EVALUATION COMMITTEE REPORT
INGV-DPC 2005-2006: VOLCANOLOGY
MEETING 12 – 18TH JUNE 2006, ROME

The INGV-DPC projects in Volcanology for the years 2005-2007 comprises 5 projects on active or potentially active volcanoes or volcanic fields in Italy (V1-V3) and on general aspects of monitoring and hazard mitigation (V4 and V5). Hazard, eruption precursor recognition and criticality levels are the most important deliverables for the Department of Civil Protection (DPC).

The Evaluation Committee (EC) initially met on the afternoon of Monday 12th of June 2006 at the GNV offices in Via Nizza, Rome, to discuss the end of Year 1 reports which had been made available in electronic format (via ftp) on the 5[5h] of June. On the 13th and 14th of June the EC received oral presentations from the project coordinators based on their reports according to an agreed timetable. The presentations were followed by questions and discussions. The reports and the interviews formed the basis of the ECs evaluation of the progress of the projects, the quality of coordination and the achievements of first year deliverables compared to the original project descriptions. Comments on the individual projects and their constituent research units (RUs) are given in the appended evaluation reports.

In general, the EC was impressed with both the depth and breadth of the research which was presented. All projects were well coordinated. Most of the first year deliverables were achieved including a number of synthetic products (e.g. maps) of direct interest to DPC. Overall the quality of the science presented was extremely high and was clearly focused on the terms of the agreement between INGV and the DPC. The EC is confident that the programme is broadly on target and can reach its goals, providing a range of important products useful for volcanic hazard assessment in the various active volcanic fields of Italy.

As noted in its December 2005 report, the EC again stresses the need for individual RUs working on similar topics to interact (e.g. sharing data, computer codes, etc).

In its considerations of the Year 1 reports the EC has identified an apparent duplication of effort in the creation of databases. We suggest that a working group should be established to consider this issue and also the archiving of the databases at the end of the project.

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Dated: June 18nd 2006

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V1

Prosecution of activities already financed in 2003 in the frame of GNV

1. Overall assessment of the project

- *achievement of the Project Deliverables specified in the original project proposal*
- *Is the project on schedule or behind schedule*

The project V1 was made of six sub-projects financed in the framework of the response to the 2002 – 2003 volcanic crisis at Stromboli. With the exception of one sub-project (Tinti) all of the sub-projects are now complete.

The EC received four reports for evaluation, which were also presented in oral form. Since a well-defined list of deliverables did not exist in the original proposals, the EC provides comments below on the scientific output of the sub-projects for which reports were provided.

RU V1/01-03 (Marsella):

The main objective was the monitoring of the evolution of the sub-aerial Sciara del Fuoco slope after the 2002-2003 eruption by means of photogrammetric surveys and topographic measurements made since 1938. The activity provides important reference data for hazard assessment at Stromboli, for example DEMs, and multi-temporal analysis of morphological variations. The report clearly outlines the achievements of the project. Several publications on the subject are indicated.

RU V1/02 (Chiocci):

The main objective was to monitor the submarine slope of the Sciara del Fuoco and to reconstruct the kinematics of the December 2002 submarine slide and tsunami. The project responsibles have obtained an impressive dataset, which is clearly summarized in the report. The coordinator also reported on the technical difficulties involved in the study of the shallow seismic structure of slope. The report clearly outlines the obtained achievements. Several publications on the subject are indicated.

RU V1/05 (Tommasi):

The main objective was to understand and model the failure of the Sciara del Fuoco slope in the context of the geotechnical properties of the materials involved. Due to the impossibility of accessing the slope for in-situ sampling or measurements standard geotechnical methods could not be used. An important observation from this project is the likelihood that liquefaction is the driving process of slope instability, combined with surface loading or dyke injections. The report clearly outlines the obtained achievements. Several publications on the subject are indicated.

Report of the EC 18.06.2006: V1 Activities already financed in 2003
RU V1/04 (Tinti): ***This project is continuing***

The main objective of the project is the development of a tsunami warning system and landslide and tsunami modeling for events at Stromboli. According to the report different tsunami modeling scenarios have been simulated. Additionally, landslide modeling was successful and has been completed. The final year of the project will be devoted to completing the sensitivity analysis for Stromboli and the Mediterranean region in general. The report outlines the achievements thus far. Several publications on the subject are quoted.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

n.a.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

n.a.

