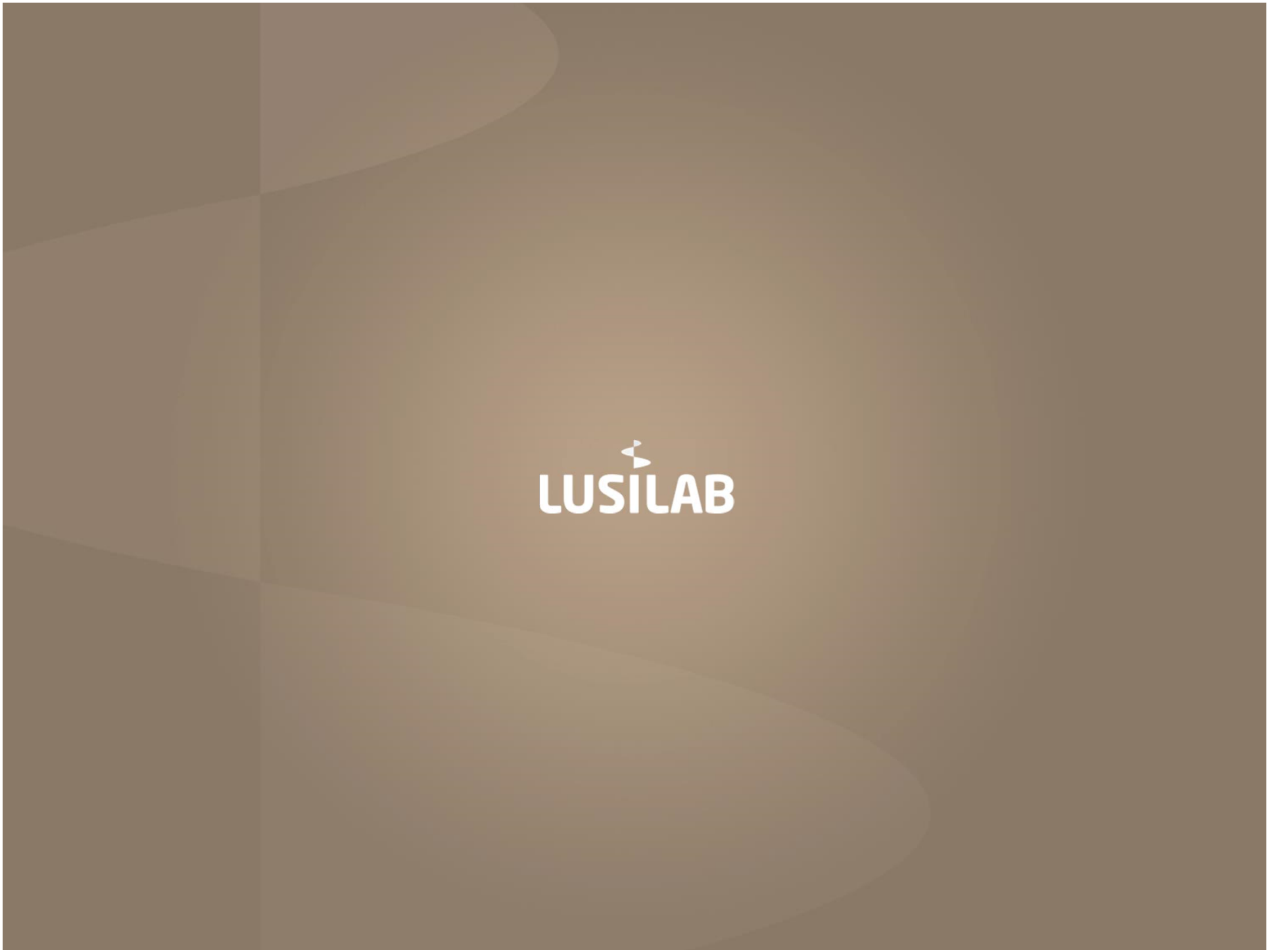

LUSILAB

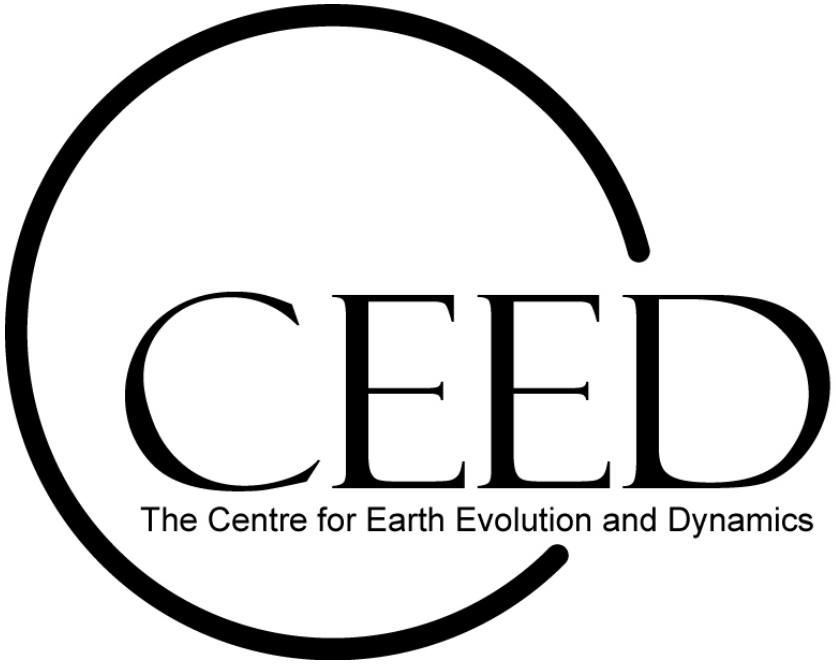
LUSILAB

Lusi: a unique natural laboratory for multidisciplinary studies