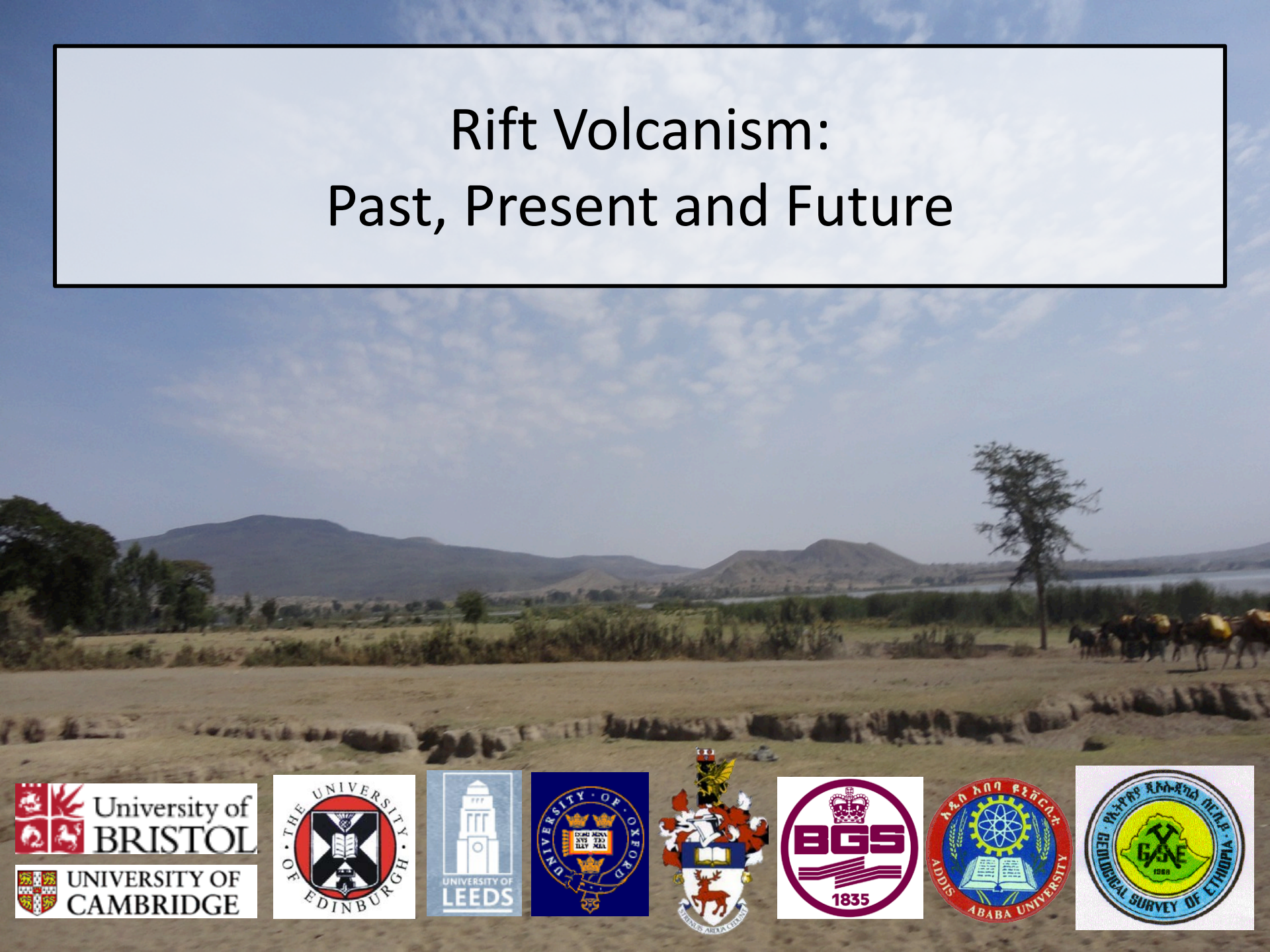
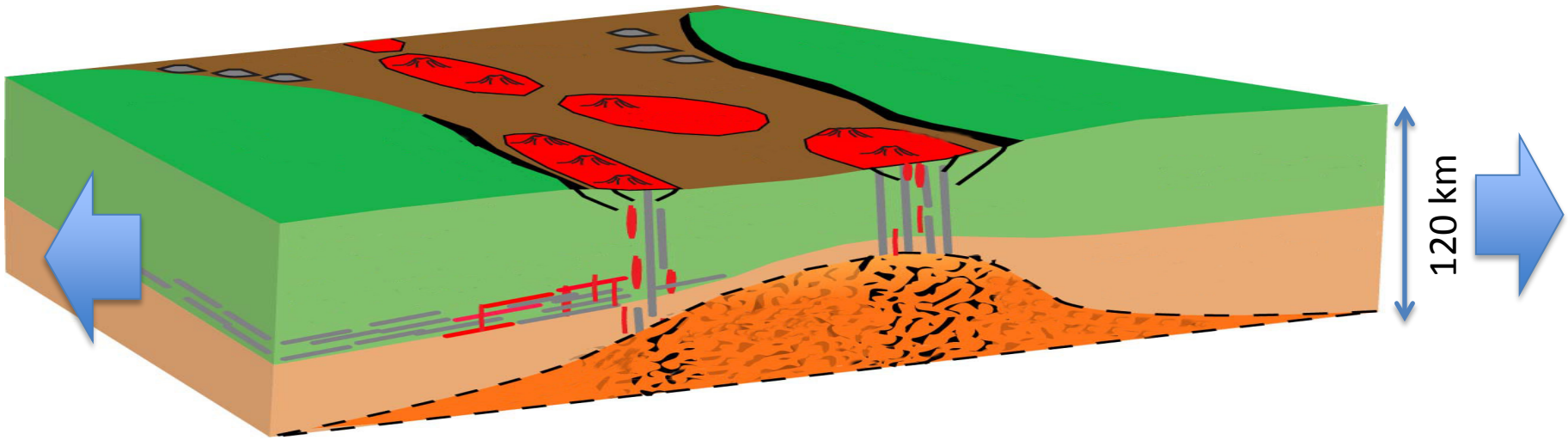
Rift Volcanism:
Past, Present and Future

