

Do you believe in coincidences?

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Hypotheses and drilling data interpretation

Two main Lusi hypotheses:

a) Man-made: data from undisclosed sources. No field data considered.

b) Not man made: different interpretation of drilling data that show discrepancies with datasets used by “Man-made” camp.

*** It is a duty of geologists to investigate each aspect on a small and large scale to provide unbiased judgments.**

The bigger picture: regional observations and the many coincidences

Field observations and geological facts in eastern Java:

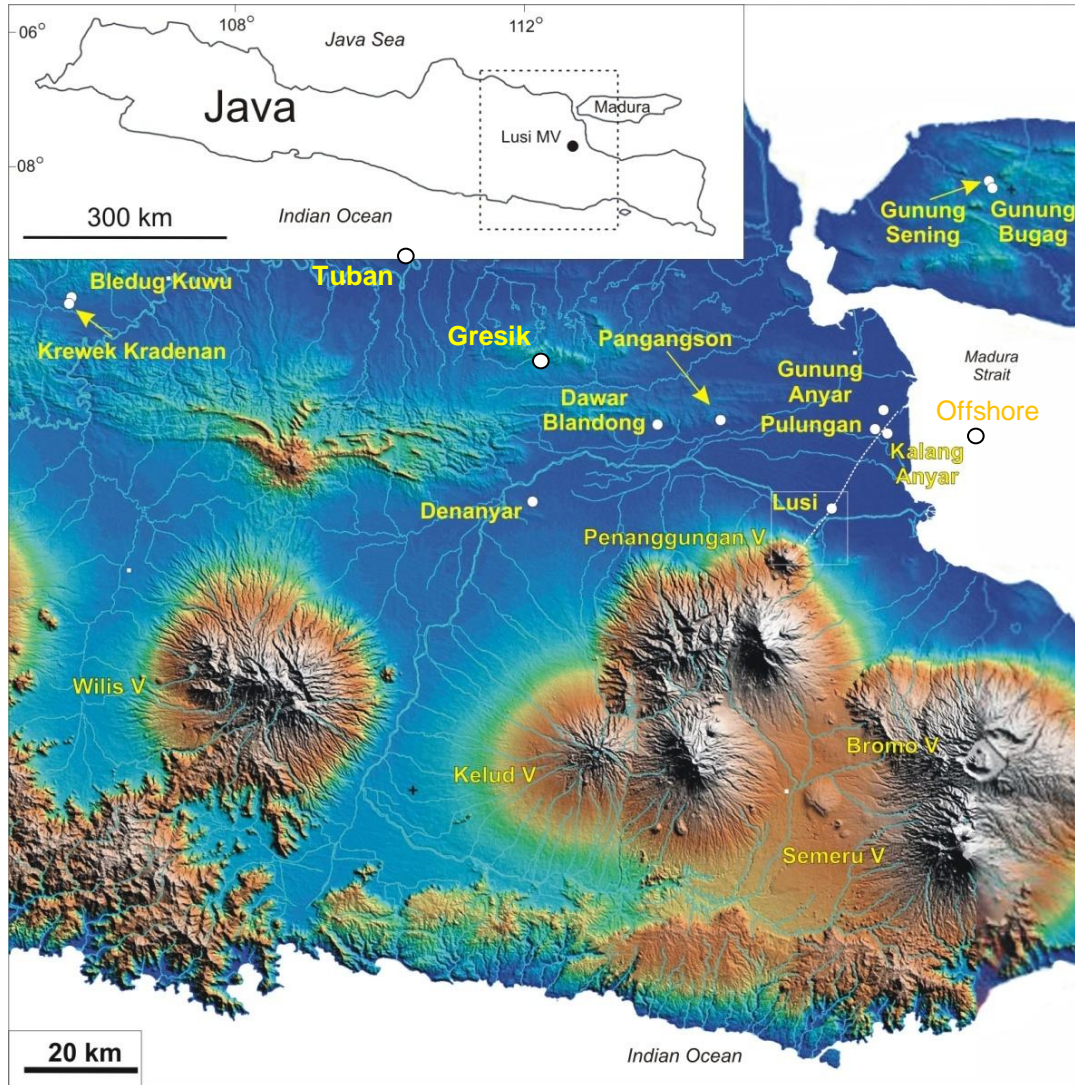
a) Numerous **mud volcanoes** and seeps → **Lusi not the only mud eruption site**

b) Lusi is aligned along a **major fault zone** → **External trigger plausible**

c) Proximity to the **volcanic arc** → **Influence of deep volcanic system?**

These facts and **regional observations** are often neglected by people and **never considered** by the “man-made” camp.
How do we explain the observations on a larger scale?

