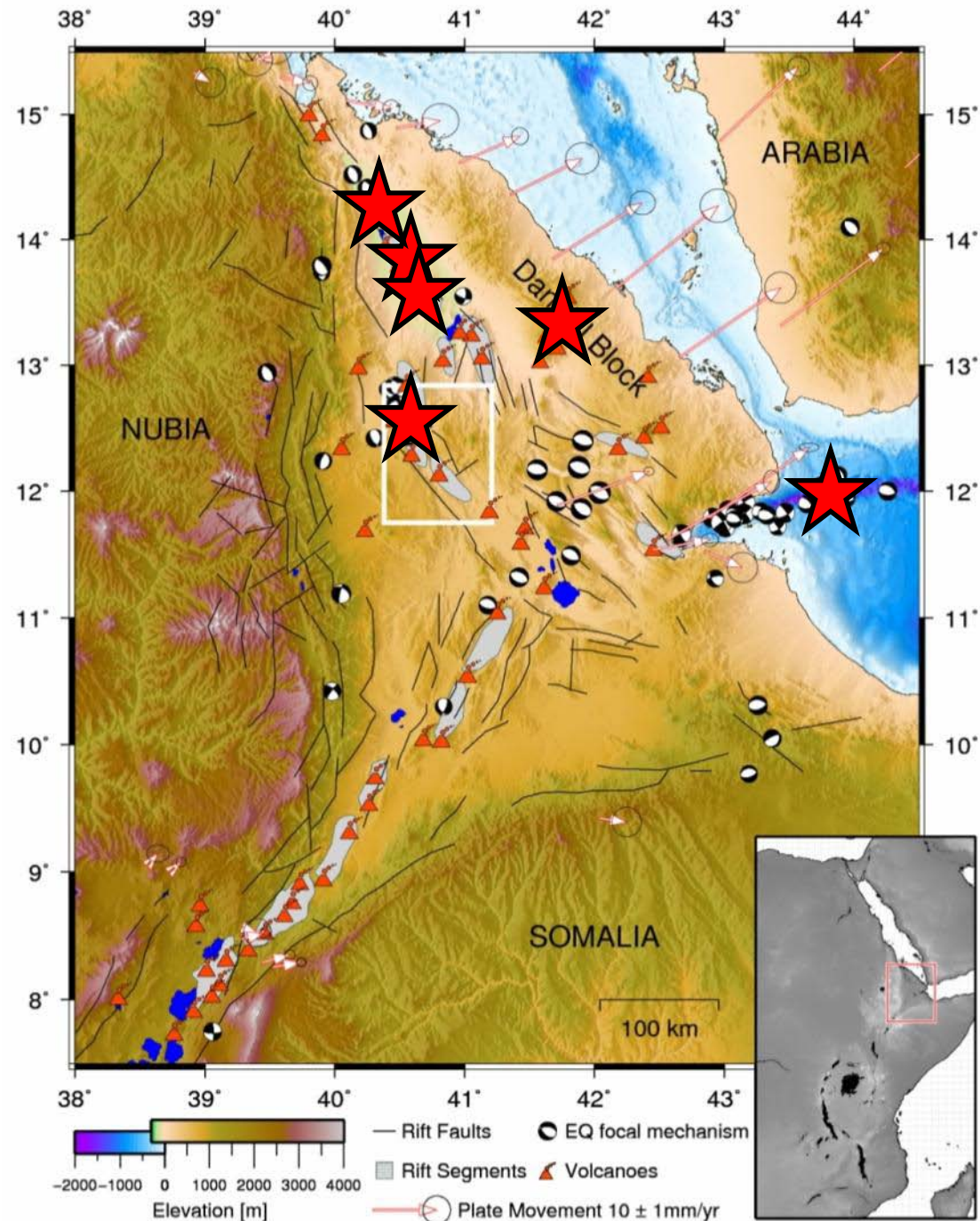
Dabbahu (2005-2010):
14 dyke intrusions
including 4 eruptions