4. Coordination

How is the organisation of the project and communication between RU's

n.a.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V2

Monitoring and research activity at Stromboli and Panarea

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project includes both Stromboli and Panarea, with the main emphasis on Stromboli. The 2002-2003 crises demonstrate the importance for civil protection.

The research builds upon a long history of interest in the volcanism of Stromboli. Research was considerably intensified during and after the eruptive events of 2002-2003.

The combined project involves 24 RUs (20 Stromboli, 4 Panarea). For Stromboli, the main emphasis is on reconstruction of the present structure of the volcano and its feeding system, the evaluation of the danger of effusive and explosive activity, the recent and future development of the Sciara del Fuoco and degassing phenomena. For Panarea, the emphasis is on the stratigraphy of the recent pyroclastic deposits and their relationship to explosive events, the state of stress in the system and the geochemical surveillance of gas emissions from the fluid system.

The project is broadly on schedule. The progress and highlights of the project were clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made good progress towards its first year goals.

Significant highlights include

- A 1:5000 map of Stromboli dikes and geo-referenced GIS database,
- The discovery that NE trending fractures are periodically injected by new magma
- The presence of two huge landslides on the NW flank of Stromboli in the last 5 ka
- The detailed understanding of a 2002-2003 paroxysm
- Maps of ground deformation of the Sciara del Fuoco and the whole of Stromboli for the period 2002-2005
- The restriction of Holocene dykes to the NW side of the island

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The overall project is broadly on schedule with the exception of the planned active marine seismic tomography experiment to determine the structure of the volcanic system. The coordinators do not report any significant delays. There has been some re-scheduling of activities into Year 2.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project is effective. Two coordination meetings have been held plus a number of task group meetings. The coordinators indicate in their report that not all the RUs have worked satisfactorily together. The EC hopes that this will be addressed fully in year two.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

A very appropriate level of activity is indicated in the report of the coordinators.

6. Comments to reports / work of individual research units

Only those RU's and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the RUs have performed well and have obtained significant results so far.

RU 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 3: see RU 13

RU 5: The RU appears to have achieved its deliverables. However, the EC was not fully convinced that the crustal structure and the location of the shallow magma chamber can be achieved with the data they have shown.

RU 13: From the RU report the EC notices that the OBS experiment is planned for December 2006, but with some important logistical issues apparently still unclear (e.g. OBS systems to be used). The organisational problems were discussed following the presentation by the coordinator. The EC notes that scientific plans of RU 13 and RU 3 depend fully on the successful data acquisition.

RU 21 and RU22: Improved cooperation between these two RUs is strongly recommended.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_1

Colli Albani

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This is the first integrated project on the Colli Albani volcanic complex and therefore there is strong emphasis on the collection and compilation of basic data. It is an important project for civil protection, because of the existing hazard from CO_2 degassing, the possible occurrence of landslides around the lakes, and the young age of phreato-magmatic eruptions.

The coordinators summary reports indicate that the project is progressing well. It is broadly on schedule and the general coordination is very satisfactory.

Highlights of the project include:

- Hazard maps developed for CO_2 emissions and landslide occurrence at Albano and Nemi lakes
- The identification of a local seismic sequence in January 2006 with the newly installed network
- The successful drilling of a scientific borehole at S. Maria delle Mole to a depth of 350 m, enabling definition of the location of a sealing horizon and the sedimentary basement

The progress of the project was clearly described in the coordinators' report and their oral presentation.

The EC generally had a good impression. The coordinators have shown that the various RU work together well in their various tasks.

Looking at the results obtained by each RU it is clear that the project achieved the general proposed deliverables. In very few cases (see below) some deliverables were delayed. These delays do not compromise the overall achievement of the project and the coordinators convinced the EC that these products will be received in the next few months. It can be expected that the project will reach its major goals at the end of the two years.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made excellent progress towards fulfilment of its first year goals.

Examples include:

- Hazard maps developed for CO_2 emissions and landslide occurrence at Albano and Nemi lake are in an advanced form.
- The installation of the seismic network (15 stations).
- The successful drilling of a borehole to a final depth of 350 m.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The coordinator has not indicated any major delays or problems

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project appears to be effective with four project meetings and two field workshops in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

The list of abstracts and submitted publications indicates an appropriate level of activity.

6. Comments to reports / work of individual research units

Only those RU's and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the RUs have performed well and have obtained significant results so far.

