On-line image analysis of the Stromboli volcanic activity recorded by the surveillance camera helps the forecasting of the major eruptive events.

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The typical activity of Stromboli consists of intermittent mild explosions lasting a few seconds, which take place at different vents and at variable intervals, the most common time interval being 10-20 minutes. However, the routine activity can be interrupted by more violent, paroxysmal explosions, that eject m-sized scoriaceous bombs and lava blocks to a distance of several hundreds of meters from the craters, endangering the numerous tourists that watch the spectacular activity from the volcano's summit located about two hundreds meters from the active vents. On average, 1-2 paroxysmal explosions occurred per year over the past century, but this statistic may be underestimated in absence of continuous monitoring. For this reason from summer 1996 a remote surveillance camera works on Stromboli recording continuously the volcanic activity. It is located on Pizzo Sopra la Fossa, 100 metres above the crater terrace where are the active vents.

Using image analysis we seeks to identify any change of the explosive activity trend that could precede a particular eruptive event, like paroxysmal explosions, fire fountains, lava flows. From the day of the camera installation up to present 12 paroxysmal events and lava flows occurred. The analysis include the counting of the explosions occurred at the different craters and the parameterization in classes of intensity for each explosion on the base of tephra dispersion and kinetics energy. The plot of dissipated energy by each crater versus time shows a cyclic behavior with max and min of explosive activity ranging from a few days to a month. Often the craters show opposite trends so when the activity decreases in a crater, increases in the other. Before every paroxysmal explosions recorded, the crater that produced the event decreased and then stopped its activity from a few days to weeks before. The other crater tried to compensate increasing its activity and when it declined the paroxysmal explosion occurred suddenly at the former site.

From September 2001 an on-line image analyzer called VAMOS (**V**olcanic **A**ctivity **MO**nitoring **S**ystem) operates detection and classification of explosive events in quasi real-time. The system has automatically recorded and analyzed the change in the energetic trend that preceded the 20 October 2001 paroxysmal explosion that killed a woman and the strong explosive activity that preceded the onset of 28 December 2002 lava flow eruption.