Project S4: ITALIAN STRONG MOTION DATA BASE

*Responsibles: Francesca Pacor, INGV Milano – Pavia
and Roberto Paolucci, Politecnico Milano*

http://esse4.mi.ingv.it

Deliverable # 10

Revised seismic classification of the ITACA stations, according to the EC8 and the Italian norms site classes

June 2010

edited by:

*UR 2 – Giuseppe Di Capua, INGV Roma
UR 6 – Giuseppe Lanzo, Sapienza Università di Roma*

1. Scope and Description of the Deliverable

The activities carried out within Task 2 aim to collect, organize and synthesize geological, geomorphological, geotechnical and geophysical data for the location site of the Accelerometric National Network (RAN) stations in Italy, managed by the Department of Civil Protection, to improve the knowledge about the subsoil (see Delverable D05) and to permit a subsoil and topographic site classification based on EC8 categories.

At the end of the project the subsoil of 695 stations have been classified using an hybrid approch, based on surface geology, spectral classification and Vs profiles from different recording tecniques (DH, CH, MASW, ESAC).

These activities have been useful to link the ITACA database with the software REXEL to select natural accelerograms, compatible with Norme Tecniche per le Costruzioni (NTC2008) and EUROCODE 8 (EC8) spectra, which may also reflect characteristics of the source in terms of magnitude and epicentral distance.

For 688 station sites have been provided also a topographic classification using a GIS based semiautomatic method with "by-hand" corrections using topographic maps and/or Google Earth software.

A Microsoft Excel Database which also allows to track all changes that have been made since the beginning of the project related to the site classification has been developed. In particular, the database contains the fields in table 1 and is related to 695 accelerometric stations. For many stations not all fields have been completed, due to a lack of information. The completeness of each database field (number of records compiled and percentage of compiling) is quantified in table 1 and shown in figure 1. For more information about data in each fields, see the Deliverable D5.

Table 1. Number of records compiled for each database field and percentage of compiling.

Field	Number of records	%
Station code	695	100
Latitude (N)	695	100
Longitude (E)	695	100
Station name	695	100
Altitude (m a.s.l.)	593	85
EC8 site classification based on surface geology (vers. 1.1)	614	88
EC8 site classification based on surface geology (vers. 2.0)	686	99
Vs30 (m/s)	107	16
Notes Vs30	107	16
Depth to bedrock (m)	67	9
Vs to bedrock (m/s)	60	8
F0, calc (Hz)	17	2
F0, exp (Hz)	31	4
Spectral classification	209	30
EC8 site classification (vers. 1.1)	615	88
EC8 site classification (vers. 2.0)	616	89
EC8 site classification (vers. 3.0)	695	100
Site morphology	199	29
EC8 topographic classification (vers. 1.0)	688	97
Landslides from IFFI project	199	29
General notes	113	16
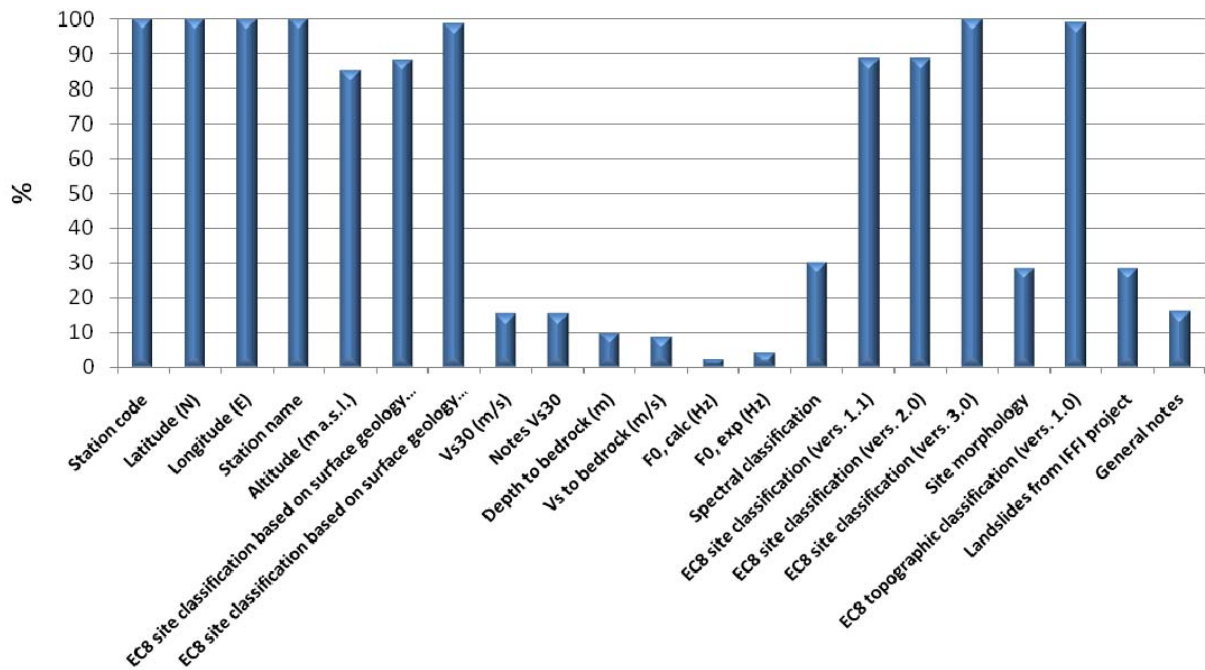
Figure 1. Percentage of compiling for each database field.

Appendix A – EC8 subsoil classification of ITACA stations based on surface geology
(*Di Capua and Peppoloni*)

Since it was necessary to acquire the classification for all ITACA stations, a first classification based on geological data available at a homogeneous level for all the sites was proposed. Using a lithological map at a national scale (1:100,000), by INGV, this goal has been achieved. This map derives from the Geological Map of Italy at 1:100,000 scale, with unification of geological formations in the EC8 subsoil classes, based on lithological and geological age criteria. The resolution of this instrument does not give a detailed result, but it certainly allows a first level of knowledge. During the project has been obtained two version of this site classification: one in the first phase (vers. 1.1) and an upgrade version during the second phase (vers. 2.0).

Appendix B – NTC topographic site classification of ITACA stations
(*Pessina*)

Morphometric analyses of high resolution digital elevation models (DEM), with the support of Geographic Information Systems (GIS), have been implemented to provide a practical tool for the identification of recording stations on topographic sites possibly affected by relevant seismic amplification effects. Analysis havs been applied to 691 recording stations of the RAN (Italian National Accelerometric Network) with the aim to collect information for the ITACA database.

