

Task 2

Geological-geotechnical catalogue of ITACA sites

Task responsables:

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1st semester evaluation by the International Evaluation Committee

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Project S4 – Task 2

Main Objectives

To complete and update the monographies of available geological and geotechnical information for ITACA stations;

To prepare new ones for the remaining stations of the RAN and of the other stations belonging to local networks.

The catalogue prepared within this Task will provide the basis for the seismic classification of the ITACA recording sites (Task 5).

Project S4 – Task 2

Main activities

1. Definition of a standard format to collect geological, geomorphological, geotechnical and geophysical data (**Deliverable D3**);
2. Acquisition, collection and compilation of data available in the literature or coming from other sources;
3. Exploiting information and experimental results coming from other research projects (NERIES and PEER-UNIRM projects);
4. Including results obtained by the experimental activity of Task 3;
5. Providing average horizontal-to-vertical spectral ratios calculated on selected records for as many as possible stations.
6. Providing the final set of monographs to be included in ITACA.

Task 2 – Deliverables

<p>D3</p> <p><i>Responsibles</i> RU2-INGV-RM1 RU6-Uni-RM1</p> <p><i>Deadline</i> 4 m</p>	<p>Definition of the standard format to prepare descriptive monographs of ITACA stations (Technical report)</p>	<p><i>This report will be compiled in close cooperation with DPC</i></p>
<p>D4</p> <p><i>Responsibles</i> RU2-INGV-RM1 RU6-Uni-RM1</p> <p><i>Deadline</i> 12m</p>	<p>Progress report on the ongoing activity for constructing a catalogue of geological/geotechnical information at accelerometer stations</p>	<p><i>A monograph will be prepared, for each station of the ITACA database, containing information for site characterization, and will be linked to the station description field in the database.</i></p>
<p>D5</p> <p><i>Responsibles</i> RU2-INGV-RM1 RU6-Uni-RM1</p> <p><i>Deadline</i> 24m</p>	<p>Catalogue of geological/geotechnical information at accelerometer stations (Technical report)</p>	<p><i>Completion of work described in Deliverable D4.</i></p>

Monographs in ITACA data-base

Stations with
 V_s -profile

45

Stations with
monograph



422



D3: STANDARD FORMAT

to collect geological, geomorphological, geotechnical and geophysical data has been defined.

- General information
- Geographical information
- Geomorpholgy
- Geology
- Geotechnical and Geophysical Information
- Microtremor H/V spectral ratio
- Earthquake H/V spectral ratio
- Site Classification (EC8-NTC2008)
- Synthesis of information
- References and Enclosures

	
ITACA (ITalian ACcelerometric Archive)	
RAN <i>Rete Accelerometrica Nazionale</i> (National Accelerometric Network)	
Recording Station	
<input type="text"/>	
Station Code	
<input type="text"/>	
First compilation	<input type="text"/>
Last update	<input type="text"/>
	<small>Day Month Year</small>

EXAMPLES

Site classification (EC8 – NTC2008)

OLD ITACA
REPORT



NEW ITACA
REPORT



Lithostratigraphic classification

Estimated

Method ¹	Soil class ²	Notes

1 Legend

GEO	Geological data
EC	Empirical correlation
HV	H/V spectral ratio

Based on in-situ measurements

Method ³	V_{s30} (m/s)	Soil class ³
NW	324	C

2 Legend

A	Rock or other rock-like geological formation, including at most 5 m of weaker material at the surface ($V_{s30} > 800$ m/s).
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of m in thickness, characterized by a gradual increase of mechanical properties with depth ($V_{s30} = 360-800$ m/s).
C	Deep deposits of dense or medium dense sand, gravel or stiff clay with thickness from several tens to many hundreds of m ($V_{s30} = 180-360$ m/s).
D	Deposits of loose-to-medium cohesionless soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil ($V_{s30} < 180$ m/s).
E	A soil profile consisting of a surface alluvium layer with V_s values of type C or D and thickness varying between about 5 m and 20 m, underlain by stiffer material with $V_s > 800$ m/s.