of focussed fluid flow

UNIVERSITY OF OSLO

Adriano Mazzini
et al.

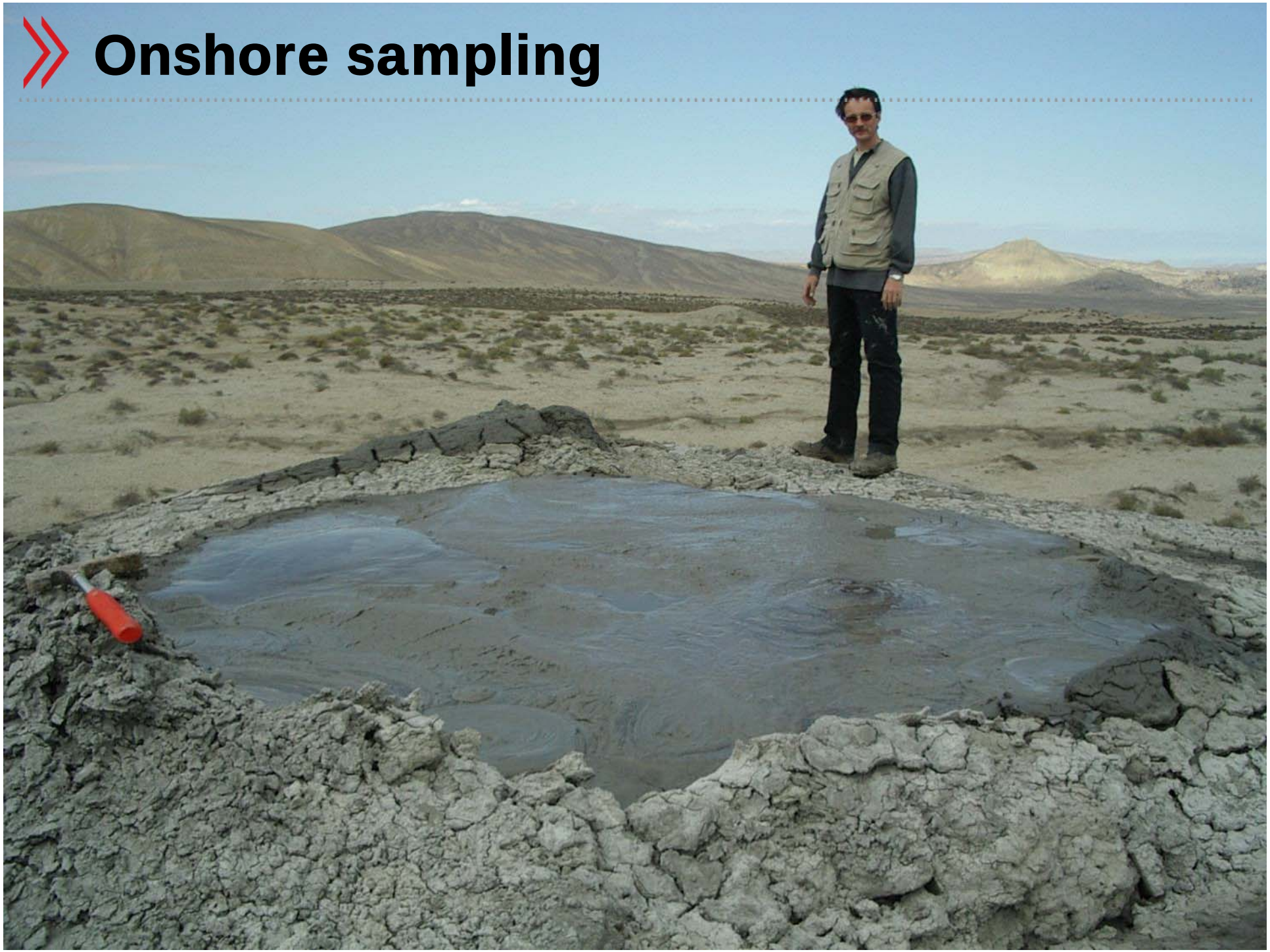
CEED
The Centre for Earth Evolution and Dynamics