Appendix C – EC8 subsoil classification of ITACA stations based on Vs profiles (Vs30)
(*Lanzo*)

A database was constructed containing the accelerometric stations with shear wave velocity profile. The compiling work has been carried out using the data already available or collected in the previous S6 project (DPC-INGV 2004-2006 agreement) and that obtained in the

framework of the new S4 Project, collected as well as measured front *ad hoc* in situ tests performed by different research units. Overall, 102 monographs with V_S profile were compiled using the new standard format. For each monograph the value of V_{S30} was computed and the corresponding EC8 subsoil classification was assigned.

Appendix D – Spectral classification of ITACA stations
(*Rovelli*)

A site classification scheme has been adopted based on the predominant period of the ITACA station site. The site predominant period is identified from the average horizontal-to-vertical (H/V) spectral ratios of the 5%-damped response spectra of accelerograms of ITACA.

Appendix E – EC8 subsoil and NTC topographic classification of ITACA stations (version 3.0)
(*Di Capua, Lanzo, Peppoloni, Pessina, Rovelli*)

At the end of the second year activity the EC8 site classification, version 3.0, according to the EC8 subsoil classes and NTC topographic categories, has been produced for all ITACA stations. It will be used in the ITACA-REXEL interfacing and in ground motion prediction equation (GMPE) studies.

2. Availability/Restrictions and contact person

All appendices of this Deliverable are available at the project web site: http://esse4.mi.ingv.it.

3. Relevance for DPC and/or for the scientific community

The site classification according to EC8 subsoil and topographic categories represents a fundamental step for studies on new empirical prediction equations of ground motion, and then for seismic hazard studies. Furthermore, it allows ITACA-REXEL interfacing with the selection of natural accelerograms for seismic design and in general permits to have syntetic lithological and morphological information in order to better analyze the seismic response of each ITACA site.

4. Changes with respect to the original plans and reasons for it

No major changes occur in the plans for this Deliverable.

Project S4: ITALIAN STRONG MOTION DATA BASE

Responsibles: Francesca Pacor, INGV Milano – Pavia
and Roberto Paolucci, Politecnico Milano

http://esse4.mi.ingv.it

Appendix # A

EC8 subsoil classification of ITACA stations
based on surface geology

June 2010

edited by:

UR2 - Giuseppe Di Capua, INGV Roma
UR2 - Silvia Peppoloni, INGV Roma

1. Scope and methodology

A first site classification based on surface geological data available at a homogeneous level for all ITACA sites has been proposed at the beginning of the S4 project. Using a lithological map at a national scale (1:100,000), by INGV (unpublished), this goal has been achieved (Figure 1). This map derives from the Geological Map of Italy at 1:100,000 scale, with unification of geological formations in the EC8 subsoil classes (A, B, C, D. E; see Table 1), based on lithological and geological age criteria. The resolution of this instrument does not give a detailed result, but it certainly allows a first level of knowledge. During the project two version of the site classification has been obtained: one in the first phase (version 1.1) and an upgrade version during the second phase (version 2.0) of the project.

Some checks during the first phase of the project revealed the limits of the "geological" classification, in particular where the site studied is near a geological limit between two different subsoil categories detached from two classes (eg. A and C), the thickness of cover, rested on bedrock, is less than 20 m or landslides of some importance are present.
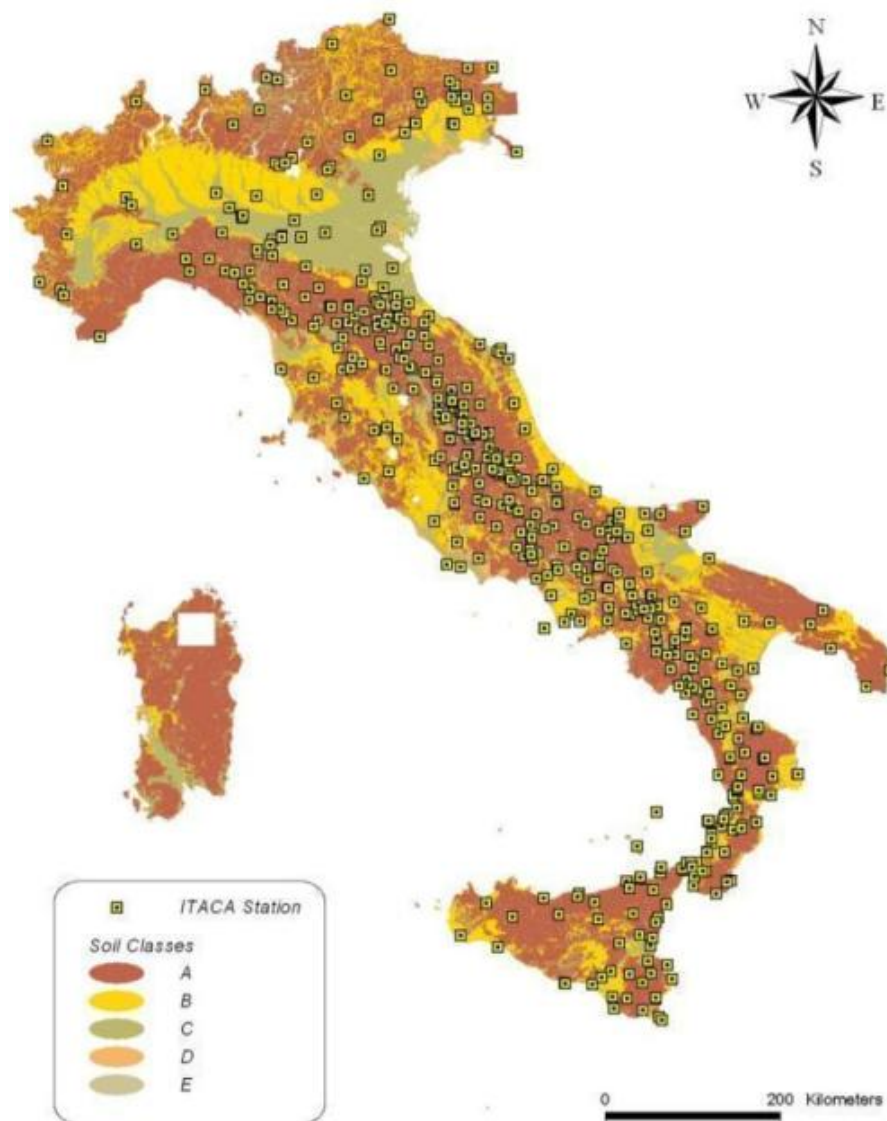
Figure 1. EC8 subsoil classes map for Italy and locations of the ITACA stations.