3 Legend

CH	Cross-Hole
DH	Down-Hole
ES	ESAC
FK	FK
MW	MASW
NW	NASW
SH	SH-Refraction
SW	SASW
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Topography classification

Topography category ⁴
T1

4 Legend

T1	Flat surface, isolated slopes and cliffs with average slope angle $i \leq 15^\circ$.
T2	Slopes with average slope angle $i > 15^\circ$.
T3	Ridges with crest width significantly less than the base width and average slope angle $15^\circ \leq i \leq 30^\circ$.
T4	Ridges with crest width significantly less than the base width and average slope angle $i > 30^\circ$.

NEW PAGES

Synthesis of information

Information relevant to site classification

	Notes	
V_{s30} (m/s)	324	MASW
Average N_{SPT} to 30m	-	
Average c_u to 30m (kPa)	-	
Site class (EC8 – NTC2008)	C	
Topography category (EC8 – NTC2008)	T1	

Geological and geomorphological information

Lithology	Pebbles and sands	
Morphology	Alluvial fan	

Other information relevant to seismic site response

Depth to bedrock (m)	57.3	
Average V_s to bedrock (m/s)	296	
f_0 from H/V microtremors (Hz)	1.0	
f_0 from H/V earthquakes (Hz)	0.85	
Observed anomalies of station response	-	

References

Geomorphology & Geology

Carta geologica d'Italia in scala 1:100.000 – Foglio n. 123 "Assisi". Servizio Geologico Nazionale
The Umbria-Marche strong motion data set (September 1997 – June 1998), SSN Monitoring System Group, CD-ROM, 2002
Sito web del Progetto IFFI: http://www.mais.sinanet.apat.it/cartanetiffi/

Geotechnical & Geophysical Information

Microtremor measurements by INGV – Sezione di Milano - Pavia

Research papers

Di Giulio G., Cornou C., Ohrnberger M., Wathelet M. and Rovelli A. (2006). <i>Deriving wavefield characteristics and shear-velocity profiles from two-dimensional small-aperture arrays analysis of ambient vibrations in a small-size alluvial basin, Colfiorito, Italy</i> . Bulletin of the Seismological Society of America, Vol. 96, No. 5, pp. 1915-1933, doi: 10.1785/0120060119

Enclosures

List

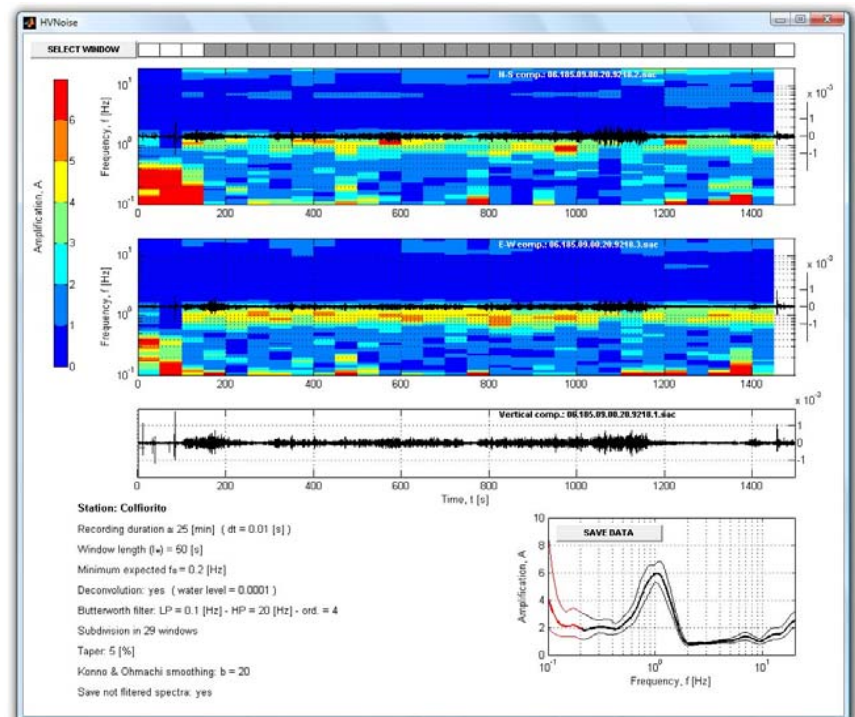
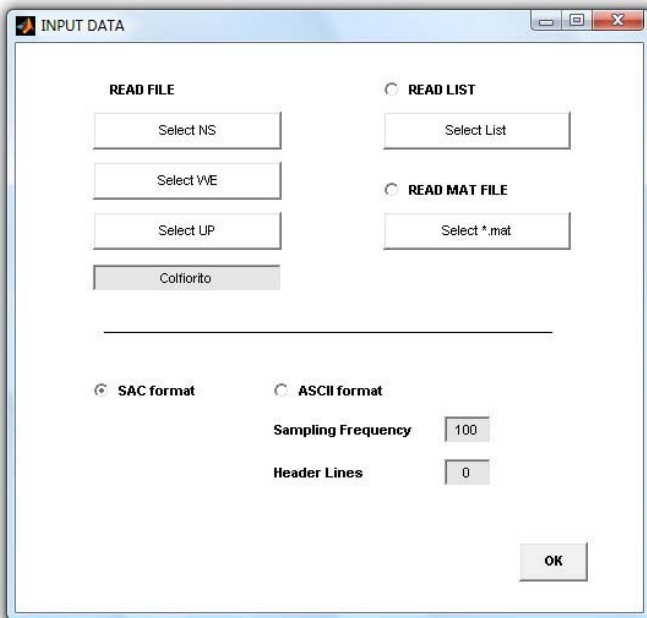
N.	Description

