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Mt. Etna ash plume during 2006 eruptions: integrated approach from satellite remote sensing and ground-based monitoring system

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Volcanic plumes represent a significant visible indicator of volcano activity. Mt. Etna, in Sicily (Italy), is one of the greatest plume-makers in the world both during degassing periods as well as when erupting. In the last ten years, Etna exhibited more than one hundred lava fountaining episodes and two consecutive prolonged explosive eruptions in 2001 and 2002-03. Overall, this activity produced copious tephra emission and fallout that damaged the inhabited and cultivated areas around the volcanic slopes and caused hazard also to air traffic at the Catania Airport. Periodic closure of this airport was often necessary, causing considerable loss to the local economy. Recently, Etna produced several episodes of ash emission lasting from a few hours to days, occurring in July and August-December 2006, that prompted the need to seek new monitoring techniques. We present the preliminary results obtained by an integrated approach experimented in order to derive information on ash emissions and define the usefulness of real time satellite monitoring system in sporadic ash emissions. This comparison represents a novelty for Etna eruptive activity and probably for all volcanoes in the world. Based on field data (obtained by visible observations, tephra samples and accounts from inhabitants), we were able to evaluate in detail the duration and intensity of most of the ash fallout events and, for some cases, to estimate the order of magnitude concerning the erupted volume. We compare field with satellite data in order to find a possible correlation for the next ash emission episodes. We try to define some categories of Etna volcanic plumes in accordance with their extension, length and considering plume height and wind intensity. This classification could be helpful in detecting the presence of ash within the volcanic plume using the frequent and good quality satellite data available. This approach, that needs to be better devel-

oped and tested, may constitute a powerful tool in the future to indicate the occurrence of ash plumes in the atmosphere and give a realistic warning to Civil Defence, thus, for example, avoiding unnecessary closures of the airports.