Table 1. EC8 subsoil classes.

| Subsoil class	Description	Vs$_{30}$ (m/s)
A	Rock or other rock-like geological formation, including at most 5m of weaker material at the surface	> 800
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of m in thickness, characterised by a gradual increase of mechanical properties with depth	360 – 800
C	Deep deposits of dense or medium-dense sand, gravel or stiff clay with thickness from several tens to many hundreds of m	180 – 360
D	Deposits of loose-to-medium cohesionless soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil	<180
E	A soil profile consisting of a surface alluvium layer with Vs values of type C or D and thickness varying between about 5m and 20m, underlain by stiffer material with vs > 800 m/s	-------

2. Results

At the end of the S4 project the version 2.0 of the site classification based on surface geology has been obtained for 686 ITACA stations (see Table 2). All values of EC8 subsoil classes have been marked with an asterisk "*". The percentage distribution of ITACA stations for each EC8 subsoil class is shown in Figure 2. Most sites are into A class, while there is a predominance of C sites than B. Few sites fall into D class, while there are no sites in E class. In the latter case, the definition of E class required the knowledge of the subsoil stratigraphy. The evaluation procedures of the EC8 classes using the lithological map, based on surface geology, make impossible to identify sites into E class. In the lithological map there is only one case in which the E class is provided (because it was arbitrarily assigned by authors of the INGV map): quaternary deposits called "paleosoils". But no station is located on these geological deposits.
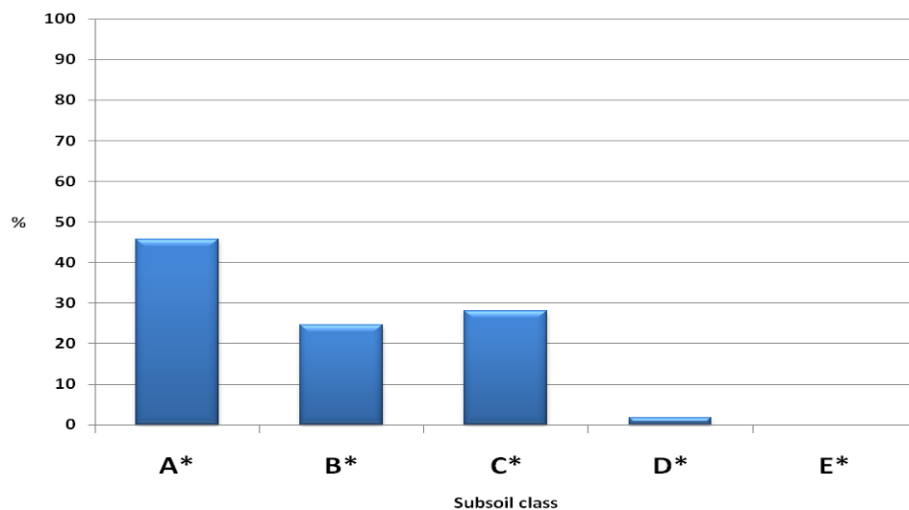
Figure 2. Percentage distribution of EC8 subsoil classes for ITACA sites.

Table 2. EC8 classification of ITACA sites based on surface geology (version 2.0).