Mud volcanism is common in Indonesia

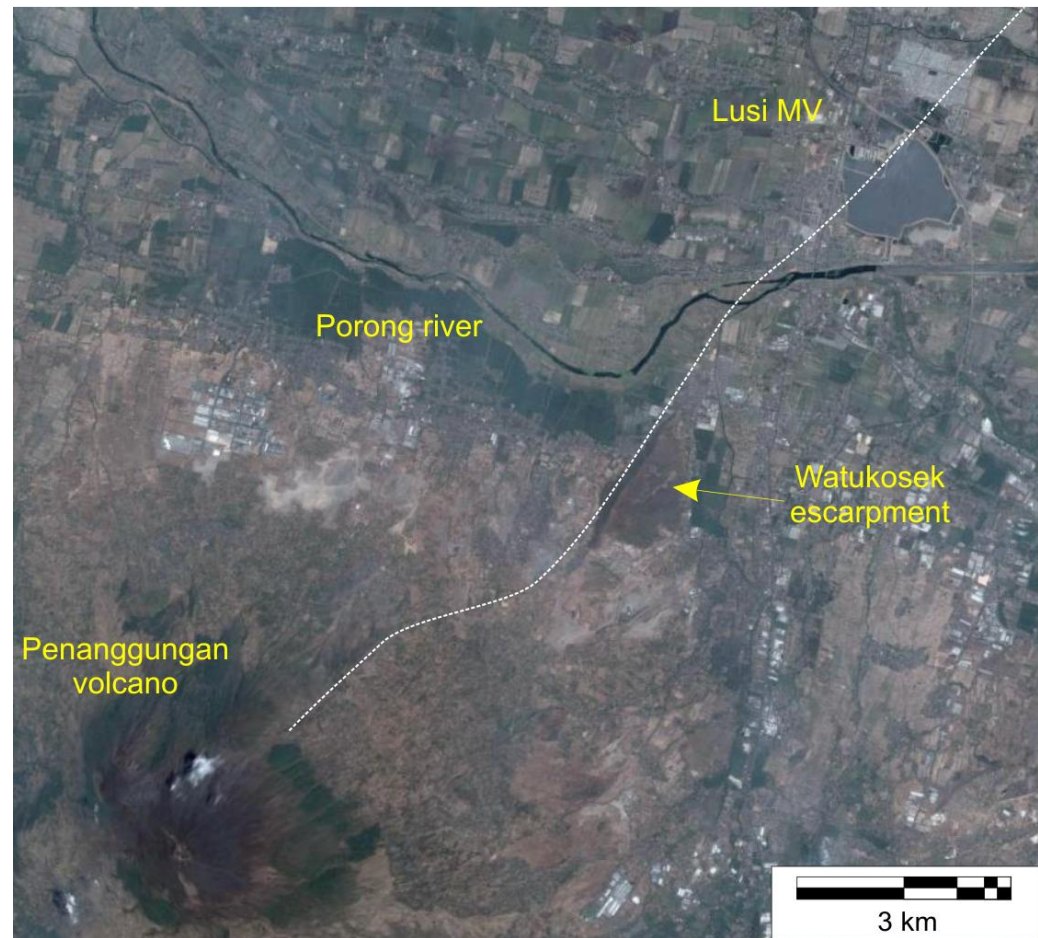
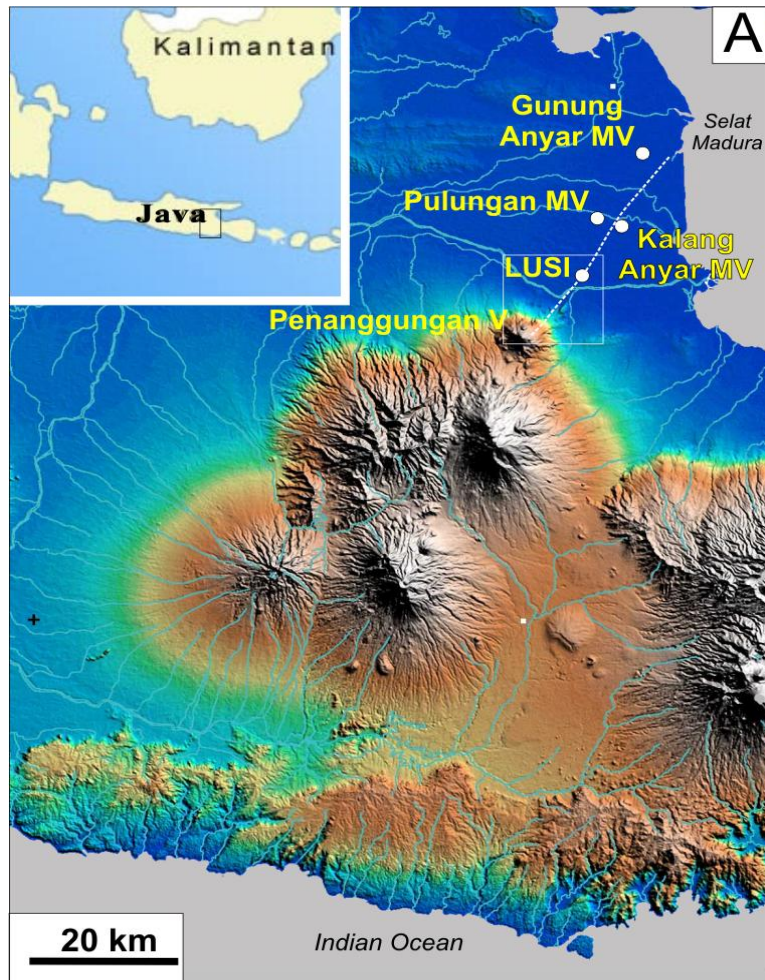


Mud volcanism is a very common phenomenon in Indonesia

The **geological setting** of Java: **text book example** for mud volcano formation

Has there ever been a Lusi in the past? Likely, based on geological and historical data

