Volcano-tectonic (VT) seismicity is one of the first precursors to be detected before volcanic eruptions. The VT event rate tends initially to increase exponentially with time but to become faster than exponential (FTE) shortly before eruption. An FTE trend is thus a strong indicator that an eruption may be imminent. Previous studies have focused on volcanoes that had been in compressional stress fields before the onset of unrest. In these cases, the FTE trend tends to a hyperbolic increase (similar to an inverse-Omori trend) that may emerge 10-14 days before eruption.

The general applicability of the precursory trends has been investigated using VT seismicity before flank eruptions on Mt Etna, in Sicily. Etna has flank eruptions at intervals of years and lies within an extensional stress field. Preliminary analyses of VT sequences between 1977 and 2008 indicate a preference (1) for initial exponential increases in event rate and (2) the appearance of FTE trends less than two days before eruption.

The exponential trend is related to magmatic pressure increasing the amount of damage around the volcanic feeding system. This appears to be common among volcanoes in all stress fields. The FTE trend is related to an enhanced connectivity of fractures in the feeding system that must occur before magma can reach the surface. This process appears to be more abrupt at volcanoes in extensional stress fields. The final mode of fracture growth may thus be sensitive to the external stress field, rather than to the magmatically-induced stresses alone.