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
ACR	39,48905900	16,37986000	ACRI	707	A*
ALC	37,97444444	12,95805556	ALCAMO	303	A*
ALD	39,92981000	16,46534900	ALBIDONA	708	A*
ALF	44,50138889	12,03305556	ALFONSINE	6	C*
ALT	40,55611111	15,39500000	AULETTA (PETINA)	343	A*
AMN	39,13672600	16,07964700	AMANTEA (CAB. ENEL)	98	A*
AMT	42,63246000	13,28617600	AMATRICE	950	A*
ANC	43,62027778	13,51611111	ANCONA	92	A*
ANNI	43,05339000	12,85663000	ANNIFO		C*
ANP	43,60222222	13,47416667	ANCONA - PALOMBINA	47	A*
ANR	43,62111111	13,51277778	ANCONA - ROCCA	48	A*
ANT	42,41811000	13,07859800	ANTRODOCO	568	A*
ANT0	43,58361111	13,51305556	ANCONA - TORRE D'AGO		A*
ANZ	41,44972222	12,62638889	ANZIO	10	C*
ANZI	40,51601000	15,92506000	ANZI	1092	A*
APR	46,15444444	10,15805556	APRICA	1.210	C*
AQA	42,37553000	13,33929800	L'AQUILA - V. ATERNO - F. ATERNO	693	B*
AQF	42,38053900	13,35474000	L'AQUILA - V. ATERNO - FERRIERA	836	C*
AQG	42,37347400	13,33702600	L'AQUILA - V. ATERNO - COLLE GRILLI	721	A*
AQI	42,34490000	13,40090000	L'AQUILA - V. ATERNO - AQUIL PARK I	730	B*
AQK	42,34496700	13,40094900	L'AQUILA - V. ATERNO - AQUIL PARK IN	726	B*
AQM	42,37864300	13,34926200	L'AQUILA - V. ATERNO - IL MORO	724	C*
AQP	42,38368600	13,36859800	L'AQUILA - V. ATERNO - M. PETTINO	1.193	A*
AQT1	42,37805556	13,34555556	L'AQUILA - V. ATERNO - PONTICELLO 1		C*
AQT2	42,37805556	13,34555556	L'AQUILA - V. ATERNO - PONTICELLO 2		C*
AQU	42,35388000	13,40193000	AQUILA CASTELLO	729	B*
AQV	42,37722222	13,34388800	L'AQUILA - V. ATERNO - CENTRO VALLE	692	C*
ARE	38,56294300	16,21143300	ARENA (CAB. ENEL)	534	B*
ARG	44,63074500	11,82516200	ARGENTA	1	-
ARI	41,15250000	15,09111111	ARIANO IRPINO	750	B*
ARL	41,05706800	14,54292800	AIROLA	504	A*
ARN	41,02694444	14,46888889	ARIENZO	92	B*
ARO	43,46630100	11,88286800	AREZZO (NUOVA)	345	A*
ARQ	42,77222222	13,29444444	ARQUATA DEL TRONTO	700	A*
ARR	41,14176200	15,08204200	ARIANO IRPINO	644	B*
ART	43,83472222	7,85138889	ARMA DI TAGGIA	10	C*
ARZ	43,46444444	11,88916667	AREZZO	300	A*
ASG	45,85583333	11,47388889	ASIAGO (ROANA)	974	A*
ASS	43,07498200	12,60414100	ASSISI	390	C*
ATC	41,62250000	13,79416667	ATINA - COLLE		C*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
ATM	41,60250000	13,78555556	ATINA - MONTE PRATO		A*
ATN	41,62027778	13,80138889	ATINA	440	A*
ATP	41,64500000	13,78333333	ATINA - PRETURA ESTERNO		A*
ATQ	41,64500000	13,78333333	ATINA - PRETURA PRIMO PIANO		A*
ATR	41,64500000	13,78333333	ATINA - PRETURA PIANO TERRA		A*
ATS	41,64083333	13,79361111	ATINA - SERBATOIO		A*
ATS0	41,64083300	13,79361100	ATINA SERBATOIO		A*
ATT	41,64500000	13,78333333	ATINA - PRETURA TERRAZZA		A*
AUG	37,24158900	15,23996400	AUGUSTA (CAB. ENEL)	53	A*
AUL	44,20875900	9,97307000	AULLA	176	C*
AUP	46,50645400	13,25634300	AUPA	960	B*
AVL	40,92266000	14,78720000	AVELLINO	423	B*
AVS	46,29193300	13,05580000	AVASINIS - TRASAGHIS	206	C*
AVT	40,31972222	17,70361111	AVETRANA	32	A*
AVZ	42,02745800	13,42592900	AVEZZANO	746	C*
BAG8	45,82280000	10,46640000	BAGOLINO	807	A*
BBB	43,70944444	11,82583333	BIBBIENA	400	B*
BBN	43,74764600	11,82142800	BIBBIENA (NUOVA)	471	C*
BCC	42,81295300	12,91629400	BORGO CERRETO - CAMPO SPORTIVO	355	C*
BCL	38,18222222	15,23333333	BARCELLONA P. GOTTO (MILAZZO)	26	C*
BCN	40,63434600	15,38237600	BUCCINO	660	C*
BCT	42,81561100	12,91538300	BORGO CERRETO - TORRE	370	A*
BDA	44,51055556	9,62833333	BEDONIA - PISCINE	530	B*
BDG	44,50805556	9,11888889	BEDONIA (GALLARETO)		A*
BDT	43,70677200	12,18803600	BADIA TEDALDA	795	C*
BGI	40,83083333	15,06805556	BAGNOLI IRPINO	672	A*
BGL	43,99583100	10,57691600	BAGNI DI LUCCA	450	A*
BGN	44,32055556	9,99027778	BAGNONE	362	B*
BGR	43,88951100	11,99129100	BAGNO DI ROMAGNA	556	A*
BLS	41,58166667	13,80222222	BELMONTE CASTELLO		A*
BLV	40,65056500	15,51283200	BALVANO	979	B*
BND	44,48888889	9,76888889	BEDONIA	477	C*
BNE	41,12755600	14,78488200	BENEVENTO (NUOVA)	221	B*
BNO	41,11972222	14,79472222	BENEVENTO - OSPEDALE	208	B*
BNT	37,78080200	14,84471800	BRONTE	925	A*
BNV	41,11694444	14,79750000	BENEVENTO	205	B*
BOI	41,48083333	14,47277778	BOIANO	495	A*
BOJ	41,48445100	14,47210300	BOJANO (NUOVA)	537	B*
BORM	46,46940000	10,37640000	BORMIO	1235	A*
BRA	46,00388889	9,76000000	BRANZI	825	C*
BRB	43,95420500	11,21286700	BARBERINO DI MUGELLO	426	A*
BRC	46,18694444	12,55361111	BARCIS	427	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
BRG	44,06833330	10,46111111	BARGA	268	B*
BRH	44,20888889	11,76333333	BRISIGHELLA	150	B*
BRM	44,12888889	11,11750000	BRASIMONE (CAMUGNANO)	842	A*
BRN	40,47194444	15,63444444	BRIENZA	691	A*
BRO	38,60277778	16,34277778	BROGNATURO	770	A*
BRR	44,50833333	9,98888889	BERCETO (RABBONI)	813	C*
BRS	42,32388889	13,59027778	BARISCIANO	920	B*
BRT	44,50805556	9,98777778	BERCETO	812	C*
BRZ	44,38083333	6,97000000	BERSEZIO	1.590	B*