Lusi is located along the Watukosek Fault



Watukosek fault hosts
other mud volcanoes on NE
Java

Geological features clearly
indicate the presence of
the fault

Watukosek Fault at surface

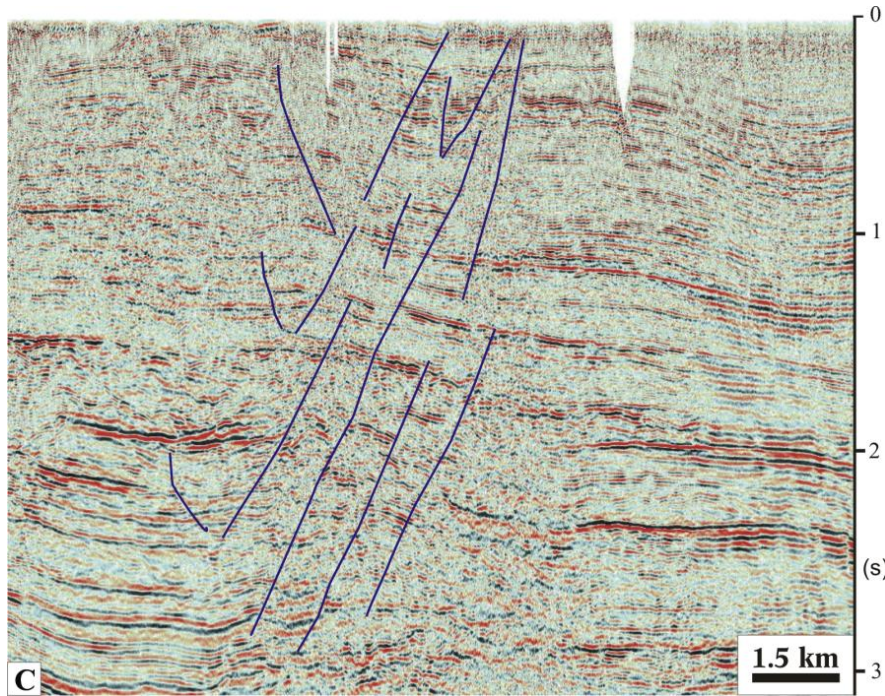


Photo from Lusi crater: aligned

- **LUSI**
- **Watukosek escarpment**
- **Ponanggungan Volcano**

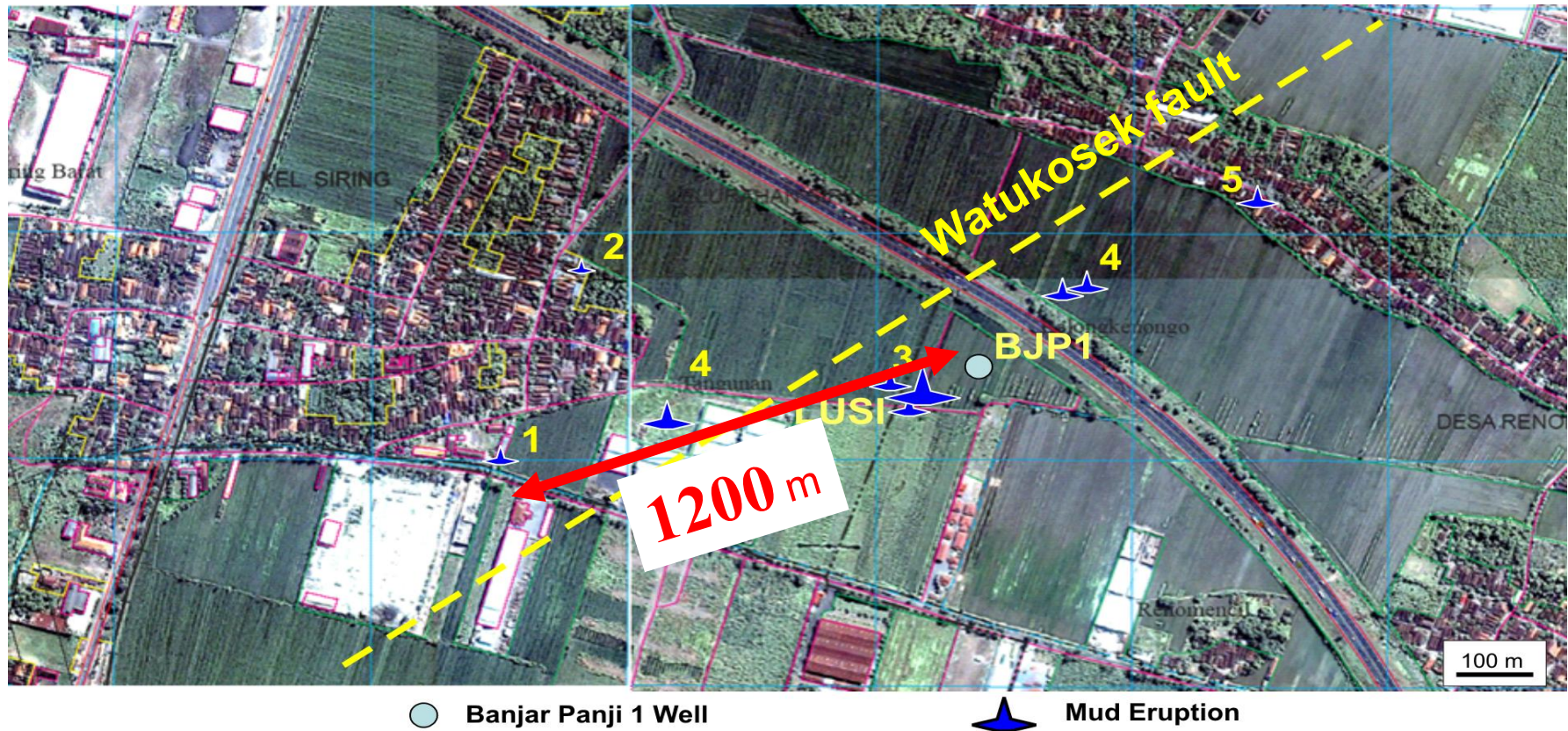
Watukosek escarpment

Watukosek Fault at depth



Seismic profiles collected during 1980's systematically show the presence of a **faulted zone** both on the **SW** and **NE of Lusi site**

May 2006: many mud and gas eruptions suddenly appeared



- Sequence of **eruptions oriented** along a **SW-NE** trend
- **First** eruption **1200 m** from **drilling** site