ERC grant

Onshore sampling

Onshore sampling

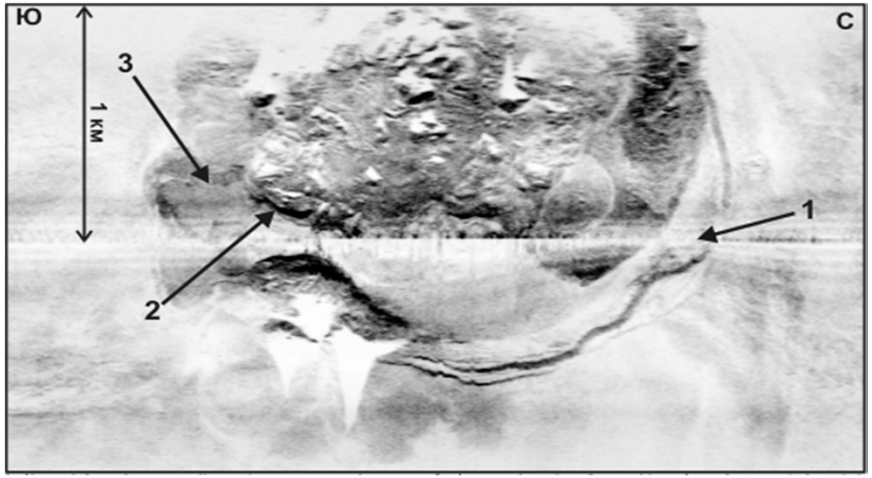


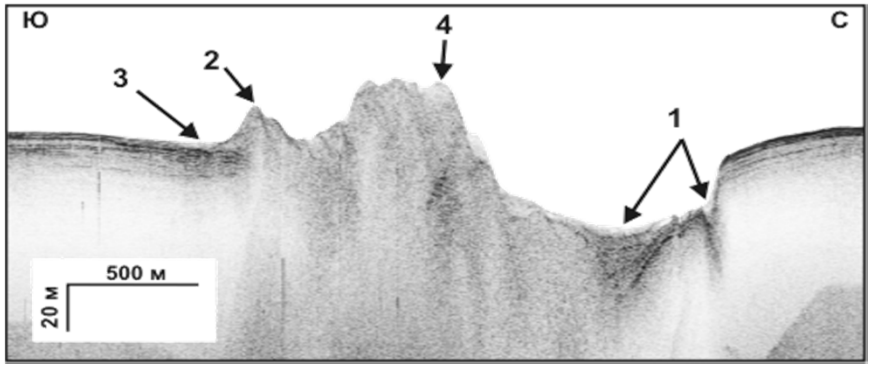
Solo sampling

Team sampling

Offshore sampling

Offshore sampling





Active eruptions

Piparo eruption, Trinidad

Sea of Azov

Lusi motivation: active

- Observe the **evolution** of a piercement structure erupting from **day one**
- Combine **drilling** data
- Continuous **monitoring** of activity
