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Historically documented activations of significant mud volcanoes near the Northern Apennine margin.

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Mud volcanoes are historically documented geological phenomena that are also to be found near the Emilia-Romagna Apennine margin, in the Po side of the Northern Apennines (Italy). According to local language, they are mainly called “Salse” because of brines accompanying their activity.
They are grouped vents that allow the release of gases (methane) and salty mud, sometimes accompanied by lithic debris or boulders. The distribution of vents is governed by alignments, according to the local structural framework. A few show eruptions accompanied with explosive activity, the majority presents a continuous release or is “dormant” (temporarily not active) at present times.
Though not exclusively, they are mainly to be found in the provinces of Modena and Reggio Emilia: our research focused on this sector of the chain.
Mud volcanoes activity was historically observed and captured the attention both of local inhabitants and scientists. Historical naturalistic and geological studies have been collected and analysed, paying attention to the geological information that could be extracted from descriptions, sometimes rich of literary details typical of storytelling. Some records are more scientific, e.g. famous Italian scientists like Spallanzani (1729-1799) and Stoppani (1824-1891) described the Modena and Reggio Emilia mud volcanoes.
The literature was divided into two parts: i) scientific-historical reports written by Authors from the 18th to early 20th century. Activations documented in more ancient times (Roman Age, 16th, 17th centuries) were quoted as well. ii) quasi-historical publications, that is more recent studies, from 1966 to 2004.
For the first time, information on positioning, years of recorded activations and type of episodes were collected and analysed by means of GIS techniques. Maps of mud volcano distribution were drawn up and the documented number of activations was reported and compared. Graphs showing the number of activations per year were produced. This allowed to classify mud volcanoes according to the documented frequency and style of activation.