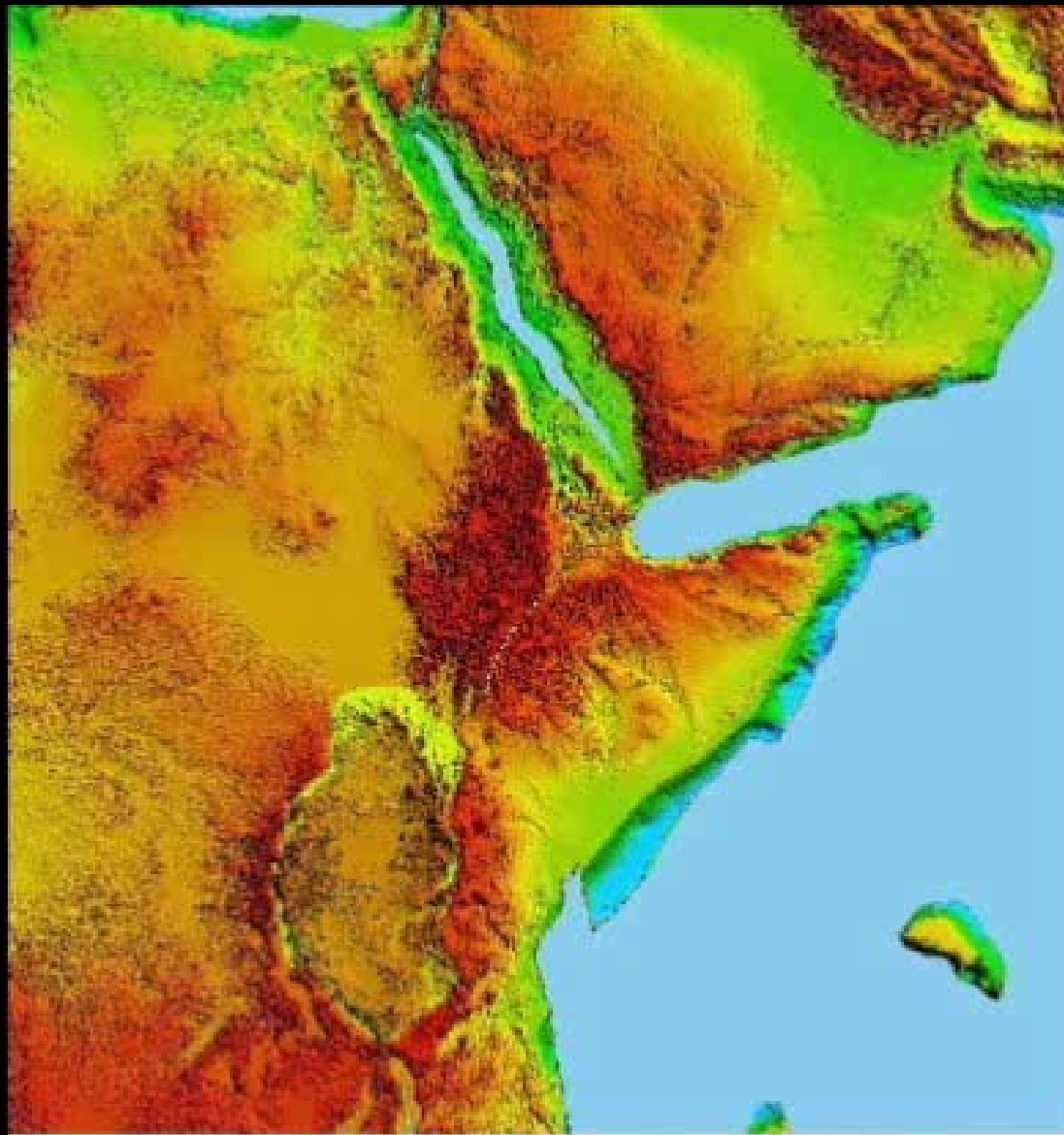
Alu-Dalafilla Eruption
(November 2008)

Erta Ale overflow
(November 2010)

Gulf of Aden swarm
(November 2010)

Nabro Eruption
(June 2011)

