An integrated study of seismic hazard assessment in the area of Aigion, Gulf of Corinth, Greece

From 2000-04-01 to 2002-07-31

Project details

<table>
<thead>
<tr>
<th>Total cost:</th>
<th>Topic(s):</th>
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<td>EUR 676 000</td>
<td>1.1.4.-7. - RTD activities of a generic nature</td>
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<th>EU contribution:</th>
<th>Funding scheme:</th>
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<tr>
<td>EUR 662 000</td>
<td>CSC - Cost-sharing contracts</td>
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Coordinated in:

France

Objective

Problems to be solved
The aim of the project is to contribute to improve observational, experimental and theoretical methodologies for seismic hazard assessment. The work will focus in the highly seismic Aigion area, Gulf of Corinth, Greece. Tectonic studies with geomorphology, trenching, and coring in Quaternary sediments, associated with dating, will provide information of long and mid term deformation and rupture sequences of the major faults. Continuous GPS will bring space and time variability of the strain field. Borehole and surface high dynamic accelerometers in soft soil sites will allow the study of non-linear effects. Continuous geophysical (strain, tilt, pore water pressure,) and geochemical monitoring will detect crustal transients, to be analysed together with seismicity. Scientific objectives and approach The tectonic studies consist of a detailed geomorphologic survey of the area, trenching on the two major fault scarps and dating of the rupture episodes, drilling at shallow depth (tens of meters) for dating of Quaternary sediments. Long-term subsidence and uplift, as well as time series of rupture, will be analysed. The source seismological studies consist of deploying broadband surface accelerometers on rock sites, installing an array of shallow borehole velocimeters (100-150 m), and installing deep borehole high dynamic accelerometers (400 m and 100 m). For the engineering seismology and earthquake engineering studies, shallow boreholes drilled in soft soils will be equipped with high dynamic accelerometers. In situ and laboratory dynamic tests will be performed to define soil profile with a detailed description of the dynamic soil properties. Finally, a buried structure will be instrumented with a few accelerometers. Experimental and theoretical analysis of non-linear behaviour of soils will be achieved. The data mostly telemeters via phone line, will be processed and stored in several databases. It will be available on request after validation and first publications. Catalogues of seismicity will be available. Effects of surface geology and of soft behaviour will be quantified. Models of crustal processes and fault mechanics, sequences of paleoearthquakes, as well as long and short-term slip on the two major faults will be published.

Expected impacts
The project will allow defining better methodologies in the whole chain of the seismic hazard assessment process. The resulting increase of expertise in Europe will allow better advising and collaboration with the end-users (Electricité de France, International Agency of Nuclear Energy and Nuclear Waste) for practical applications. It will in particular provide reliable design values for the Eurocode 8, based on strong data and taking into account non-linear behaviour of soils.

Related information

Result In Brief
Unearthing the secrets behind earthquakes
Report Summaries

Online seismic management
Radiometric dating of earthquake-prone faults
Ground Penetrating Radar aids seismic research
Focusing on Europe's earthquake zones
Studying the earth's changes
Viewing geochemical data online

A catalogue of earthquakes (location) of the area from the CRL array
A catalogue of earthquakes (location, mechanism) of the area from the CORNET array
Cumulative long and mid-term slip rates on the Helike and Aigion faults
Definition of a benchmark 1D soil profile at the CORSSA site
Detection of buried fault scarp on the west Helike fault with Ground Penetrating Radar (GPR)
Displacement vector of continuous and repeated GPS measurements, and assessment of the present steady-state deformation across the Gulf of Corinth
Evidence for abrupt environmental change from coring in the Eliki hanging wall and coastal plain
First application of 210Pb geo-chronology to paleo-seismology on the colluvial edge of the Heliki fault scarp
GIS data-base
Identification of paleoearthquakes in trenches on the Helike and Aigion faults scarps
Map and model of the fluid geochemistry background of the Aigion area
Maps of the Aigion and Helike faults at different scales
Maps of the marine terraces
Methodology for SAR interferometry studies with selection of coherent reflectors
Models of seismic sources from local earthquakes
Short seismic profile across the Aigion harbour
Tectonic activity of the Aigion fault deduced from the study and the deposits crossed by the gamma1 borehole in the Aigion harbour
Vertical tectonic motion deduced from the modelling of marine terraces
Web site for seismological data-info exchange
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Subjects
Earth Sciences - Economic Aspects - Environmental Protection - Meteorology - Social sciences and humanities

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