- Excellent **access** otherwise impossible in natural conditions

Brief history: the facts

- 27th May 2006: 6.3 M earthquake (Yogyakarta)
- 29th of May 2006: LUSI eruption
- Several aligned eruption sites
- ~7 Km^2 area flood
- Pulsating behaviour, up to 180.000 m^3/day mud erupted
- >60.000 people evacuated

Brief history: the facts

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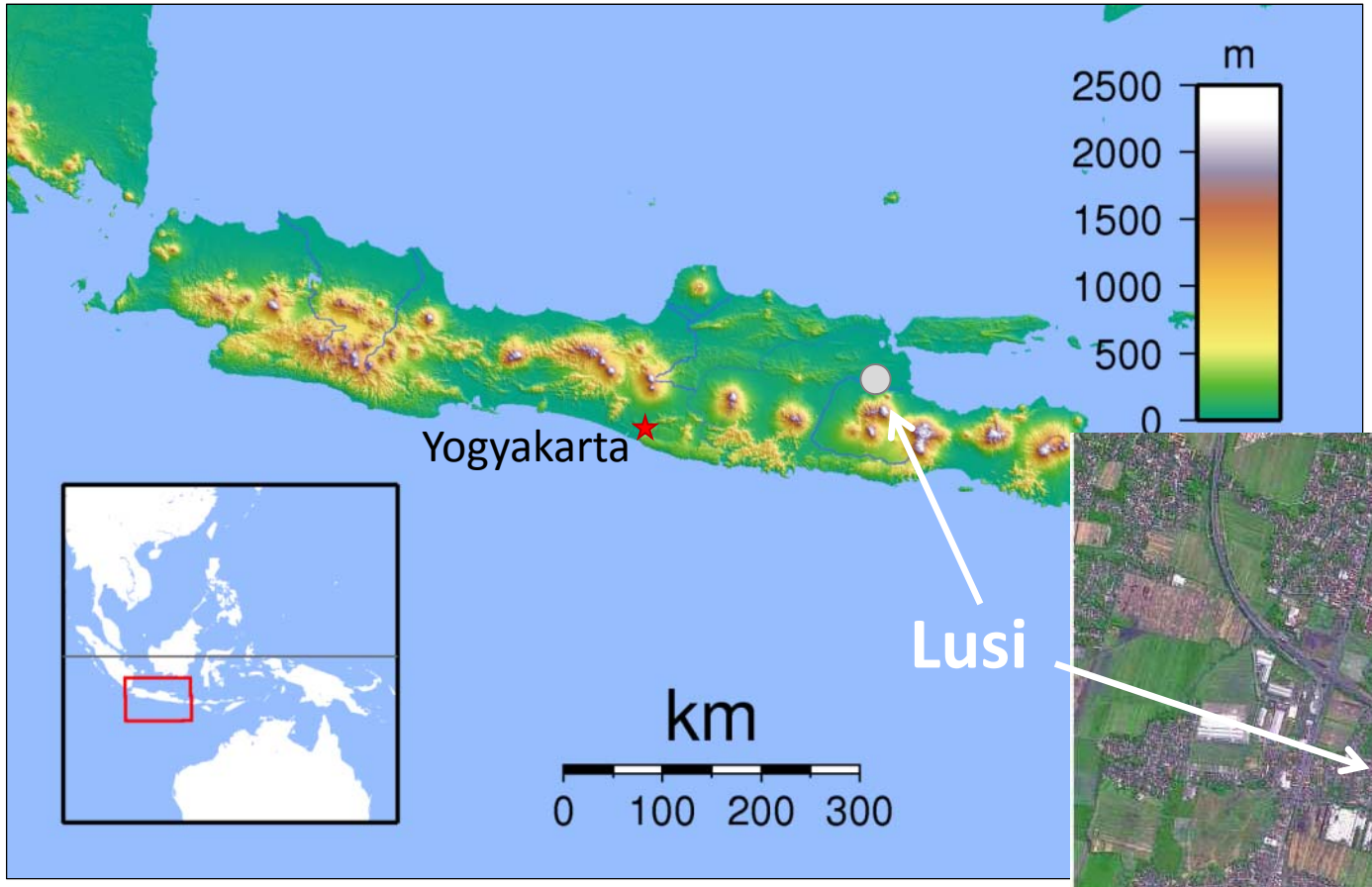