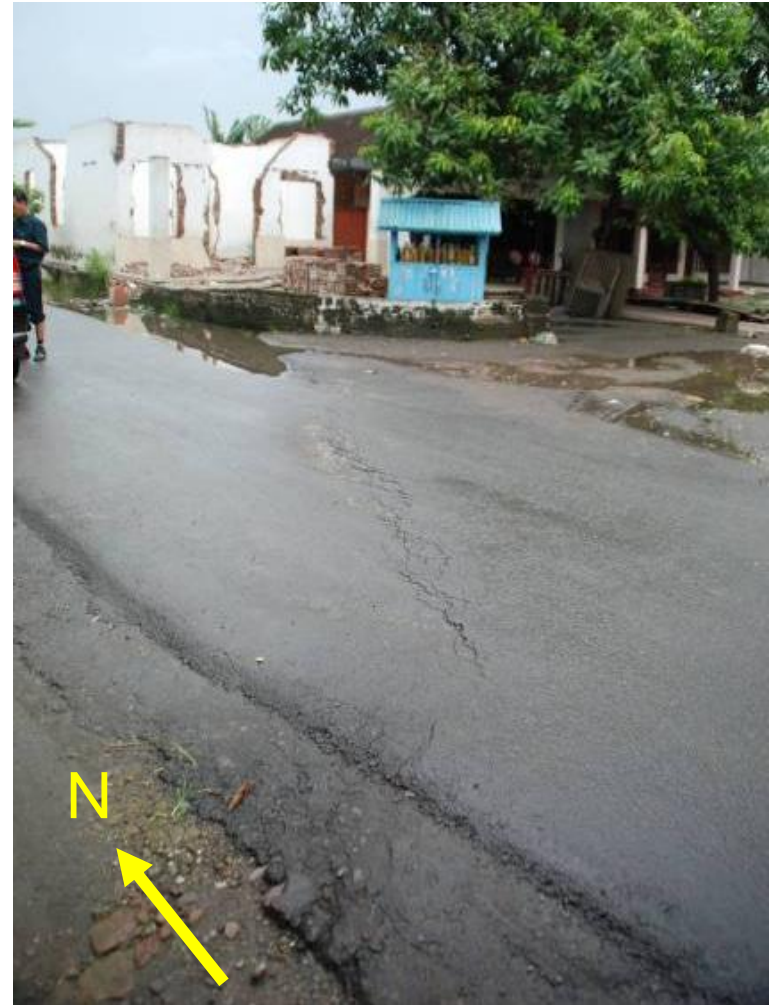
LUSI prograding cracks after EQ



**Fractures
follow the
Watukosek
fault direction**



Faulting north of LUSI



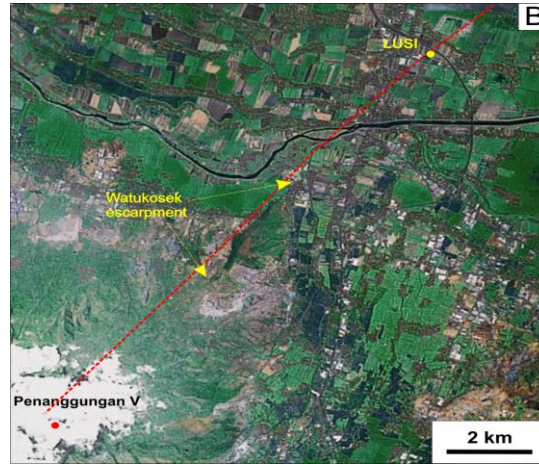
Faulting follows the Watukosek fault direction

Intersection fault-railway

Railway movement:

Repaired 4 times

Total~ 40-50 cm



GPS monitoring:

July ~2cm

August 10cm

September 10cm

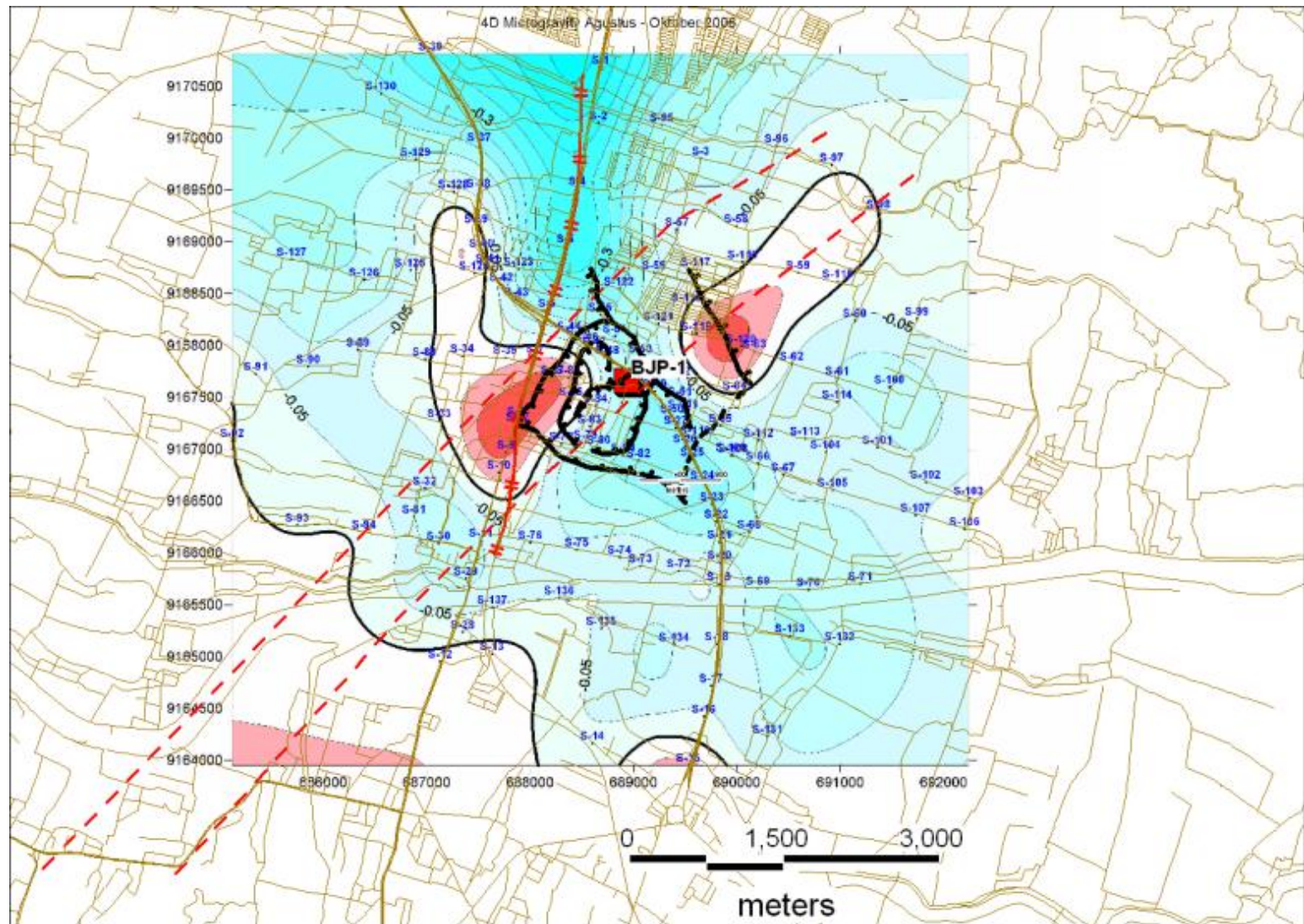
June ~2cm?

