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Peripheral deformation and gas release at the southern foot of Mt. Etna volcano (Sicily)

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Mt. Etna is characterized by the presence of several areas with diffuse or focused degassing. Some of these areas are located on the flanks of the volcano, even in peripheral zones. In most cases, degassing is characterized by "cold" emissions of CO_2, but in some cases, steam emissions occur together with output of CO_2, radon and other minor gas species and in some others, fluids like thermalized saline waters or mud are released at the surface with the gases. In the last year, an increase in the output of fluids has been observed around Mt. Etna, and new sites have been discovered (probably, because of a marked increase in local outflow of gas/steam that made them visible). The location of these emissions is not surprisingly along major tectonic faults that bound or cross the lower southern and eastern sides of Mt. Etna. It is well known, actually, that tectonic faults play a key role in driving magmatic/hydrothermal fluids to the surface and that changes in the regime of fluids release at the surface often reflects not only a direct variation of volatiles input from a deep (magmatic) source, but also changes in the strain regime within the volcanic system of Mt. Etna. The recent increase in the emission of such fluids could, therefore, indicate a marked change in the strain conditions at Mt. Etna, likely related to new intrusion of fresh magma inside of the volcano.
Between June 2016 and March 2017, for the first time since routine satellite InSAR monitoring is performed over Mt. Etna, a clear ground deformation has been detected on the whole southern periphery of the volcano. The observed deformation includes the area where the mud volcanoes fields develop and peaked in September 2016. Later on, several areas showing local ground deformation have been detected on the southern periphery of the volcano and also the well-known Ragalna fault shows significant slip, even not associated with recorded seismicity.
We report on the InSAR data and imagery and on its time series, showing this particular ground deformation, together with the geochemical and geological information about the "Salinelle" mud volcanoes. The aim is to try to interpret the ongoing dynamics in terms of interplay between local tectonics and over-pressure of magmatic gas and its underground circulation, looking for its potential indication on new magma accumulation beneath Mt Etna.