RU 1, 2, 4, 6, 7, 8, 9, 12, 13 have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 3: Physical-chemical characteristics of gas and waters from springs and wells have been determined based on a systematic sampling program. However, the He isotope data are missing due to technical problems. The EC encourages the RU to complete the data set on the year two.

RU 5: The main emphasis was the study of carbonate encrustations at the archeological site at Ponte Galeria. Unfortunately, the data from this site have not thus far proved useful for quantifying the cyclicity of past CO_2 gas release in connection with geophysical phenomena (e.g. earthquakes). However, the work has been extended to other sites. At this stage it is not clear whether the expected products (identifying correlations) will be achieved by the end of the project.

RU 9: The original plans were modified to drilling only one deeper borehole and a final depth of 350 m has been reached. The hole will be used to install geophysical sensors (seismometer) and for stress measurements. The deliverables for year two are likely to be achieved.

RU 10: The report was not clearly structured and was, therefore, difficult to read. The direction of research in relation to the original project is not very clear, as well as its current state. The research unit must make clear how the different parts of their approach will converge towards the main aim of the project in year two (i.e. to define the vertical and horizontal pathways for fluid migration). The cooperation between RUs 10, 11 and 13 should be improved.

RU 11: The RU has made partial progress towards their original deliverables. The reasons for the delays are explained in their report. The cooperation with RUs 10 and 13 is important for the project.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_2

Campi Flegrei

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project builds on an extensive data and knowledge base from previous projects. The emphasis is clearly on the volcano-related hazards of Campi Flegrei. It is a high priority project for civil protection.

The coordinators summary reports indicate that the project is progressing extremely well. It is broadly on schedule and the general coordination is excellent and exemplary.

The EC was impressed by evidence of the systematic processing of a huge amount of geophysical, structural and petrological data accumulated over the years and supplemented by the current project.

The progress of the project was clearly described in the coordinators' report and their oral presentation.

The EC generally had a very good impression. The coordinators have shown that in general the various RUs work together well in their various tasks.

Looking at the results obtained by each RU it is clear that the project achieved the general proposed deliverables. It can be expected that the project will reach its major goals at the end of the two years.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made excellent progress towards its first year goals.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The coordinators have not indicated any major delays or problems.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project is highly effective. Six project meetings were held in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

The list of abstracts and submitted publications is impressive.

6. Comments to reports / work of individual research units

Only those RU's and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the research units have performed well and have obtained significant results so far.

RU 2, 3, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23 have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 1: has applied differential InSAR techniques to Long Valley caldera (USA) and to Campi Flegrei. The currently processed time period for Campi Flegrei seems to be very short. The report is disappointing with respect to the presentation of the data and preliminary results. There is no evidence that the seismic data base for Campi Flegrei has been compiled. These data are important to achieve the project deliverables for year two.

RU 9: The report leaves the EC unconvinced about the importance of the so far acquired data for other research units in the Campi Flegrei project.

RU 10: The Bayesian event tree scheme to predict eruptions has a high potential to be useful for civil protection purposes. The EC feels it is essential to start to validate the method on examples of actual volcanic eruptions.

RU 12 has a highly demanding task: (1) development of 2D thermal fluid-mechanical model (finite volume, temperature conduction and advection, porous flow, soil deformation) and (2) development of a laboratory apparatus to study water flow through permeable tuffs at high temperatures near the critical point of water. The report is enthusiastic, but indicates that the realization is difficult in some cases. Significant delays are described, but the delivery of the laboratory apparatus was foreseen by the end of July.

RU 17: The EC is concerned about the reported experimental problems in the LMU Munich laboratory with the high temperature viscosity measurements. The reported problems must be resolved for the achievement of the final deliverables.

RU 19 aim to model or invert gravity and surface deformation data and develops its own techniques for this. Cooperation with other groups has not been indicated in the report. A greater cooperation with RU 2 could be useful.

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END OF YEAR ONE

INGV-DPC Project V3_3

Ischia

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

The importance of this project for civil protection is underlined by the high frequency of historic volcanic eruptions of Ischia. In addition Ischia has a large potential for subaerial and submarine landslides. The emphasis is on the young volcanic history and the geothermal system.

The coordinators' summary indicates that the project is progressing quite well. The coordinators have listed the highlights of the first year achievements but also a significant number of problems, which have delayed certain aspects of the project.