TOT: ~25 cm

Initial shearing : 15-20 cm



Collapse/new seeps following fault trend



Subsidence monitoring October_august 2006

Istadiet *al.* 2009

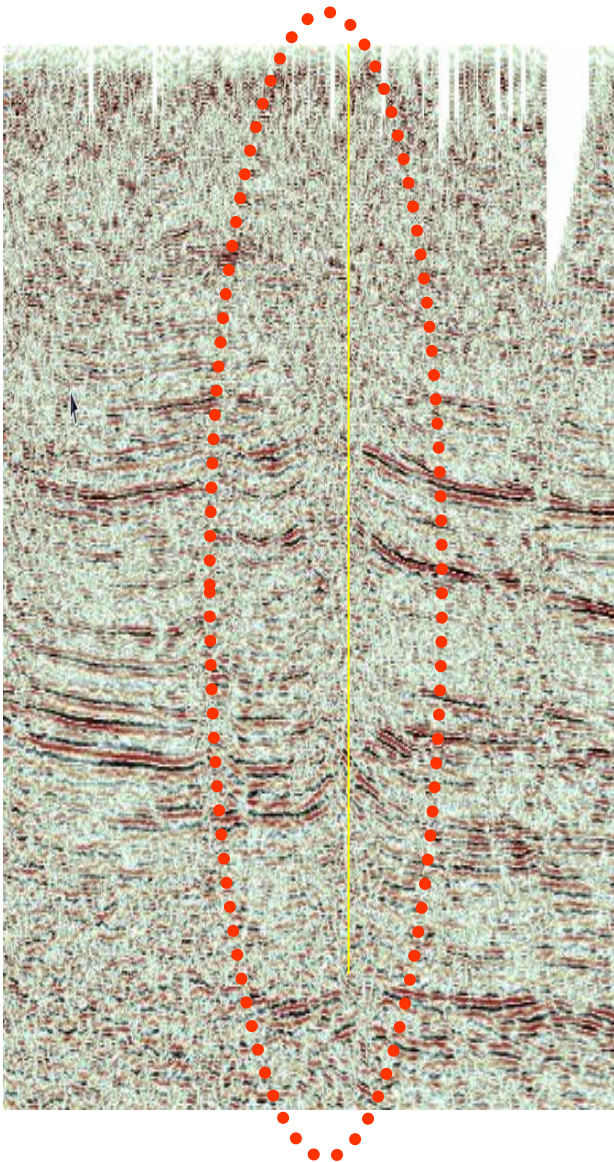
Seismics show pre-existing diapir

Seismic profiles from 1980's show presence of **growing diapir** at Lusi site.

