A multidisciplinary study on gas emission and volcanic tremor characteristics of Mt. Etna

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The 2008-2009 eruption of Mt. Etna was heralded by episodes of paroxysmal summit activity, with strong Strombolian activity and spectacular lava fountains and flows, starting from spring 2007. In this study, we present analyses of a three-month period (from February to April, 2007) which led to the first paroxysm. In doing so, we merge volcanic tremor data and gas measurements of SO₂ and Radon. This multidisciplinary study allows characterizing a stage during which the volcano feeder was affected by fluid recharge, producing to repeated episodes of temporary increases in volcanic tremor amplitude, without any visible phenomenon at the surface. We investigate on these spurious changes in tremor characteristics and their relationship to gas emission. Ruling out other exogenous sources, we hypothesize that certain changes represented aborted eruptions, where the magma failed to reach the surface.