The progress of the project was clearly described in the coordinators' report and their oral presentation, giving the EC a generally positive impression. The coordinators have shown that in general the various RUs work together well in their various tasks.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made satisfactory progress towards its first year goals. One of the most significant highlights includes the quantification of on- and offshore landslides.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The coordinator has highlighted a significant number of problems, which have caused delays for a number of RUs.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project is effective. Two coordination meetings and a joint field campaign were held in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

The list of abstracts and submitted publications indicates an appropriate level of activity.

6. Comments to reports / work of individual research units

Only those RU's and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the research units have performed well and have obtained significant results so far.

RU 1, 2, 3, 4, 5, 8, 9, 10, 11, 13 have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

R6: The coordinator has highlighted serious problems with the progress of the Ar-Ar dating. These are largely due to the apparently late availability of funding. Given the importance of the dating for the project the EC stresses the necessity to overcome these problems in order to fulfill the project deliverables for the full two-year program.

R7: Due to personal problems the data acquisition of the project has not started yet. The deliverables of year one have not been reached. It is unclear if there will be sufficient time in year two to collect, process and interpret the data to achieve the deliverables.

R12: The tephrochronological interpretation of the core is still at the beginning. Magnetic and oxygen isotope stratigraphy has been established.

R13: The analytical program for the isotope geochemistry has been modified and concentrated on the <10 ka period, in accordance with the scope of RU 8. No reasons are given in the report for the changes in the analysed isotopic systems.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_4

Vesuvius

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *is the project on schedule or behind schedule*

This project has extreme importance for civil protection because of the consequences of a possible eruption of Vesuvius for the population of the greater Neapolitan area. This is reflected in the specific tasks of the project. The project builds upon a long history of research and data collection at Vesuvius. An important focus of this project is the integration of all the available data to define possible eruptive scenarios including possible precursor phenomena.

The coordinators summary reports indicate that the project is progressing very well. It is broadly on schedule and the project is well coordinated. The research units work together in an adequate way. There is strong interface with the project V3_2 (Campi Flegrei).

The progress of the project was clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made excellent progress towards its first year goals.

Significant highlights include

- A new database for ground deformation enabling the definition of the background level of activity,
- The new study of the distribution of fractures and dikes in Somma Vesuvius,
- A model for real-time simulation for ash fallout
- The elaboration of intensive parameters of past eruptions
- Enhanced geophysical interpretation of the high-level structure beneath Vesuvius

The EC noted that the Bayesian Event Tree software for eruption forecasting (developed in the framework of project V4) may have potential for implementation in civil protection for Vesuvius.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

No specific delays have been indicated by the coordinator.

4. Coordination

How is the organisation of the project and communication between RUs

The coordination of the project is effective. Three coordination meetings have been reported in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

The list of submitted publications indicates an appropriate level of activity.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the research units have performed well and have obtained significant results so far.

RU 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 have achieved their Year One deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 9: There appeared to be quite serious problems with the scheduling of the use of the French laboratory equipment by Italian guest researchers. This will eventually produce further delay if a strict plan is not put in place. This affects partly also the work of RU 11.

RU 20: The project cannot be fully evaluated because of the shortness of the report, although the EC accepts that publications are quoted.

RU 21: The EC recognizes the importance of comparative studies. However, the EC is critical of the fact that no progress has been made on the establishment of precursors for the next eruption of Vesuvius, which is one of the essentials of the project.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_5

Vulcano

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project has importance for civil protection because of the consequences of a possible eruption of La Fossa of Vulcano and the seasonally variable population.

The project builds upon previous research. The focus of the project includes improved understanding of the volcanic hazard, the criticality of the volcanic system, and the structure of the volcanic plumbing system.

The coordinators' summary report indicates that the project is progressing well. It is broadly on schedule and the project is well coordinated. The research units work together in an adequate way.

The progress of the project was clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made good progress towards its first year goals.

Significant highlights include

- The production of a new geological map
- The detailed revision of the volcanic stratigraphy for the last 25 ka
- The integration of a range of different geophysical surveys
- Observation of a volcanic crisis in October 2005 to January 2006

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

No specific delays have been indicated by the coordinator.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project is effective. Two coordination meetings and additional task meetings were held in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

An appropriate level of activity is indicated in the reports of some of the individual RUs, but these are not summarized in the coordinators' report.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the research units have performed well and have obtained significant results so far.