26th May 2006: 22:53:58 GMT, 6.3 M earthquake (Yogyakarta) depth 17km

Brief history: the facts

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- 27th May 2006: 6.3 M earthquake (Yogyakarta)
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- Several aligned eruption sites
- ~7 Km^2 area flood
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Eruption: the first day

The evolution of the eruption

The evolution of the eruption

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Multidisciplinary studies of focussed fluid flow

P2236232.AVI

Multidisciplinary laboratory

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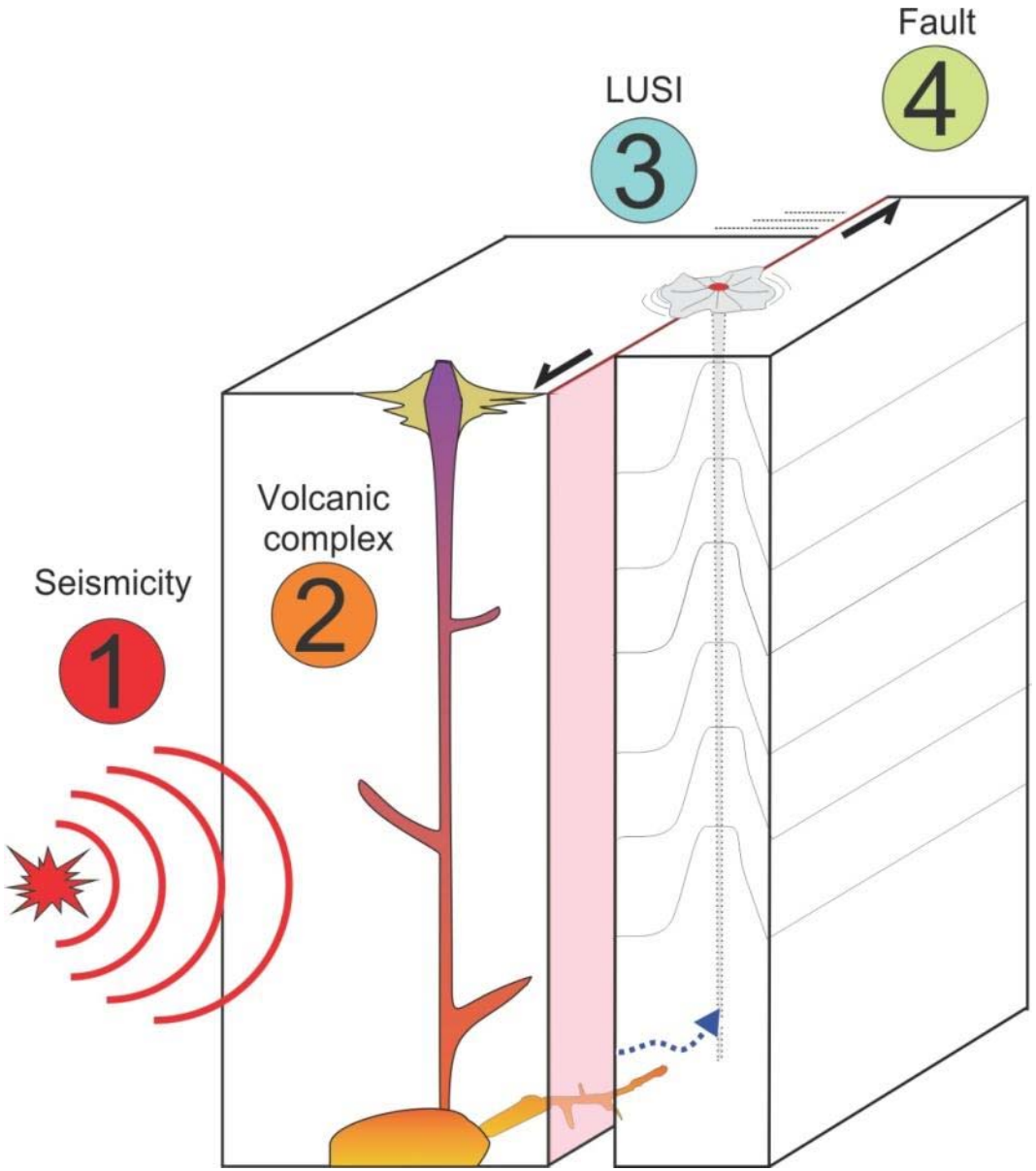