BSA	41,00924700	15,35827100	BISACCIA (NUOVA)	934	A*
BSC	41,00972222	15,37611111	BISACCIA	887	A*
BSL	43,95666667	11,37694444	BORGO S. LORENZO	197	B*
BSM	44,12083333	11,14166667	BRASIMONE - CENTRALE	890	A*
BSS	42,19000000	13,84361111	BUSSI	266	C*
BSZ	44,03151300	11,46733600	BORGO S. LORENZO (NUOVA)	682	A*
BTT	41,99833333	13,54305556	BORGO OTTOMILA	652	C*
BTT2	41,99833333	13,54305556	BORGO OTTOMILA - 2 (CELANO)		C*
BUI	46,22166667	13,09027778	BUIA	163	B*
BVG	42,93238900	12,61105600	BEVAGNA	205	C*
BVM	37,93150000	15,93600000	BOVA MARINA	184	A*
BVN	41,24861100	15,34222200	BOVINO	605	A*
BZZ	42,33750000	13,46611111	BAZZANO	597	C*
CAG	43,05444400	12,82888800	CASSIGNANO		C*
CAMO	41,61700000	15,10200000	CASALNUOVO MONTEROTARO		A*
CAN	41,20300000	15,47500000	CANDELA		B*
CAPR	45,63720000	9,93450000	CAPRIOLO	215	B*
CAS	47,04944444	12,12722222	CASERE (PREDOI)	1.590	C*
CASA	41,73900000	14,84600000	CASACALENDA		A*
CAST	41,70100000	14,73200000	CASTELLINO DEL BIFERNO		A*
CAT	37,44694444	15,04666667	CATANIA (PIANA)	10	C*
CATP	37,52762600	15,08040000	CATANIA PARCO GIOENI	155	A*
CDA	45,15833333	9,70222222	CODOGNO (AGENZIA)	60	B*
CDG	45,15833333	9,69805556	CODOGNO	60	B*
CDI	37,49411000	14,64298800	CASTEL DI IUDICA	471	A*
CDM	42,00277778	14,19972222	COLLE DI MACINE	793	A*
CDN	45,95888889	12,98416667	CODROIPO (NUOVA)	42	B*
CDR	45,95888889	12,98416667	CODROIPO	42	B*
CDRV1	42,81760000	12,91400000	CERRETO DI SPOLETO CEDRAV-1 (Master)	542	C*
CDRV2	42,81671900	12,91465000	CERRETO DI SPOLETO CEDRAV-2 (Slave-a	545	C*
CDRV3	42,81772600	12,91488000	CERRETO DI SPOLETO CEDRAV-3 (Last)	542	A*
CDS	41,78714000	14,11187000	CASTEL DI SANGRO	932	A*
CER	41,25950000	15,91020000	CERIGNOLA	176	B*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
CESM	43,00466500	12,90333200	CESI MONTE		C*
CESV	43,00388800	12,90111100	CESI VALLE		C*
CGL	43,53527778	12,62916667	CAGLI	277	A*
CHT	42,36982700	14,14780900	CHIETI	109	B*
CLA	46,27217900	12,51455000	CLAUT	513	B*
CLC	43,02938800	12,89127700	COLFIORITO CASERMETTE		C*
CLF	43,03589800	12,92053800	COLFIORITO	753	C*
CLG	37,21163600	14,52077000	CALTAGIRONE	531	B*
CLL	43,47879800	11,26910400	CASTELLINA IN CHIANTI	687	A*
CLM	40,43553200	15,38344100	CORLETO MONFORTE	703	A*
CLN	42,08522400	13,52072200	CELANO	803	C*
CLP	40,91694444	15,43805556	CALITRI - PITTOLI	600	B*
CLT	40,89833333	15,43861111	CALITRI	595	B*
CLV	37,81833333	13,89000000	CALTAVUTURO	620	A*
CMB	41,56280000	14,65230000	CAMPOBASSO	709	B*
CML	40,74698300	13,90129200	CASAMICCIOLA	171	B*
CMM	41,86832000	14,44984000	CASTIGLIONE MESSER MARINO	1.137	A*
CMO	46,09115000	13,51476600	CASTELMONTE	605	A*
CMR	41,83342700	14,71202900	CASTELMAURO	708	A*
CNA	45,97222222	12,43583333	CANEVA CENTRALE - POZZO	150	A*
CNB	40,87527778	15,32694444	CONZA - BASE	450	B*
CNC	41,07750000	14,02416667	CANCELLO ARNONE	7	D*
CNF	44,11052300	10,41111900	CASTELNUOVO DI GARFAGNANA	306	C*
CNG	45,88305556	12,28833333	CONEGLIANO 5	63	B*
CNM	41,61822500	15,10451700	CASALNUOVO MONTEROTARO (NUOVA)	462	A*
CNP	40,87111111	15,30750000	CONZA - PIANA	443	B*
CNT	41,90000000	12,48333333	CANTERNO - CENTRALE		C*
CNV	45,96898700	12,44904500	CANEVA	101	C*
CNV0	40,87166667	15,32916667	CONZA - VETTA	594	B*
CONC	45,60600000	10,21700000	CONCESIO	126	B*
CONT	42,40900000	12,76600000	CONTIGLIANO		A*
COP	40,37823500	16,04064400	CORLETO PERTICARA	775	A*
COR	39,11772200	16,38002000	CORACI (CAB. ENEL)	879	A*
COS	39,28907000	16,25768300	COSENZA (NUOVA)	376	B*
CPC	44,92333333	11,87555556	COPPARO (COCCANILE)	2	C*
CPP	44,89361111	11,82916667	COPPARO	4	C*
CPS	42,27200000	13,75800000	CAPESTRANO	585	A*
CR1	40,88972222	15,29638889	CAIRANO 1	455	B*
CR2	40,88694444	15,31222222	CAIRANO 2	450	C*
CR3	40,88666667	15,33416667	CAIRANO 3	438	B*
CR4	40,88611111	15,34805556	CAIRANO 4	443	B*
CRA	39,28888800	16,24555500	COSENZA (Ragonesi) (cab. ENEL)	315	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
CRC	41,45972222	14,71944444	CERCEMAGGIORE	926	A*
CRD	46,52500000	12,11805556	CORTINA D'AMPEZZO	1.550	B*
CRG	46,24611111	8,34000000	CREGO (CRODO)	625	B*
CRL	37,81805556	13,29388889	CORLEONE	600	A*
CRN	39,07750000	17,11138889	CROTONE (MONTEDISON)	60	B*
CRO	43,26784100	11,98055000	CORTONA	371	A*
CRP1	45,05027778	9,88000000	CAORSO PAESE 1	44	C*
CRP2	45,05027778	9,88000000	CAORSO PAESE 2	44	C*
CRR1	42,81972222	12,91722222	CERRETO DI SPOLETO - COMUNE 1	557	A*
CRR2	42,81972222	12,91722222	CERRETO DI SPOLETO - COMUNE 2	557	A*
CRR3	42,81861111	12,91694444	CERRETO DI SPOLETO - PALAZZO NOBILI	545	A*
CRS	45,07361111	9,87027778	CAORSO - CENTRALE	45	C*
CRT	39,07750000	17,12666667	CROTONE	9	C*
CRV	40,70777778	17,65166667	CAROVIGNO	144	A*
CS2	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 37,73	38	C*
CS3	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 39,00	39	C*