RU 1, 3, 4, 5, 10, 11 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 2: The responsible informed the EC that the planned Sr-Nd-Pb isotopic measurements have not been made and are unlikely to be completed by the end of the project. The EC feels that this should not compromise the overall goals of the project significantly.

RU 6: The EC appreciates that the geophysical data have been compiled, but feels that progress towards data interpretation has been small and is essential for completion of the project in year two.

RU 7: The responsible indicates that the program of viscosity determinations may not be completed. The coordinator should investigate the implications of this for the work of other research units.

RU 8: Whilst the results are of interest for understanding magma generation processes and the origin of fluid in the hydrothermal system, the EC is not convinced that this has significant potential to define the criticality of the Vulcano magmatic system as proposed for year two.

RU 9: The RU focussed almost exclusively on organic species in the fumarole field, which is in-line with the original proposal. The EC notes, however, that the RU does not appeared to have made the planned measurements of CO_2 and CH_4.

RU 12: The EC feel strongly that this project needs to be much more closely integrated with the research of the other RUs.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_6

Etna

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project has considerable importance for civil protection because of the frequent eruptions of Mt. Etna and the high population density in the immediate area.

The project builds upon a long history of previous research, including a number of EU projects. The main emphasis of the project includes identification of precursors and eruptive scenarios, combined with a detailed understanding of the volcano structure, history and the magma generation processes.

This is a complex multidisciplinary project involving 40 RUs. The project has been subdivided into 7 tasks with task group leaders having a high level of responsibility for the coordination of their respective RUs. The coordination is in general good and most RUs are working together in a satisfactory way. Nevertheless it was made clear that not all RUs have yet fully integrated with their respective task groups.

The EC strongly advises the coordinators to ensure that RUs working on similar datasets or using similar approaches should work closely together to ensure the successful outcome of this project.

The EC notes that as part of this project a number of RUs are compiling databases, which appear to involve the same datasets. We recommend that the coordinators establish a working group to consider the nature, availability, and long-term storage of these databases.

The project appears to be broadly on schedule. The progress of the project was clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made good progress towards its first year goals. Nevertheless some RUs have not made as much progress as they originally anticipated.

Significant highlights include

- The identification of a broad depth range of magma crystallisation conditions and a possible time migration.
- A database of local seismic events and tremor amplitudes between 1977–1991 has been compiled and validated and is available for others
- SO_2 monitoring network installed (FLAME network)
- High-resolution multibeam survey offshore Etna indicates new morphological features which can be directly correlated with subaerial tectonic and volcanic features.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

No specific delays have been indicated by the coordinators. Nevertheless, the EC has identified a number of weaknesses (see below). This may compromise the ability of the project to deliver all the products of value to civil protection outlined in the original proposal.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project has been well planned. The subdivision into seven tasks with individual task coordinators has improved the structure of the project considerably.

The RUs involved in Tasks 2, 3 and 6 have had separate meetings. No reasons are given why other task groups were not coordinated in a similar way. The EC recommends that individual task group coordinators provide reports on their coordinating efforts in the final report.

One kick-off meeting and a coordinators meeting have been held in the first year.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

An appropriate level of activity is indicated in the report of the coordinators.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

– achievement of project deliverables
– feasibility to finish within funding time

In general all the RUs have performed well and have obtained significant results so far.

Task 1: Definition of plumbing systems and volcano structure (5,6,8,10,19,23,26,28,32,34,39)

RU 5, 6, 8, 10, 19, 23, 26, 28, 32, 34, 39 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RUs working on the petrology and geochemistry of Etna lavas should join their efforts towards production of a systematic integrated dataset (e.g. RU 8,10, 1, 34)

RUs working on mapping of the distribution of active fault systems should collaborate more closely (RU 28, 32, 39)

RU 26 has reported problems in obtaining the required seismic data from INGV-CT, which caused some delay. The EC feels the project coordinators should investigate this issue.

Task 2: Physical and chemical properties of magma and volcanic rocks (1,2,24,30)

RU 1, 24, 30 have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 2: The report was poor and did not make clear how the deformation maps will be integrated with the rest of the project.

RUs working on gas emissions should collaborate more closely (RU 24, 30)

Task 3: Modeling and simulation of pre-eruptive processes (3,4,16,36,38)

RU 3, 4, 16, 36, 38 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 3: The analysis of deformation and cumulative seismicity was highlighted as a potential tool for real-time hazard analysis of lateral dike intrusions. The EC recommends that this should be tested with data from Etna as foreseen in the original proposal. Other comment see RU 4.