HV NOISE

HVNoise: a MatLab routine to compute the ratio HVSR between horizontal to vertical components of noise signals

The HVSR is calculated for:

- NS and WE components, separately
- geometric and arithmetic means



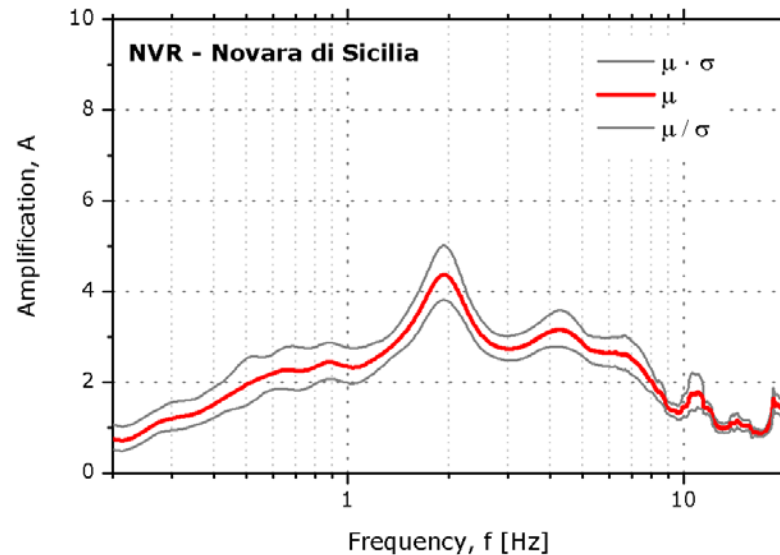
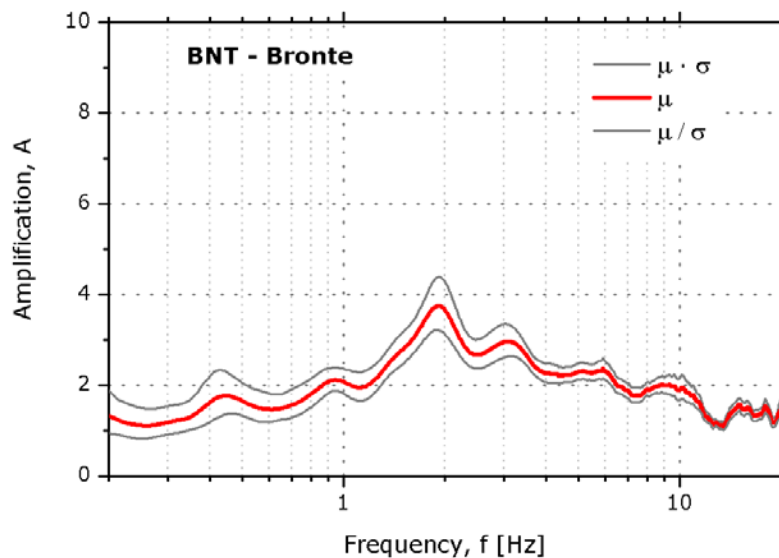
Analyzed ITACA stations

Umbria Marche region: **17** stations

Sicily Region: **15** stations

Others: **10** stations

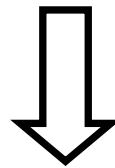
All noise tracks were recording with Lennartz LE-3D/5s sensor



