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## **The Lusi eruption and implications for understanding fossil piercement structures in sedimentary basins**

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The Lusi eruption started in northeast Java, Indonesia, on May 29th 2006, and it has been erupting rocks, mud, water, and gas ever since. We have been doing field work and research on Lusi ever since the eruption commenced. This work was initially motivated from studying the initiation of a mud volcano. However, the longevity of the eruption has made it possible to describe and monitor the lifespan of this unique piercement structure. . One of the first-order questions regarding the eruption is how it should be classified and if there are any other modern or fossil analogues that can place Lusi in a relevant geological context. During the initial stages of eruption, Lusi was classified as a mud volcano, but following geochemical studies the eruption did not show the typical CH<sub>4</sub>-dominated gas composition of other mud volcanoes and the temperature was also too high. Moreover, mud volcano eruptions normally last a few days, but Lusi never stopped during the past decade. In particular, the crater fluid geochemistry suggests a connection to the neighboring volcanic complex. Lusi represent a sedimentary hosted hydrothermal system. This opens up new possibilities for understanding fossil hydrothermal systems in sedimentary basins, such as hydrothermal vent complexes and breccia-pipes found in sedimentary basins affected by the formation of Large igneous provinces. We will present examples from the Karoo Basin (South Africa) and the Vøring Basin (offshore Norway) and discuss how Lusi can be used to refine existing formation models. Finally, by comparing Lusi to fossil hydrothermal systems we may get insight into the processes operating at depth where the Lusi system interacts with the igneous rocks of the neighbouring volcanic arc.