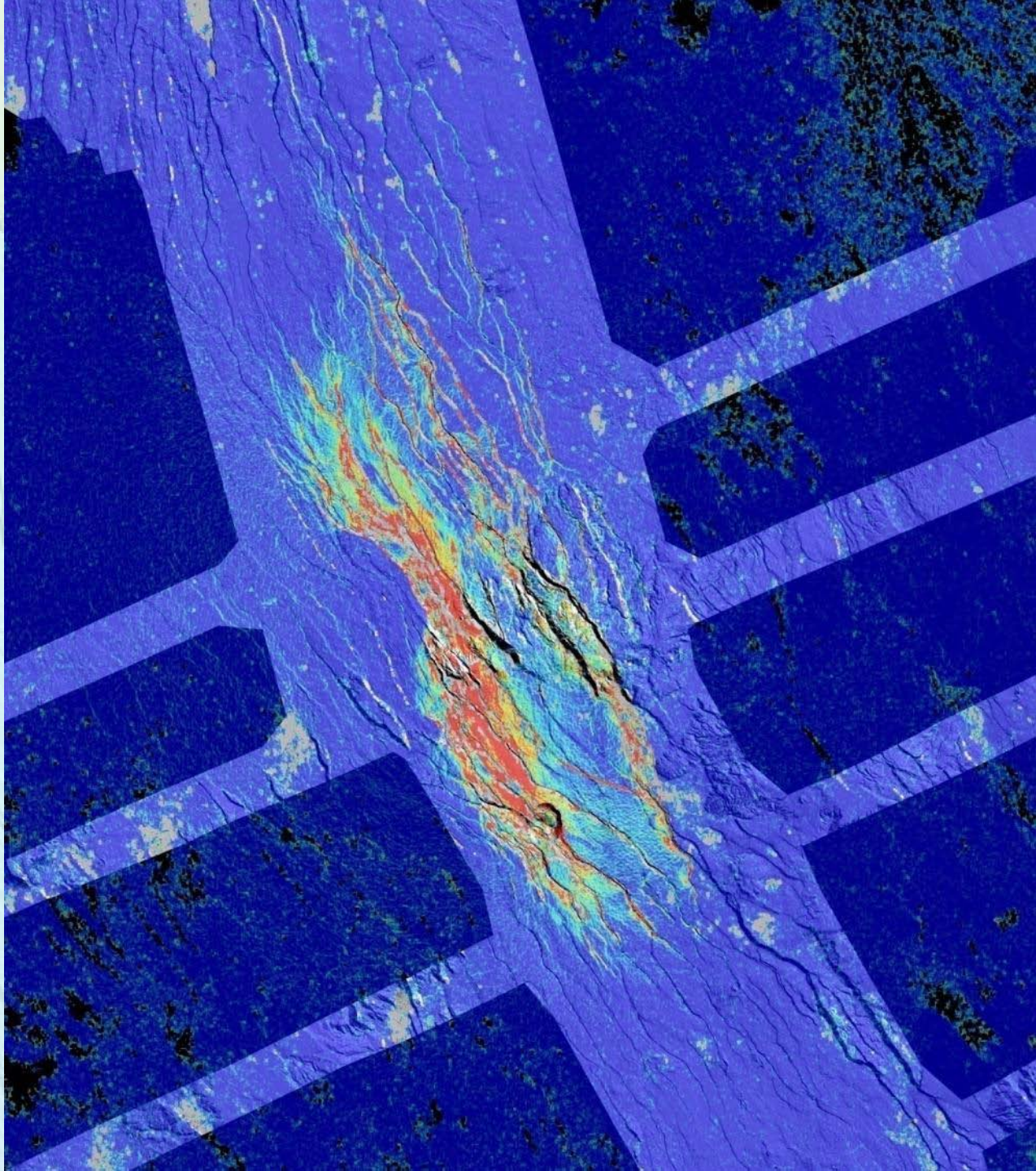




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This Meeting

- Active Magmatic Rifting
- Rifting and Climate
- Natural Hazards
- Mantle-Lithosphere interactions and the causes of breakup
- Mid-ocean Ridge Processes
- Rifted Continental Margins
- Resources from Magmatic Rifts



23.5km x
27km