HVQUAKE

For each station, the strong motion data included in ITACA will be analyzed to compute HVSR

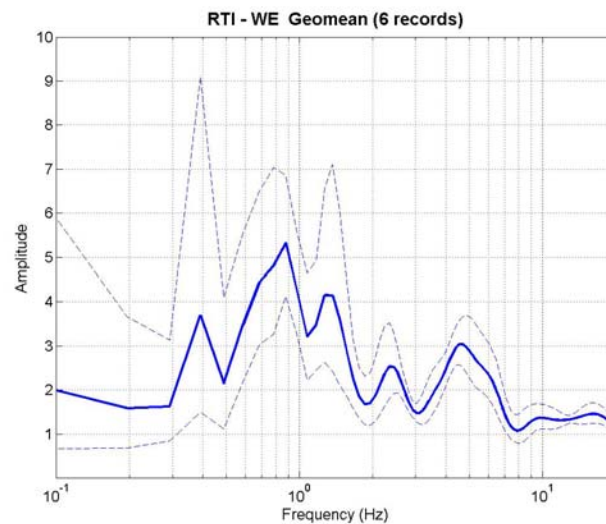
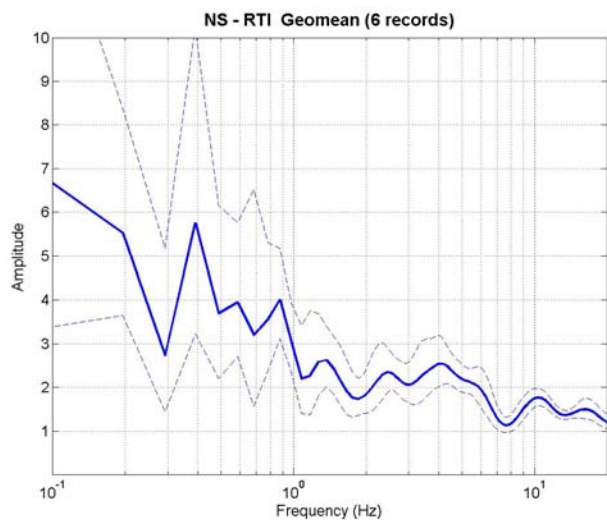
A standard procedure will be implemented



HVQUAKE

a MatLab routine to compute HVSR from strong motion data
(planned)

HV EARTHQUAKE: NS and WE components



Eventi	M	Repi [km]	PGA [cm/s ²]	PGV [cm/s]
14/10/1997 15.23	5.5	52.4	33.9062	-4.0342
26/09/1997 0.33	5.6	66.1	25.4814	2.0111
26/09/1997 9.40	5.8	65	18.3831	1.785
06/10/1997 23.24	5.4	66.4	16.917	1.5188
12/10/1997 11.08	5.1	53.5	10.933	-1.4103
04/10/1997 16.13	4.5	54.5	4.5088	0.42306

WEB ARCHIVE OF DATA AVAILABLE FOR EACH STATIONS

The screenshot shows a Mozilla Firefox browser window displaying the website 'Banca Dati Accelerometrica Italiana Progetto DPC-S4'. The page is titled 'Stazioni' and shows a list of data files for the Basilicata region. The files listed are:

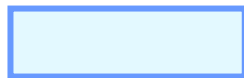
File Name	Downloads	Date	Action
SantArcangelo_SNA.pdf <small>NEW</small>	0	2008-11-05	Download
Tricarico_TRO.pdf <small>NEW</small>	0	2008-11-05	Download
Tricarico_TRR.pdf <small>NEW</small>	0	2008-11-05	Download
Viggianello_VGG.pdf <small>NEW</small>	0	2008-11-05	Download
Potenza_PTZ.pdf <small>NEW</small>	0	2008-11-05	Download

The website also features a navigation menu on the left, a search bar, and a login form. The footer of the browser window shows the taskbar with several open applications and the system clock at 12:42.

Task2 – Work progress

Planned

Geological-geotechnical catalogue of ITACA sites	I	II	III	IV
Definition of a standard format	X			
Collect information and filing	X	X	X	X
Synthesis of results and inclusion in ITACA				X



completed



started on schedule

Problems

This task is going on schedule.

Priority will be given to stations with important records.

Huge number of reports