RU 4: The EC notes that this RU appears to be doing similar work to RU 3 and that they should collaborate.

Task 4: Identification and characterisation of precursors (5,14,17,18,21,24,25,29,33,35,36,37)

RUs 5, 17, 18, 24, 29, 33, 35, 36, 37 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 14 has reported problems in obtaining the required data from INGV, which caused significant problems. The EC recommends that the project coordinators should investigate this issue.

RU 21: The report is unsatisfactory, both in its form and in content. The EC could not evaluate if any progress has been made.

RU 25: The RU has compiled a parametric catalogue of historic Italian earthquakes. There is a strong mismatch between the defined proposal deliverables and the content of the RU report.

Task 5: Reconstruction of the eruptive record, characterization of eruptive types and event probabilities (7,20,22,23,34)

RU 7, 20, 23, 34 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 22: Does not appear to have made significant progress towards its first year deliverables.

Task 6: Simulation of lava flows and associated hazard (9,11,13,15,31)

RU 9, 11, 13, 15 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 9, 11 and 15 are all simulating lava flow scenarios. The EC recommends that they should quantitatively compare their results and the effectiveness of their different approaches. The results of RU 13 (lava tubes) should be integrated in lava flow simulations where possible.

RU 31: The report is extremely poor and does not provide the EC with sufficient information to judge the value and progress of the work in Task 6

Task 7: Simulation of atmospheric dispersal processes and associated hazard (27,31,40)

RU 27, 40 have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:
RU31: The report is extremely poor and does not provide the EC with sufficient information to judge the value and progress of the work in Task 7.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_7

Pantelleria

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project is the first integrated project on volcano-related hazards of Pantelleria and the Sicily channel under the aspects of Civil Protection. It is of importance because of the relatively young age of volcanism on the island and the historical submarine eruptions.

The project, involving 9 RUs, focuses on the volcano-tectonic features, ground deformation, the geothermal system and hazard mapping.

The coordinators' summary reports indicate that the project is progressing well. It is broadly on schedule and the general coordination is effective.

The EC generally had a good impression. The coordinators have shown that in general the various RUs work together well in their various tasks.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project has made good progress and fulfilled its first year goals.

The progress of the project was clearly described in the coordinators' report and their oral presentation. Looking at the results obtained by each RU it is clear that the project achieved the general proposed deliverables. It can be expected that the project will reach its major goals at the end of the two years.

The highlights include:

- Revision of the geological map and of the detailed volcano-stratigraphy,
- Geo-structural analysis of the island including a new digital topographic map
- Geophysical database with the production of maps (bathymetry, gravimetry, seismicity, deformation)
- Installation of a temporary seismic 5-station network on Pantelleria (for June 2006)
- Hazard maps developed for CO_2 and Rn emissions

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The coordinators have not indicated any major delays or problems. Individual RUs mention minor technical problems that have obviously been overcome.

4. Coordination

How is the organisation of the project and communication between RUs

The coordination of the project is effective and satisfactory. After a kick-off meeting with all 9 RUs participating subgroups of RUs met several times for coordinated field operations.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

Manuscripts have not yet been submitted. One group abstract is listed.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the research units have performed well and have obtained significant results so far.

All RU have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC has the following additional comments:

It is expected that the various preliminary maps will soon be available in a final form and that the individual RUs should give some consideration to presenting their results at international conferences.

The EC notes that the accuracy of earthquake locations in the Sicily Channel is still poor but of high importance for understanding the geodynamic setting of the volcanism. The EC recommends the coordinators consider how in cooperation with INGV this could be improved.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V3_8

Historical research

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project was established after the start of the main INGV-DPC project in 2005. The aim is to provide a chronological catalogue of the activity of Campanian volcanoes from historical sources. The details of the intended activity and the deliverables form the content of a special contract with INGV, which was not available to the EC. The group did not present an oral summary of their report.

The examples given in the report highlight the potential of the approach. According to the report, all the selected material from the project will be archived in a database of INGV-SGA.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

n.a.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

n.a.

4. Coordination

How is the organisation of the project and communication between RU's

n.a.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

n.a.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

– achievement of project deliverables
– feasibility to finish within funding time

n.a.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V4

Conception, verification and application of innovative techniques to study active volcanoes

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

This project aims to develop novel techniques for the study of volcanoes in order to improve the understanding of volcanic processes and volcanic hazard. The developments are not associated with individual volcanoes and are intended to be of use for all the other projects with a regional focus.