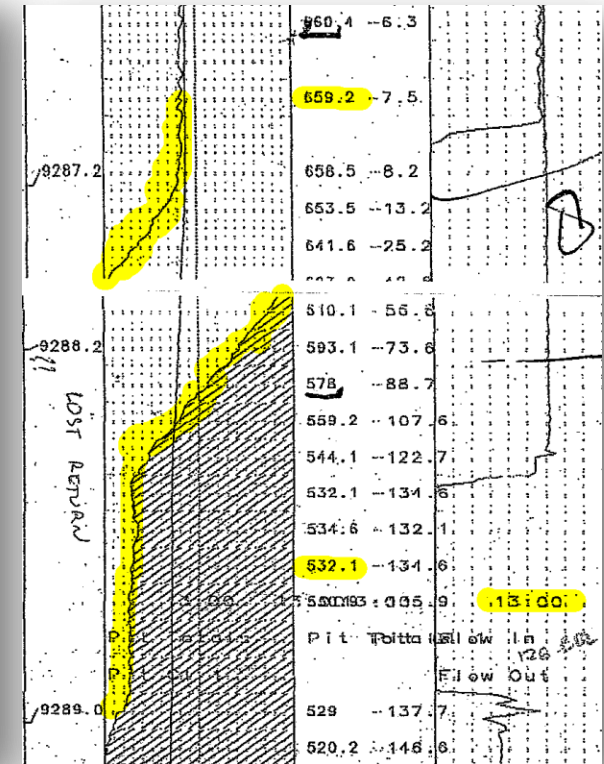
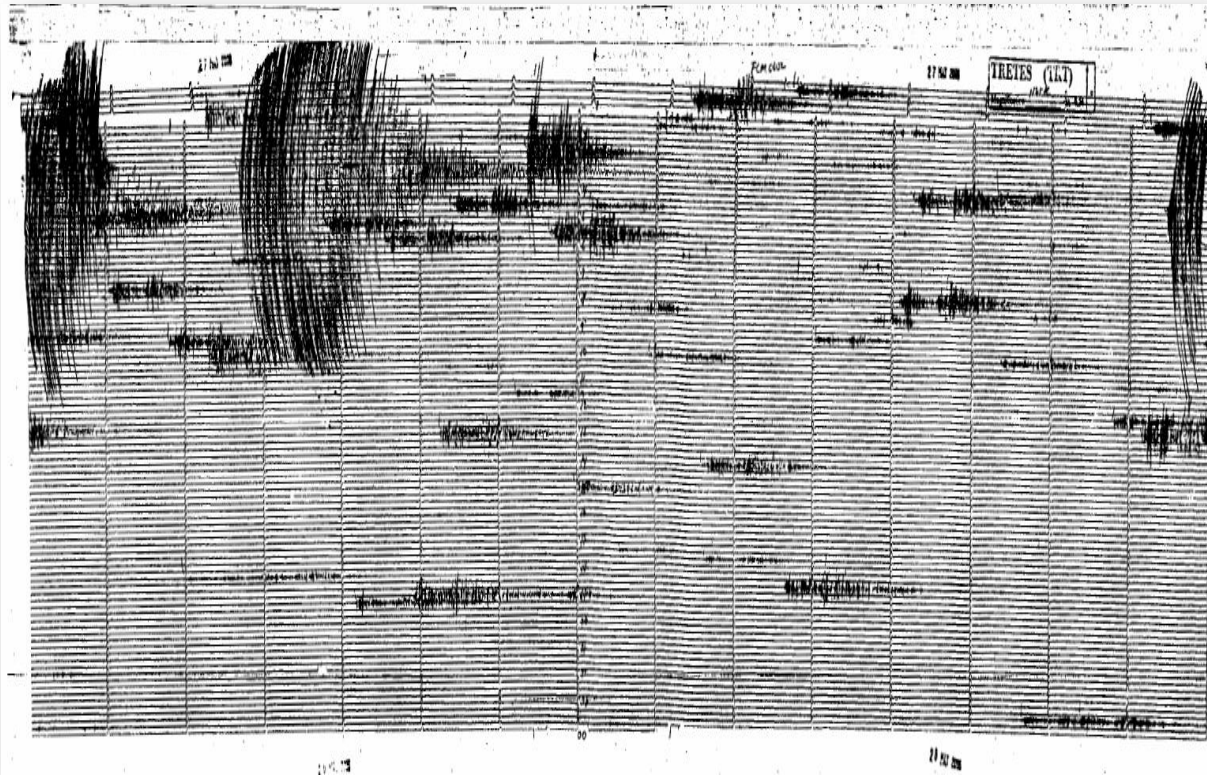
Typical of geological features that **will manifest** to the surface **as mud volcanoes**

→ **Lusi would have erupted sooner or later**

Important detail **never included** in previous modelling from man-made camp

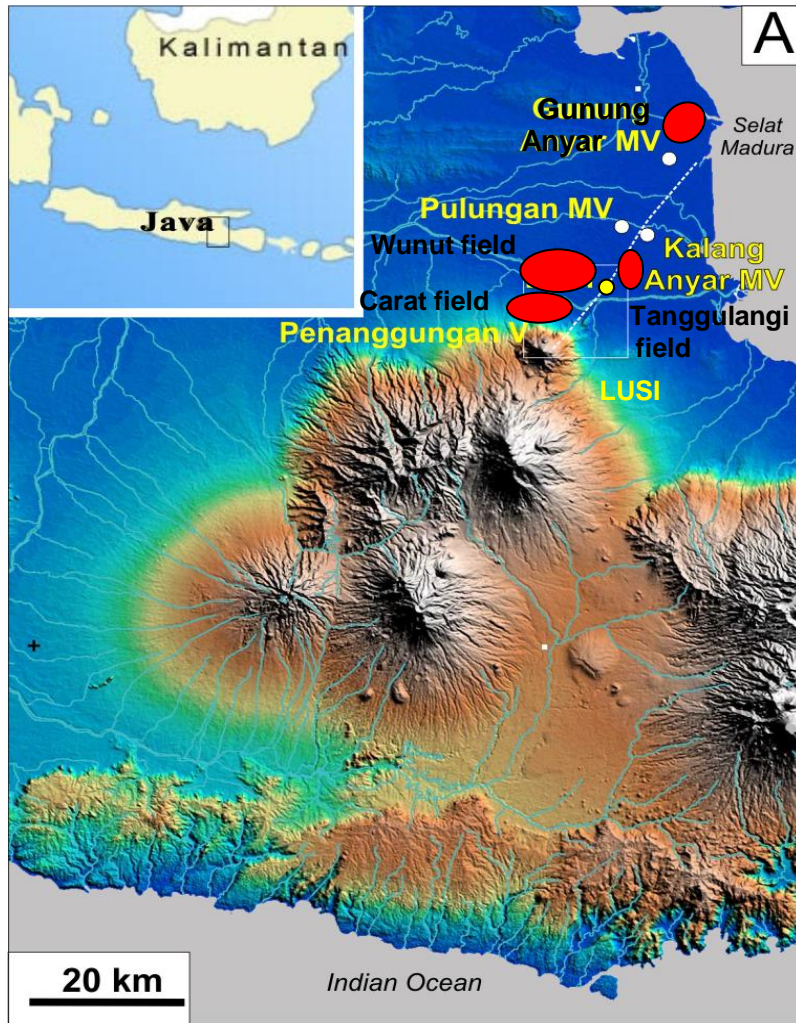


Earthquake and loss of circulation at drilling site



Coincidentally **partial loss** of circulation **after the earthquake**
and
total loss of circulation **following** the two **after shocks**