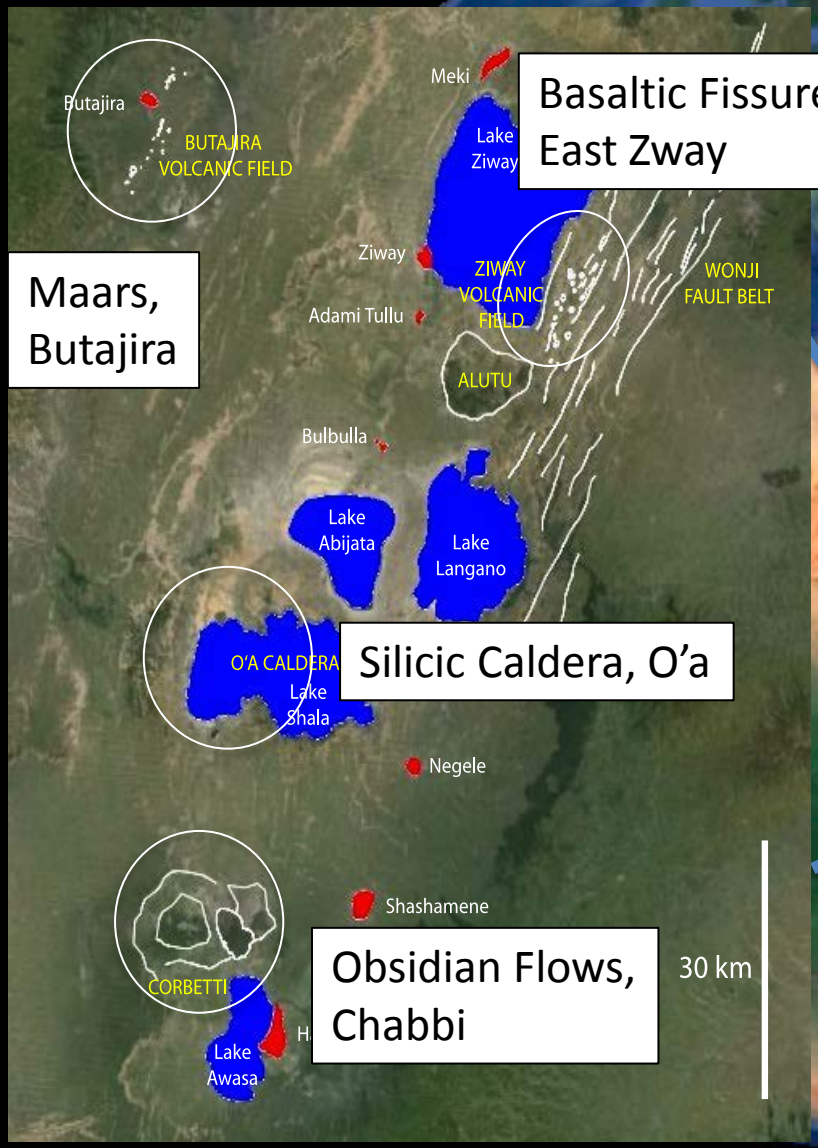


What controls volcanism in a continental rift?



1. How does rifting influence magma generation, storage, migration and eruption?
2. What drives unrest at volcanoes?
3. What are the potential volcanic threats?

Why Ethiopia (1): THE classic mature continental rift



Basaltic Fissures, East Zway

Maars, Butajira

Silicic Caldera, O'a

Obsidian Flows, Chabbi

Specific Objectives

O1: Constrain the timing and magnitude of Holocene to Recent volcanism.

O2: Understand magmatic controls on eruption style at the central volcanoes.

O3: Determine the links between eruption style and climate/hydrology.

O4: Define the role active rifting plays on magmatic plumbing systems and volcanism.

O5: Characterise the spatial and temporal variations in stress and strain associated with magmatic, hydrothermal and fault-related processes at the silicic volcanic centres.

O6: Quantify the state of unrest from geophysical data.

O7: Develop probabilistic assessment methods to fully characterise key volcanic hazards at a high risk central volcano.

O8: Develop a regional analysis of ash fall hazard and assess the long-term volcanic threat, incorporating the inherent uncertainty.

Progress: Science Highlights

- Aluto eruptive history, structural controls on fluid pathways and evidence for mid-pleistocene ignimbrite flare-up (Hutchison et al)
- ~25 ash layers from the Holocene deposited in lake cores near Aluto (McNamara, Fontjin, Cashman, Yirgu)
- 36 seismometers, including some real-time (Keir, Greenfield, Ayele)
- 2-D model of cross-rift MT profile (Hübert, Whaler & Fisseha)
- GPS, InSAR, dynamic gravity: ~7 cm/yr uplift at Corbetti (magma input), ~2cm/yr subsidence at Aluto (hydrothermal) (Birhanu, Lloyd, Lewi, Gottsmann)
- Jan 2016 Hawassa EQ (Wilks et al); Jan 2017 Shashamene EQ and Erte Ale overspill in progress.
- Expert elicitation on the characteristics and frequencies of explosive eruptions in Ethiopia and Kenya (Vye-Brown et al)