The project involves 14 RU and is focused on geophysical techniques including three tasks: (a) hazard probability estimation, (b) high-resolution seismic techniques and (c) sensor system developments for real-time observations and measurements.

The project is broadly on schedule. The progress and highlights of the project were clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

The EC recommends that the coordinators work towards the establishment of an open database of software codes to analyse volcanoes and volcano dynamics. This database should to be usable for the other groups. Each method/entry needs to be sufficiently validated and described, including complete manuals and test examples.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made good progress towards its first year goals.

Significant highlights include:

- Development and delivery of an Event Tree Scheme (BET_EF) for probabilistic eruption hazard estimation.
- Development and delivery of a 3D velocity model for Campi Flegrei for use in testing and applications
- Reflection seismic methods to resolve velocity and density contrasts at depth
- New method for the lithological interpretation of seismic velocities.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The overall project is on schedule. Nevertheless, some minor delays have been indicated by the coordinators for some of the RUs due to technical or organizational problems. These have been clearly identified and can be overcome according to the RUs reports.

4. Coordination

How is the organisation of the project and communication between RU's

The coordination of the project is very effective. In addition to the kick-off meeting two operative meetings were held in November 2005 and April 2006. A project web page to share and exchange datasets and other kinds of information has been established.

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

A very appropriate level of activity is indicated in the report of the coordinators.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the RUs have performed well and have obtained significant results so far.

RU 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14 have achieved their year one deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

The EC makes the following additional comments:

RU 2 and 3: Both RUs develop techniques to detect and classify volcanic tremors. They should aim to compare their techniques on the same datasets.

RU 4: The RU develops codes for modeling and inversion of deformation and gravity data. The EC is concerned that a number of groups within the entire INGV-DPC 2005-2006 project seem to be developing similar codes. The EC recommends that a working group is established for the coordination of parallel activities in this field.

RU 11: The EC has discussed during the presentation meeting the possible technical problems which may affect the delivery of a working ocean bottom monitoring system.

RU 12: The RU reports to be behind schedule and explains the reasons. The EC encourages the group to start the first field measurements soon.

INGV-DPC Projects 2005-2006 – Volcanology

END OF YEAR ONE

INGV-DPC Project V5

Research on diffuse degassing in Italy

1. Overall assessment of the project

– *achievement of the Project Deliverables specified in the original project proposal*
– *Is the project on schedule or behind schedule*

The main goal of the project is the mitigation of gas hazard in Italy. It is the only coordinated project with an emphasis on mitigation strategies working directly with civil protection. For this, the project involves 15 RUs and is focused on two research lines, i.e. the production of a catalogue of gas emissions (MANITERM) and hazard identification and risk mitigation.

The project is broadly on schedule. The progress of the project was clearly described in the coordinators' report and their oral presentation. The project deliverables for the first year are almost completely fulfilled.

The EC was extremely pleased with the outcome of the project so far.

2. Scientific deliverables

This should include the progress towards synthesis of the available data into a consistent format for use by DPC in risk analysis.

The project appears to have made good progress towards its first year goals.

Significant highlights include

- The development of a web-based catalogue of Italian gas emissions
- Code for simulating CO_2 dispersion under different meteorological and topographical conditions
- The measurement and quantification of the toxicology at Vigna Fiorita, Fiumicino and Vulcano.

3. Specific problems which have delayed progress

Is it realistic and feasible to reach the goals within the stated budgetary and the time-line parameters?

The overall project is broadly on schedule.

4. Coordination

How is the organisation of the project and communication between RUs

The coordination of the project is highly effective. Two coordination meetings have been held during the first year plus a second working group meeting of Task 1

5. Publications which have arisen directly from this project

At this stage of the project the EC does not expect to see a high number of publications arising directly from the first years work.

A very appropriate level of activity is indicated in the report of the coordinators.

6. Comments to reports / work of individual research units

Only those RUs and sub-projects are commented on in detail, where questions arise or points are unclear. The main criteria are:

- achievement of project deliverables
- feasibility to finish within funding time

In general all the RUs have performed well and have obtained significant results so far.

All RUs have achieved their Year 1 deliverables (>80%) and it is anticipated that they will complete their planned program of research by the end of the project.

End of report