Pressure loss at various wells in May 2006

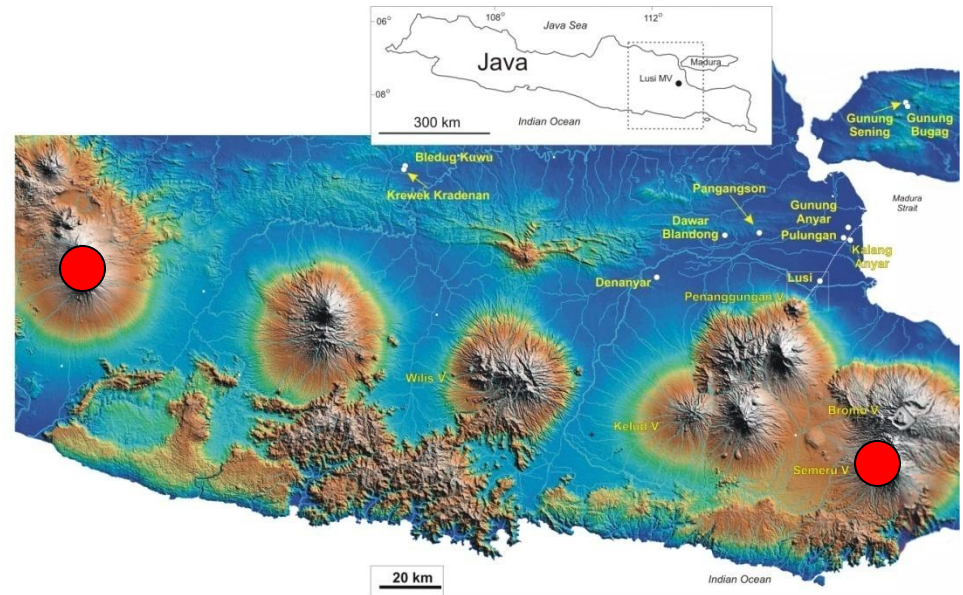
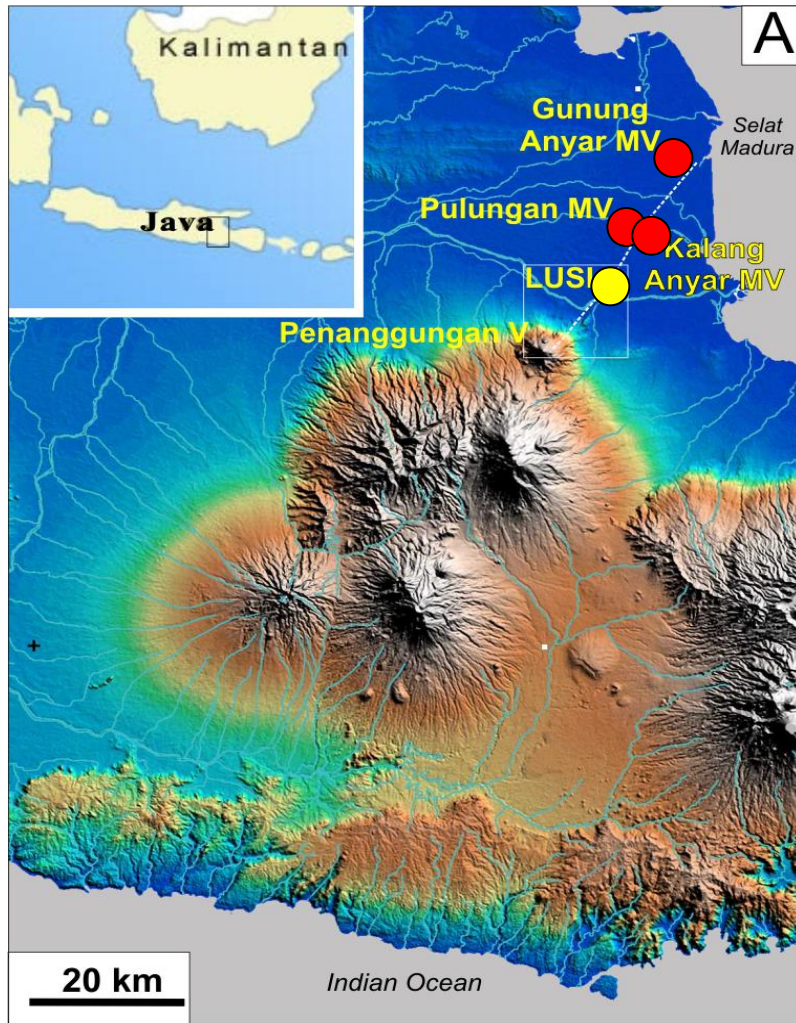


Interestingly **Wunut, Carat, Tanggulangin** gas and oil fields and the water wells close to **Gunung Anyar** report sudden pressure loss after the 27-05-2006 earthquake.

→ **Fluids flushed away from aquifer**

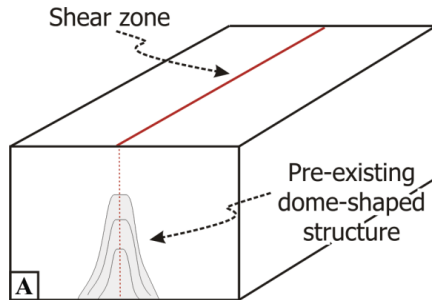
Increased activity of other mud volcanoes along fault after May 2006 earthquake

Coincidentally **other mud volcanoes** along Watukosek fault were **more active after earthquake** when activity started around Lusi.

