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A Regional Multidisciplinary Geophysical Monitoring Facility for Civil and Peaceful Applications

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The Mediterranean region is a disaster-prone area, where earthquakes, volcanic eruptions and other natural disasters are common. Human-induced calamities are also potential events which threaten population. In this area a regional monitoring facility with readiness capabilities is a useful tool for disaster mitigation, allowing civil protection agencies to promptly manage rescue actions.

The ongoing efforts aimed at realizing the verification system for the Comprehensive Nuclear Test Ban Treaty (CTBT) offer a unique opportunity to develop a multidisciplinary international real-time monitoring network. The data from the four global monitoring technologies mentioned by the CTBT (seismic, infrasound, hydroacoustic and radionuclide) are available to the Member States through the International Data Center (IDC) located in Vienna. Although the data received through the IDC are subject to a confidentiality regime, international efforts are being done to make these data available to the international scientific community. An important outcome of the dissemination of data and analysis products would be an improvement of the capability of the scientific organizations working for disaster mitigation purposes. In this respect also man-made disasters, such as nuclear power plants leakage, are events to be carefully monitored.

The Italian Government participates in the verification system by means of a National Data Center (NDC) linked to the IDC. The Italian NDC, run by the Istituto Nazionale di Geofisica e Vulcanologia (INGV) and located in Rome, is setting up the most up-to-date infrastructure for collecting, archiving, and real-time processing of geophysical

data for identifying events which may constitute potential violations of the Treaty. In this frame, methodologies relative to fast event location and characterisation of seismic events, as well as radionuclides analysis and atmospheric transport modeling are under development. In addition, the Italian NDC is setting up capabilities of conducting geophysical surveys using techniques foreseen by the Treaty and the Protocol during an On-Site Inspection (OSI). These techniques include, among others, analysis of data collected by three-partite seismic arrays, aeromagnetic and other kinds of airborne geophysical survey, radionuclides detection, etc. Several of these techniques turned out to be useful also to locate buried artefacts associated to unauthorized waste of dangerous material. The achievement of practical results from the application of scientific research depends on the solution of a large variety of problems that constitutes a challenge to our young NDC for the forthcoming years.