ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA

il Direttore

Gestione WEB

Al Responsabile Centro Servizi – Ufficio per il Coordinamento
delle attività a Supporto della Ricerca
Alla Segreteria della Presidenza

Istituto Nazionale di Geofisica
e Vulcanologia
AOO INGV
Protocollo Generale - U
N. 0017537
del 18/12/2017

Oggetto: Pubblicità atti

Si notifica in copia l'allegata Delibera n. 491/2017 del 29/11/2017 – Allegato L al Verbale n. 12/2017 concernente: Memorandum of Understanding tra INGV e British Geo Survey e Università di Edimburgo.

Tullio PEPE

DIREZIONE CENTRALE
AFFARI AMMINISTRATIVI
E DEL PERSONALE

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Istituto Nazionale di Geofisica e Vulcanologia

Delibera n. 491/2017
Allegato L al Verbale n. 12/2017
Oggetto: Memorandum of Understanding tra INGV e British Geo Survey e Università di Edimburgo.

IL CONSIGLIO DI AMMINISTRAZIONE

- Visto il Decreto legislativo 29 settembre 1999, n. 381, concernente la costituzione dell'Istituto Nazionale di Geofisica e Vulcanologia (INGV);
- vista la Legge 27 settembre 2007, n. 165, concernente la "Delega al Governo in materia di riordino degli Enti di Ricerca";
- visto il Decreto legislativo 31 dicembre 2009, n. 213, concernente il "Riordino degli Enti di Ricerca in attuazione dell'art. 1 della Legge 27 settembre 2007, n. 165";
- visto il Decreto legislativo 25 novembre 2016, n. 218, concernente "Semplificazione delle attività degli Enti Pubblici di Ricerca ai sensi dell'art. 13 della Legge 7/08/2015, n. 124";
- visto lo Statuto dell'Istituto Nazionale di Geofisica e Vulcanologia emanato con Decreto del Presidente n. 90 del 21 marzo 2011 e pubblicato sulla Gazzetta Ufficiale della Repubblica Italiana - Serie Generale n. 90 del 19 aprile 2011, in particolare, l'art. 6, comma 8, lettera s), il quale prevede che il CdA *....approva le convenzioni e gli accordi quadro con le Università e con gli altri enti e organismi pubblici e privati, nazionali e internazionali;*
- visto il Regolamento di Organizzazione e Funzionamento dell'Istituto Nazionale di Geofisica emanato con Decreto del Presidente n. 503 del 14 ottobre 2016 e pubblicato sul Sito WEB istituzionale;
- visto il Regolamento di Amministrazione, Contabilità e Finanza pubblicato sulla Gazzetta Ufficiale della Repubblica Italiana – Serie Generale n. 113 del 18 maggio 2009;
- valutata l'opportunità di sottoscrivere un Memorandum of Understanding con il British Geo Survey e l'Università di Edimburgo, per la gestione e la politica di raccolta dati, successivamente al terremoto di Amatrice del 24 agosto 2016;
- considerato che l'attività da espletare rientra tra i compiti scientifici e istituzionali dell'INGV;
- tenuto conto dei pareri scientifici prodotti dai competenti Direttori di Struttura e di Sezione dell'INGV;
- su proposta del Presidente,

DELIBERA

L'approvazione dello schema del Memorandum of Understanding tra l'INGV, il British Geo Survey e l'Università di Edimburgo, allegato alla presente quale parte integrante e sostanziale (allegato 1).

Viene dato mandato al Presidente alla sottoscrizione definitiva dell'atto in questione.

Letto, approvato e sottoscritto seduta stante.

Napoli, 29/11/2017

La segretaria verbalizzante
(Sig.ra Silvana TUCCI)

Silvana Tucci

IL PRESIDENTE
(Prof. Carlo DOGLIONI)

MEMORANDUM OF UNDERSTANDING

This agreement is made between:

ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA (INGV) Via di Vigna Murata, 605, 143 Roma, Italy

BRITISH GEOLOGICAL SURVEY (BGS), Lyell Centre, Research Avenue South, Edinburgh, EH14 4AP, United Kingdom

UNIVERSITY OF EDINBURGH (UoE), Old College, South Bridge, Edinburgh EH8 9YL, United Kingdom

Hereinafter referred to as each a Party and collectively the Parties.

This document sets out the common scientific objectives and the collaboration framework between the Parties defining the data management and policy for the data collection immediately following the Amatrice 24th August, 2016 earthquake in the Central Apennines, Italy.

INGV is the Italian organization responsible for providing nearly real time scientific information to the Department of Civil Protection in times of earthquakes disasters occurring on the Italian territory. To this end, running 24h per day seismic monitoring services based on real-time data collected by more than 300 permanent seismic station deployed on the Italian territory, providing earthquake detection and rapid evaluation both in terms of location and magnitude for the earthquakes occurring on the country is a statutory responsibility of INGV.
This collaboration is grounded on the joint BGS-INGV deployment of a temporary seismic network in the epicentral area of the 2016-17 Central Apennines earthquake sequence. The UK seismic instruments were an urgent loan from the Geophysical Equipment Facility (FEG) provided through SEIS-UK following an application from BGS PI (Application Number 1067) including BGS and UoE scientists. The deployment is supported by direct funds provided by the National Environmental Research Council (NERC).