CS4	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 61,70 - 1	62	C*
CS5	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 61,70 - 2	62	C*
CS6	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 90,00	90	C*
CSA	43,00799700	12,59058100	CASTELNUOVO (ASSISI)	188	C*
CSAD	43,00700000	12,59100000	CASTELNUOVO (ASSISI)		C*
CSC	42,71888889	13,01333333	CASCIA	677	A*
CSC1	42,81722222	12,91500000	CERRETO DI SPOLETO - CONSERVATORIO 1	500	C*
CSC2	42,81722222	12,91500000	CERRETO DI SPOLETO - CONSERVATORIO 2	500	C*
CSD	42,75305556	12,00416667	CASTEL VISCARDO	488	A*
CSE1	45,07361111	9,87027778	CAORSO CENTRALE - EMERGENZA 1		C*
CSE2	45,07361111	9,87027778	CAORSO CENTRALE - EMERGENZA 2		C*
CSF	46,28111111	11,43722222	CASTEL DI FIEMME (CAPRIANA)	950	C*
CSI	42,71888889	13,01333333	CASCIA - PRONTO INTERVENTO		A*
CSL	40,63166667	16,92805556	CASTELLANETA	227	B*
CSN	44,13700500	12,24140800	CESENA	100	A*
CSN0	41,52305556	13,86361111	CASSINO - SANT'ELIA		C*
CSO	42,09625200	13,08346000	CARSOLI	653	C*
CSO1	42,10090300	13,08811200	CARSOLI1	712	A*
CSP	44,37777778	11,58000000	CASTEL SAN PIETRO TERME	99	B*
CSR	42,75500000	13,00416667	CASCIA - PETRUCCI	617	A*
CSS	41,48579000	13,82309000	CASSINO	174	A*
CST	45,65916667	11,90166667	CASTELFRANCO 5	42	B*
CST1	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 1	550	A*
CST2	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 2	550	A*
CST3	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 3	550	A*
CSV	42,29750000	13,62916667	CASTELNUOVO (SAN PIO)	819	B*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
CSZ	39,30416667	16,24722222	COSENZA	240	B*
CTC	43,46305556	12,25305556	CITTÀ DI CASTELLO	308	C*
CTD	42,38750000	12,94750000	CITTADUCALE	485	B*
CTL	43,95510500	12,73582600	CATTOLICA	12	C*
CTN	38,91555556	16,58833333	CATANZARO	377	A*
CTS	43,48500000	12,22361111	CITTA' DI CASTELLO (REGNANO)	297	C*
CTV	38,34983100	16,08051300	CITTANOVA	469	B*
CTZ	38,94073500	16,58507500	CATANZARO (PONTEGRANDE)	489	A*
CVD	46,08805556	13,23194444	CIVIDALE DEL 6	126	B*
CVL	39,81685300	16,19475400	CASTROVILLARI	483	B*
CVM	42,99409100	11,28230500	CIVITELLA MARITTIMA	352	A*
CVT	44,00527778	11,93750000	CIVITELLA DI ROMAGNA	226	A*
DCM	43,89123500	11,51801100	DICOMANO	200	C*
DMN	44,31500000	7,27111111	DEMONTE	770	C*
EBO	40,54027778	14,98916667	EBOLI	18	B*
FAZ	44,29801600	11,89074600	FAENZA (NUOVA)	71	C*
FDF	38,78915800	16,30006200	FILADELFIA (CIMITERO)	654	A*
FGV	43,60145600	11,41161900	FIGLINE VALDARNO	345	A*
FHC	42,76111111	13,21027778	FORCA CANAPINE (ARQUATA TRONTO)	1.473	A*
FIE	43,80725100	11,29438500	FIESOLE	351	A*
FLD	38,77963300	16,29089500	FILADELFIA (CAB.ENEL)	591	B*
FLP	46,02444444	11,91833333	FELTRE (PASQUER)	275	C*
FLT	46,01944444	11,91194444	FELTRE	305	C*
FMC	40,88138889	15,25500000	TEORA - CONTRADA FIUMICELLO		B*
FMG	42,26802800	13,11722000	FIAMIGNANO	1.071	A*
FNP	38,01722222	14,16472222	FINALE DI POLLINA	62	A*
FNZ	44,30416667	11,88722222	FAENZA	28	C*
FOR	44,19940900	12,04191600	FORLI' (NUOVA)	77	B*
FORC	42,96100000	12,95200000	FORCELLA		A*
FRC	46,22111111	12,99666667	FORGARIA CORNINO	216	A*
FRE	44,12928000	11,39785000	FIRENZUOLA	457	A*
FRE1	44,11806900	11,38287300	FIRENZUOLA1	461	-
FRL	44,21111111	12,07777778	FORLI'	2	B*
FRN	44,68555556	10,10777778	FORNOVO	275	B*
FRR	38,05111111	16,13250000	FERRUZZANO (AFRICO NUOVO)	18	A*
FRR	40,49214200	16,45776900	FERRANDINA	530	B*
FRS	44,72527778	10,09166667	FORNOVO (SANT'ANDREA)	200	A*
FRZ	38,03794667	16,08746333	FIRENZUOLA	420	A*
FSMI	42,95350200	12,69961000	FOLIGNO S. MARIA INFRAPORTAS		C*
FST	44,11750000	11,37750000	FIRENZUOLA (SANTERNO)	420	C*
FVZ	44,23824700	10,13108900	FIVIZZANO	429	A*
GAI	45,65927500	10,61626500	GAINO (TOSCOLANO MADERNO)	398	B*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
GBB	43,35700000	12,60200000	GUBBIO	407	A*
GBP	43,31381600	12,58955000	GUBBIO PIANA		C*
GEL	37,08416667	14,26888889	GELA (AGENZIA)	12	C*
GLD	41,50972222	14,75694444	GILDONE	755	A*
GLL	41,66111111	13,79777778	GALLINARO		A*
GLT	43,23310100	12,78900100	GUALDO TADINO	621	C*
GMB	38,16666667	15,82694444	GAMBARIE (S. STEFANO)	1.305	A*
GMN	46,29196000	13,12313000	GEMONA DEL FRIULI	222	B*
GNL	40,84331500	16,03311900	GENZANO DI LUCANIA		B*
GNV	44,43173200	8,93167600	GENOVA	361	A*
GRD	42,17850500	14,17985100	GUARDIAGRELE	702	A*
GRG1	41,25833333	13,83277778	GARIGLIANO - FREE FIELD 1	5	C*
GRG2	41,25833333	13,83277778	GARIGLIANO - FREE FIELD 2	5	C*
GRM	40,31027778	15,88527778	GRUMENTO NOVA	575	A*
GRN	41,81250000	13,31833333	GUARCINO	1.200	A*
GRR	37,72611111	15,16277778	GIARRE	240	A*
GRS	45,36972222	7,28000000	GROSCAVALLO	1.060	C*
GSA	42,42068900	13,51936200	GRAN SASSO (LAB. INFN ASSERGI)	1.062	C*
GSG	42,46000000	13,55000000	GRAN SASSO (LAB. INFN GALLERIA)	1.200	A*
