



Automatic estimation of local magnitude at Mt. Etna

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Seismic monitoring and the correct estimate of seismic parameters in Mt. Etna play a key role for a quantitative evaluation of the volcano dynamics. The recent installation of a new 3C broadband seismic network of the Istituto Nazionale di Geofisica e Vulcanologia - Sezione di Catania, allow us to perform a near real time analysis of quality seismic data. At Mt. Etna, the estimation of the earthquake duration and the related magnitude is very difficult in case of seismic swarm occurrence (more than one earthquake per minute) or high amplitude of the volcanic tremor. In order to verify the duration magnitude values, for earthquakes occurred during the opening of the eruptive fractures of the last eruption (2002-2003), we simulate a Wood-Anderson seismometer and then estimated local magnitude. Moreover, after correction for the instrument response, geometrical spreading, attenuation model and site effects, we estimated the source parameters of the earthquakes. The comparison of local magnitude values with that ones obtained from the source parameters and with local magnitude from MedNet seismic network, shows a good agreement and evidences that in environments with high seismic noise, such as Mt. Etna volcano, the magnitude estimates based on the measurement of the ground amplitude are more reliable and that some care must be taken in using a magnitude scale based on coda duration for low values of magnitude when the noise level is high. The good quality of the data obtained allowed us to perform an automatic estimate of local magnitude using eight broadband stations and a dataset of about 400 earthquakes occurred from February to July of 2004. The results show, except for some stations, that magnitude values calculated at different stations are comparable.