Interaction of:

- **Seismicity**
- **Volcanism**
- **Fluid flow**
- **Faulting**
- **Modelling**

The work flow

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Lusi crater

Monitoring, sampling
ROV design - probe

PhD 1, PostDoc. 1

Volcanic complex

Sampling vents
Mapping fault - intrusions

PhD 1, PostDoc. 1

Seismicity
Strike slip

Monitoring (Seismomenters, GPS)

PhD,2 PostDoc 2.

Modelling

Combine results
Computer code

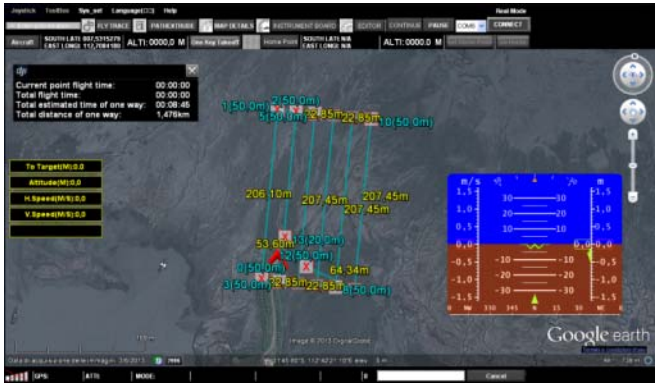
PostDoc. 2

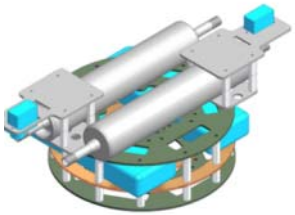
The Lusi drone

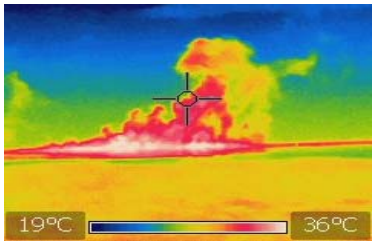
The Lusi drone

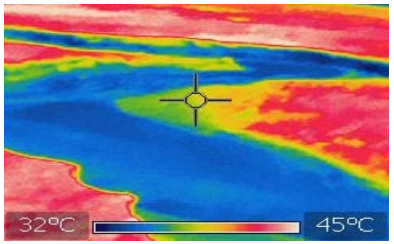
- Versatile
- Light weight
- Easy transport
- Multipourpose
- accesses extreme environments

