



Assessing and optimizing infrasound network performance: application to remote volcano monitoring

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Interest in infrasound propagation studies has been revived since the Comprehensive nuclear Test Ban Treaty (CTBT) was adopted in 1996. The International Monitoring System (IMS) is designed to ensure compliance with the CTBT by detecting and locating explosions in the world using at least 2 stations. Even not yet fully established, the infrasound network already allows studies on a global scale as it has demonstrated to be a major asset to remotely identify and analyze geophysical events such as volcanoes. Simulation methods incorporating realistic source and propagation effects have been developed to quantify the detection capability of this network. These methods can also be used to optimize the network configuration (number of stations, geographical location) in order to reduce the detection thresholds taking into account seasonal effects in infrasound propagation. Recent studies have shown that remote infrasound observations can provide useful information about eruption chronology and the released acoustic energy. Comparisons with near-field recordings allow evaluating the potential of these observations to better constrain source parameters when other monitoring techniques (satellite, seismic, gas) are not available or cannot be made. Because of its regular activity, the well-instrumented Mount Etna is in Europe a unique natural repetitive source to test and optimize detection and simulation methods. In summer, during the downwind season, its eruptions are quasi-permanently detected by IS48 in Tunisia, the closest infrasound station part of the IMS. Under the European ARISE project (Atmospheric dynamics InfraStructure in Europe, FP7/2007-2013), experimental arrays have been installed in order to characterize infrasound propagation in different ranges of distance and direction. Such an experimental setting offers an opportunity to address the societal benefits that can be achieved through routine infrasound monitoring.