GSN	41,30166667	14,44583333	GIOIA SANNITICA	275	C*
GSS	40,63090000	16,28190000	GRASSANO		C*
GTR	38,44805500	15,91805500	GIOIA TAURO (CAB. ENEL)	20	B*
GVD	45,61000000	10,38361111	GAVARDO (GAZZINO - VALLIO TERME)	315	B*
GVR	45,57888889	10,43638889	GAVARDO	196	B*
GVT	40,64500800	15,85582300	COSTA DELLA GAVETA	720	A*
ISD	45,27333333	10,96833333	ISOLA DELLA SCALA	31	B*
ISG	42,50333333	13,64972222	ISOLA DEL GRAN SASSO	433	A*
ISI	36,79776000	14,89235700	ISPICA	276	A*
ISP	42,50361111	13,64972222	ISOLA DEL GRAN SASSO-CABINA PRIMARIA	435	B*
ISR	41,61063400	14,23587900	ISERNIA	539	A*
LARI	41,80500000	14,91900000	LARINO		A*
LCA	37,11416667	13,91250000	LICATA (AGENZIA)	11	C*
LCT	37,10944444	13,92805556	LICATA	7	A*
LDP	42,03916900	14,18263000	LAMA DEI PELIGNI	780	A*
LEON	45,45820000	10,12340000	CAPRIANO DEL COLLE	92	C*
LGN	40,13111100	15,75849600	LAGONEGRO	809	C*
LMT	38,88722222	16,25750000	LAMEZIA TERME	9	C*
LMZ	38,91867100	16,25281100	LAMEZIA TERME (S.EUFEMIA)	63	C*
LNG	44,65555556	10,31305556	LANGHIRANO (LESIGNANO BAGNI)	207	C*
LNM	40,87833333	15,19194444	LIONI - MACELLO		C*
LNS	42,56500000	12,98416667	LEONESSA	950	C*
LNT	37,28841000	15,00225900	LENTINI	117	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
LOD	45,30722222	9,50400000	LODI	80	B*
LPD1	42,01861111	14,16916667	LAMA DEI PELIGNI		C*
LPR	38,46815100	14,95690300	LIPARI	67	A*
LRG	40,02111111	15,89000000	LAURIA GALDO	739	B*
LRN	41,79802300	14,91743300	LARINO	503	A*
LRS	40,04611111	15,83500000	LAURIA	425	D*
LS2	45,74640000	7,07040000	LA SALLE		-
LS4	45,74630000	7,07890000	ECOURS		-
LSN	41,85277778	15,36000000	LESINA	7	C*
LSP	44,09614000	9,80791300	LA SPEZIA	107	A*
LSS	42,55824300	12,96889400	LEONESSA (NUOVA)	1.065	A*
LTB	40,08760000	15,98090000	LATRONICO BAGNI		A*
LTC	41,41750000	12,80638889	LATINA CENTRALE - COLONNA TERMICA	5	D*
LTN1	41,41750000	12,80638889	LATINA - CENTRALE 1	5	D*
LTN2	41,41750000	12,80638889	LATINA - CENTRALE 2	5	D*
LTP	41,41750000	12,80638889	LATINA CENTRALE - PILE C A P	5	D*
LTR	40,08765000	16,00948300	LATRONICO		A*
LTS	40,08910000	16,01130000	LATRONICO SCUOLA		A*
LVN	40,78481300	15,30462600	LAVIANO	558	A*
LVR	43,49996600	10,41260100	LIVORNO	295	A*
MAA	46,18666667	13,06944444	MAJANO - ASCENSORE	169	B*
MAD	46,36444444	9,36000000	MADESIMO	1.510	A*
MAI	46,18666667	13,07333333	MAIANO	164	B*
MAJ	46,18233900	13,06892200	MAJANO (NUOVA)	214	B*
MAP	46,18666667	13,06944444	MAJANO - PRATO	169	B*
MAR	40,67561700	16,58278500	MATERA	410	A*
MAT	46,18666667	13,06944444	MAJANO - PIANO TERRA	169	B*
MCN	41,33929400	14,66354000	MORCONE	665	A*
MCR	43,79916667	12,44833333	MACERATA FELTRIA	290	C*
MCS	43,99436600	12,10744100	MERCATO SARACENO (NUOVA)	190	A*
MDC	44,48500000	11,64027778	MEDICINA	21	C*
MDG	44,15972222	11,78777778	MODIGLIANA	197	A*
MDN	44,64696700	10,88989200	MODENA	37	C*
MDT	44,13472222	11,83000000	MODIGLIANA (TREBBIO)	574	A*
MER8	45,67250000	9,41820000	MERATE	350	B*
MFG	38,18881200	15,54062700	MESSINA FORTE GONZAGA	199	A*
MI01	42,35803500	13,50976800	PESCOMAGGIORE	740	A*
MI02	42,35448700	13,47428300	PAGANICA	648	C*
MI03	42,32741500	13,47569200	ONNA	581	C*
MI03	42,32741500	13,47569200	ONNA	581	-
MI05	42,28947300	13,52525500	SANT'EUSANIO FORCONESE		B*
MILA	45,48030000	9,23210000	MILANO	125	B*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
MJS	46,17805556	13,06250000	MAJANO - SAN MARTINO		B*
MLC	45,81277778	10,85305556	MALCESINE	77	A*
MLD	44,11750000	12,07083333	MELDOLA	126	B*
MLF	40,99440000	15,65270000	MELFI		B*
MLL	40,84340700	15,01105300	MONTELLA	671	A*
MLR	40,24022700	15,86313800	MOLITERNO		A*
MLT	38,61027778	16,07083333	MILETO	363	B*
MLZ	38,23194444	15,24388889	MILAZZO	53	C*
MMB	42,35888889	11,52972222	MONTALTO CENTRALE - BASE REATTORE	7	C*
MMP	42,24855000	12,74855400	MOMPEO	474	A*
MN4	42,35888889	11,52972222	MONTALTO CENTRALE - MOD N4	7	C*
MNC1	42,35888889	11,52972222	MONTALTO DI CASTRO - CENTRALE 1	7	C*
MNC2	42,35888889	11,52972222	MONTALTO DI CASTRO - CENTRALE 2	7	C*
MND	41,63833333	15,89166667	MANFREDONIA	55	A*
MNE	42,35888889	11,52972222	MONTALTO CENTRALE - PEDESTAL	7	C*
MNF	43,06277778	13,18472222	MONTE FIEGNI (FIASTRA)	642	A*
MNG	41,70324700	15,95898100	MONTE S. ANGELO	809	A*
MNN	41,63400000	15,91100000	MANFREDONIA	27	A*
MNP	42,25027778	14,03888889	LETTOMANOPPELLO	270	C*
MNS	45,25277778	11,72277778	MONSELICE	5	C*
MNT	43,13972222	11,18333333	MONTICIANO	361	A*
MOG	44,17031900	11,76685300	MODIGLIANA	469	A*
MRA	39,98711000	15,73094000	MARATEA	535	A*
MRC	41,34388889	14,69166667	MORCONE	403	B*
MRC	40,36240000	16,68820000	MARCONIA		B*
MRD	44,88833333	11,07277778	MIRANDOLA	18	C*
MRH	41,34138889	16,19250000	MARGHERITA DI SAVOIA	3	C*
MRL	40,75822100	15,47856500	MURO LUCANO	779	A*
MRM	39,88320500	15,98955500	MORMANNO	919	A*
MRN	44,88638889	11,07277778	MIRANDOLA (NAPOLI)	18	C*