A Multidisciplinary Tool



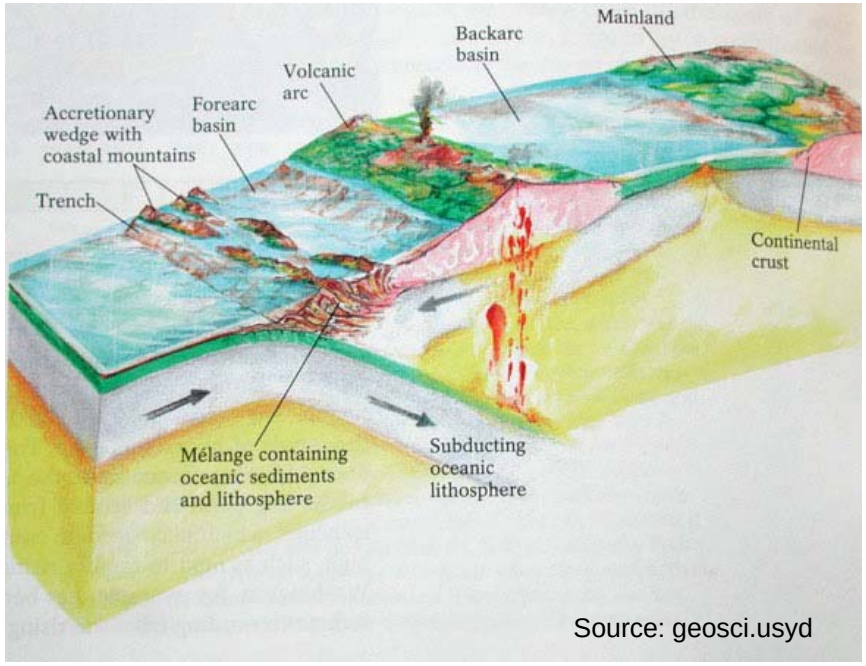


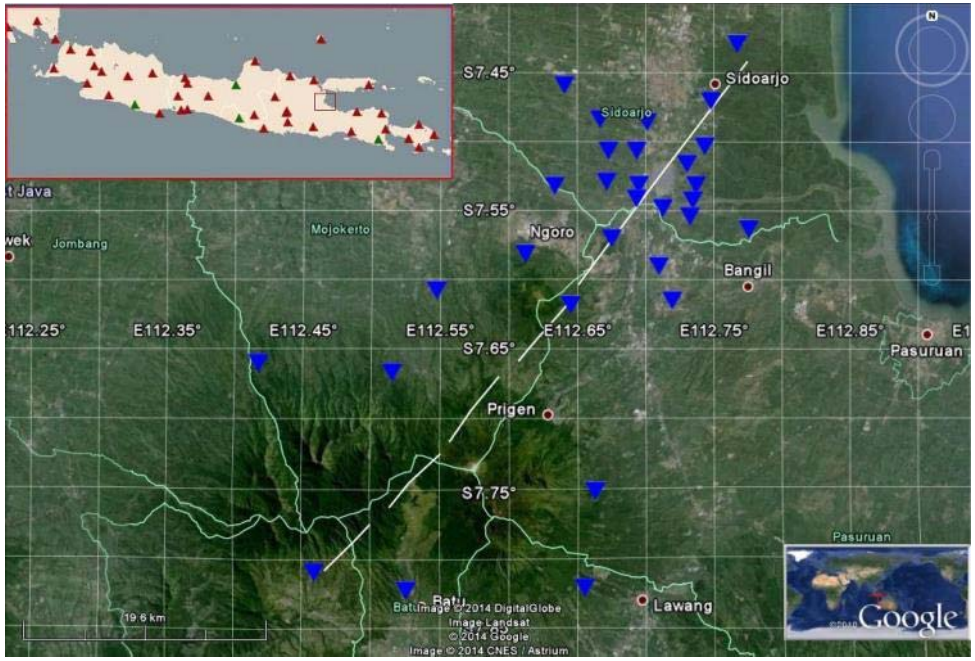




- GPS automated software
- Photogrammetry
- Video survey
- Gas sampling
- Water/solid sampling
- Temperature logging
- Infra red

Microseismicity monitoring





- **Aim**: monitor the **effects of subduction** seismicity in the **backarc** zone of NE Java.
- **Tools**: 30 seismometers SB and BB.
- **Monitor** effects of induced **microseismicity** on the Watukosek **fault**, Arjono-Welirang **volcanic** complex, **Lusi** open system. Listen to Lusi active chamber

Westsystems Flux measurements

Thank you