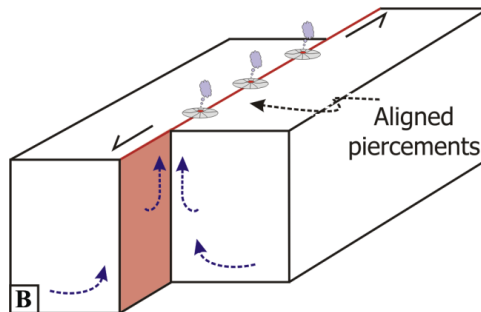


Semeru + Merapi stronger activity after earth quake

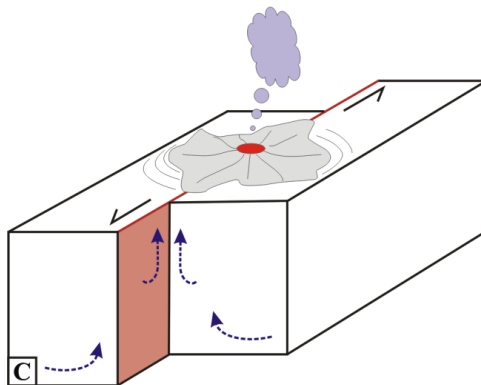
Suggested scenario that explains also regional observations



Pre-existing **diapir and pre-existing **Watukosek fault****

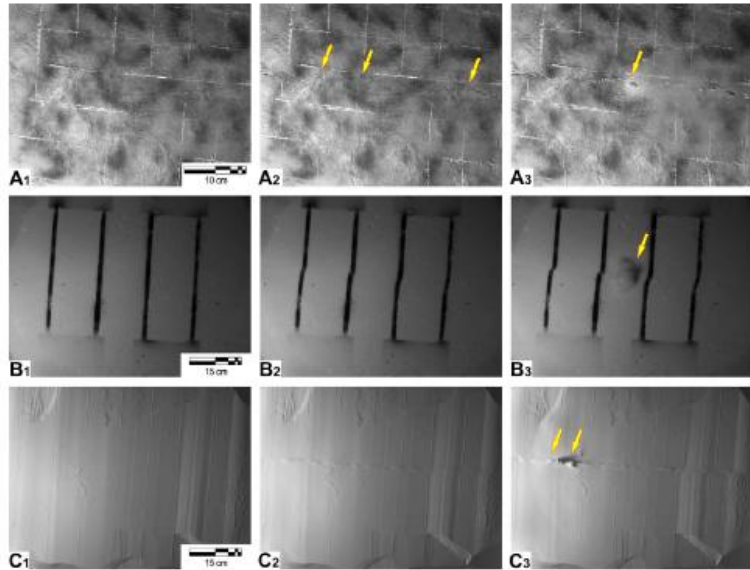


Reactivation of Watukosek fault after earth quake. Draining of fluids towards faulted zone. **Aligned craters along fault zone**

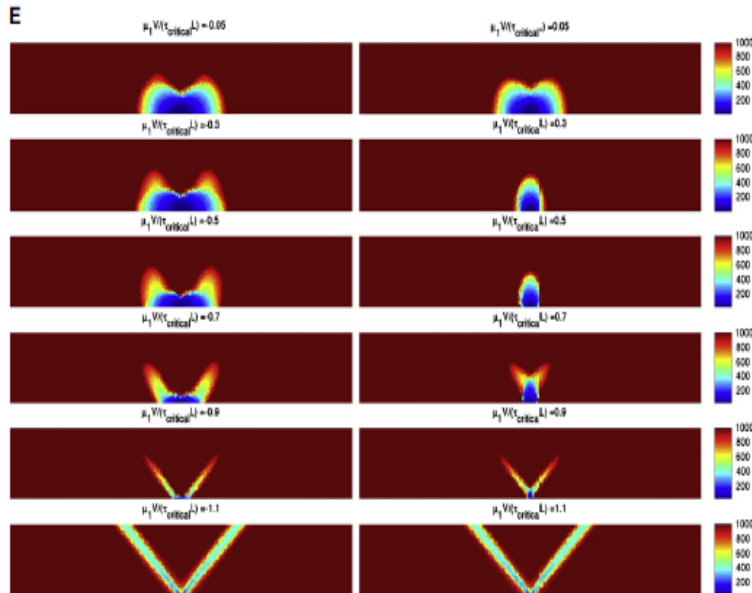


Prominent crater cover other eruption sites

Scenario supported by modelling



Laboratory simulations with different media reveal seepage along fault zones



Numerical model show feasibility of lateral faulting as trigger for eruptions

Do you still believe in coincidences?

Too **many coincidences** that cannot be ascribed to the drilled well and that are systematically **neglected by "man-made" camp**

However, the **drilling hypothesis** cannot be excluded, and the **debates are continuing**

The sole **drilling hypothesis cannot explain** the **alterations** of the plumbing system at regional scale, neither to **reactivate the Watukosek** fault across NE of Java or many of the other geological observations

Possible satisfactory **explanation**: The 27-05-2006 earthquake **reactivated** the pre-existing **Watukosek fault**

Open questions

Why the **“man-made” camp** apparently **decided from day 1** that the drilling triggered Lusi – **without** doing any **field work**?

The **use of the media and press releases** in advertising the results of the **“man-made” camp**. **What is hidden in the mud of Lusi**?

“Man-made” camp: where do they get their data from?

Natural trigger option: what is the role of the volcanic arc in all this?