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Lusi mud eruption and its connection with petroleum systems of East Java

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The Lusi mud eruption took place in NE Java, Indonesia, the 29th of May, 2006 and it is still erupting after nearly 10 years of activity. North-Eastern Java is part of a back-arc basin with high petroleum potential with mature source rock and an active oil system.
Several studies have been conducted to understand the origin of the gas and water erupted at the Lusi crater, however very little investigations have been conducted on the oil fraction and on the clasts erupted at the crater site. In particular, a detailed investigation of the erupted solid fraction could provide distinct evidence about the depth of the conduit and useful constrains for modelling the forces necessary to fracture and eject clasts from defined depths.

A large collection of clasts and fluids sampled from the Lusi crater site has been investigated completing lithological descriptions and conducting geochemical analyses. Our results show the presence of clasts that can be linked with the various formations pierced by the Lusi feeder conduit. One of the main goals was to distinguish the presence and the input of the deep regional Ngimbang Formation. The organic-rich Ngimbang Formation is the regional Eocene source rock in NE Java estimated to be buried at a depth of >4km. This is a black shale kerogen type II with TOC up to 10%. We identified significant amounts of organic rich black shale samples, several of which are coaly, and with TOC content up to 10% and very high hydrocarbon potential. Mineralogical analyses show also the presence of high temperature minerals. Ongoing analyses are comparing the composition of the oil seeping at Lusi with that extracted from the hydrocarbon impregnated black shale clast.