The deployment results in an extraordinary dataset consisting of approximately one year of continuous waveforms recorded over more than 90 seismic stations in the affected region. The high detection capabilities provided by such a dense network, will let us derive a seismic catalogue with improved magnitude sensitivity and location accuracy in order to characterize very small magnitude events.

Within the international framework of disaster risk reduction, we are interested in conducting research that would allow the effective mitigation of evolving earthquake hazard. Within an ongoing earthquake sequence, the occurrence of large aftershocks can severely hamper emergency response and raise concern among the displaced population.

The aim of this collaboration based on the emergency scientific and technical response is to improve our understanding of aftershock sequences. The unparalleled data collection is expected to shed light on how earthquakes nucleate and trigger earthquake cascades and enhance the future earthquake forecast models. The invaluable dataset and the proposed work plan aims in improving our understanding of the seismogenic structures focusing on unravelling the anatomy of active faults, the interaction pattern and the complexity of normal fault systems in the Apennines. The above is the first crucial element towards a robust seismic hazard assessment and contributes towards the development of testable statistical and physics-based forecast models for aftershock occurrence. We will investigate under which conditions seismic activity migrates to neighbouring faults as well as the geometry of the seismogenic structure to achieve a better description of the underlying physical processes within the earthquake sequence.

The Parties agree on collaborating on subjects based on the high-quality dataset collected together (between August 2016 and August 2017), to generate specific scientific products described below to advance the investigation of the activated fault system, seismicity pattern, physical properties of the crust that would allow the development of testable earthquake forecasts. To this end the Parties will reciprocally provide hosting facilities and computational access to the researchers visiting another Party encouraging collaborations between investigators, promoting scientific knowledge exchange and search for future common project funding.

The main research topics and data products are the following, while the data availability and management plan, together with the collaboration rules are identified in Annex 1:

A) DEVELOPMENT OF A STATE OF THE ART EARTHQUAKE CATALOG

The actions steps towards the generation of such a product will involve the production of:

i) A phase file of P- and S-wave arrival times. The file will be assembled following a processing protocol including a new picking algorithm and a binder optimization based on previous expertise (lead Party: INGV);

ii) An absolute earthquake location catalogue computed with the use of a 1D velocity model representing the shallow crust plus station corrections (lead Party: INGV);

iii) Local magnitude (M_L) estimation for all the earthquakes present in the earthquakes catalogue based on the amplitude of the S-waves measured during the picking process (lead Party: INGV).

B) SCIENTIFIC PRODUCTS BASED ON THE EARTHQUAKE CATALOG

i) Three-dimensional velocity model and estimation of elastic parameters changes with time through seismic tomography approach (lead Party: INGV);

ii) Empirical expressions of the relationship between local and moment magnitude (lead Party: BGS);

iii) Uncertainty estimation of initial locations determined in A) using the newly derived 3D velocity model (Bi; lead Party: University of Edinburgh);

iv) Coda wave interferometry for determining the structural and lithological controls of wave propagation in the Apennines (lead Party: BGS);

v) Development of physics-based (lead Party BGS) and statistical forecast models (lead Party INGV) for earthquake sequences of interest.

vi) Three-dimensional seismic reflection imaging of mid-crustal horizons through a depth migration approach applied to micro-earthquake data (lead Party: INGV).

ANNEX 1

PUBLICATIONS OF THE SCIENTIFIC PRODUCTS

Each topic cited in A and B paragraph of the main document, will be the subject of *at least* one (1) publication on peer reviewed journals. When publishing the results, scientists and students of the Parties will be in the Authors list in number and order respecting their degree of involvement in the generation of the scientific product. The paper may include colleagues not pertaining to any of the Parties only in case they have essentially contributed to the generation of the product.

DATA MANAGEMENT PLAN AND DATA PRODUCT AVAILABILITY

Being the Parties dedicated to the promotion of scientific excellence for the benefit of the society and increase public resilience, we will be committed to *open data* policy allowing data availability and reuse as soon as possible.

As a consequence, all the waveforms are already open and available, respectively:

INGV is archiving raw waveforms data in real time and stations information in standard format (seed) in the European Integrated Data Archive node located at Rome (www.eida.rm.ingv.it) part of the **ORFEUS** consortium (orfeus-eu.org).

BGS is archiving the raw waveforms collected data in **IRIS** server, as described in SEIS-UK provisions, and in the Data Management Plan of the NERC Urgency Data. Furthermore, the raw data collection will be archived in the European Integrated Data Archive (EIDA) from INGV.

DATA PRODUCTS AVAILABILITY

The Parties agree to open the data products to Third Parties within two and a half (2.5) years from the signature of this agreement, or after publication, whatever comes first. In the meantime, Third Parties will face data products restrictions.

In case of a new project involving the Parties and external Institutes, data products availability can be revised upon agreement between the signatories.

In case a Third Party is authorized to use data products before the 1-year deadline, the derived products cannot be published or presented to the scientific community or the media.