MRN	40,42533500	15,72930100	MARSICO NUOVO	795	C*
MRR	44,06194444	11,60250000	MARRADI	370	A*
MRS	43,94444444	12,18055556	MERCATO SARACENO	190	A*
MRT	40,78944444	14,76277778	MERCATO S. SEVERINO	155	C*
MRV	40,36135900	15,82648200	MARSICO VETERE	747	A*
MSC	42,52611111	13,34638889	MASCIONI (CAMPOTOSTO)	1.332	A*
MSR	39,07695800	16,78974000	MESORACA (FILIPPA) (CAB. ENEL)	495	A*
MSS1	38,20694444	15,51583333	MESSINA 1	456	A*
MSS2A	38,20856100	15,51596600	MESSINA 2 (NUOVA)	475	A*
MST	37,92555556	14,36361111	MISTRETTA	925	A*
MTC	41,49027778	13,81277778	MONTECASSINO (CASSINO)	512	A*
MTL	43,24949700	13,00842800	MATELICA	365	C*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
MTM	46,19500000	13,53138889	MONTEMAGGIORE (SAVOGNA)	965	A*
MTR	42,52402100	13,24479600	MONTEREALE	975	A*
MTV	43,53277778	11,55694444	MONTEVARCHI	143	B*
MZR	37,65277778	12,61083333	MAZARA DEL VALLO	17	B*
MZZ	38,23412300	15,24513500	MILAZZO (NUOVA)	125	C*
NAD	40,87175000	14,28001000	NAPOLI EST	139	B*
NAP	40,79925500	14,17960700	NAPOLI OVEST	205	B*
NAS	38,11861111	14,78611111	NASO	470	A*
NCB	43,10277700	12,80527700	NOCERA UMBRA BISCONTINI		A*
NCH	38,96277778	16,31361111	NICASTRO (LAMEZIA TERME)	175	C*
NCM	43,14917000	12,79722200	NOCERA UMBRA SALMATA		C*
NCO	38,55304300	15,93804300	NICOTERA (SCUOLA)	271	A*
NCR	43,11158300	12,78466600	NOCERA UMBRA	478	A*
NCR2	43,11158300	12,78466600	NOCERA UMBRA 2		A*
NCS	37,75111111	14,40027778	NICOSIA	780	B*
NCT	38,97500000	16,31388889	NICASTRO	246	C*
NEVI	44,58100300	10,31287500	NEVIANO DEGLI ARDUINI	522	A*
NIC	38,55304000	15,93804600	NICOTERA (CAB. ENEL)	272	A*
NIC0	38,55333333	15,93361111	NICOTERA	180	A*
NIM	38,54416600	15,93500000	NICOTERA MARINA (CAB. ENEL)	25	C*
NOCE	43,12000000	12,79200000	NOCERA UMBRA P.I.		A*
NOR	42,79244200	13,09242200	NORCIA LE CASTELLINA		D*
NOT	36,90000000	15,06833333	NOTO	171	A*
NRA	42,79583333	13,08861111	NORCIA - ALTAVILLA		D*
NRC	42,79138889	13,09638889	NORCIA	609	B*
NRI	42,78861111	13,09694444	NORCIA - INA CASA		B*
NRM	42,79527778	13,08472222	NORCIA - MULINO		D*
NRN	42,51500000	12,51916667	NARNI	300	A*
NRO	42,79750000	13,08388889	NORCIA - ORELLI		D*
NRP	42,76916667	13,09694444	NORCIA - PANIFICIO		B*
NRZI	42,78141600	13,09700000	NORCIA ZONA INDUSTRIALE		B*
NSC	37,15138889	14,39138889	NISCEMI	319	B*
NTE	36,90959500	15,06923700	NOTO (AREA ENEL)	235	A*
NVL	44,84194444	10,73055556	NOVELLARA	23	C*
NVR	38,01633100	15,13192700	NOVARA DI SICILIA	550	A*
NVR0	38,01634600	15,13191900	NOVARA DI SICILIA (CAB. ENEL)	638	A*
NZZ	44,78222222	8,35694444	NIZZA MONFERRATO	165	B*
OPB	40,86916667	15,20722222	OPPIDO BALZATA		A*
ORC	41,95360600	13,64234600	ORTUCCHIO (NUOVA)	732	C*
ORT	41,95611111	13,64583333	ORTUCCHIO	662	A*
OVD	44,63670700	8,64244300	OVADA		C*
PAGA	42,36000000	13,46000000	PAGANICA		C*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
PCB	42,55666667	13,33638889	POGGIO CANCELLI (BASE DIGA)	1.298	A*
PCH	36,71083333	15,09111111	PACHINO	47	A*
PDM	41,35535400	14,38537600	PIEDIMONTE MATESE	340	C*
PGA	40,56859200	15,77885800	PIGNOLA	1.018	A*
PGC	42,55861111	13,33916667	POGGIO CANCELLI (CAMPOTOSTO)	1.334	A*
PGG	42,32222222	13,54000000	POGGIO PICENZE	760	B*
PGL	43,69555556	12,49833333	PEGLIO	465	A*
PGN	41,45194444	13,79083333	PIGNATARO	58	B*
PIC	42,85037600	11,68497500	PIANCASTAGNAIO	832	C*
PIT	43,98964700	10,94455200	PISTOIA	537	A*
PLB	42,06333333	12,76472222	PALOMBARA SABINA	350	A*
PLC	40,18250000	16,65916667	POLICORO	26	C*
PLL	38,02444444	15,65444444	PELLARO (CAB. ENEL)	80	C*
PLM	38,36388800	15,85833333	PALMI (CAB. ENEL)	350	B*
PLN	37,99333333	14,14611111	POLLINA	700	A*
PLP	45,82833333	7,03000000	PLANPINCIEUX (COURMAYER)	1.580	B*
PLS	42,08250000	12,76472222	PALOMBARA SABINA S.S.636	265	A*
PLT	39,00234200	16,31933800	PLATANIA (CAB. ENEL)	748	A*
PLZ	37,06834700	14,90975600	PALAZZOLO ACREIDE	657	A*
PMI	38,35537700	15,85329200	PALMI	340	B*
PNC	42,84888889	11,70555556	PIANCASTAGNAIO	760	A*
PNM	44,37995100	9,88165000	PONTREMOLI	355	C*
PNN	43,81722222	12,26138889	PENNABILLI	525	A*
PNR	44,87777778	7,34444444	PINEROLO	355	C*
PNS	42,84555556	11,68666667	PIANCASTAGNAIO (NATALI)	740	A*
PNT	41,49861111	13,68277778	PONTECORVO	115	A*
PO11	45,25833333	8,19833333	TRINO CENTRALE - AREA PO1	155	B*
PO12	45,25833333	8,19833333	TRINO CENTRALE - AREA PO2	155	B*
POLC	40,19670000	16,70330000	POLICORO CINEMA		C*
POLM	40,20875900	16,66969300	POLICORO MUNICIPIO	89	B*
POPL	42,15700000	13,84200000	POPOLI		C*
PPL	36,68341800	15,13377500	PORTOPALO DI CAPO PASSERO (CAB. ENEL	43	A*
PRC	42,51111111	13,40972222	PROVVIDENZA CENTRALE - SALA TURBINE	1.030	A*
PRCI	42,87833300	13,03916600	PRECI		A*
PRF	44,82527778	10,31194444	PARMA (FORNACE)	48	C*
PRI	44,76944444	10,28277778	PARMA (ILSEA)	83	C*
PRM	43,97833333	11,78250000	PREMILCUORE	450	A*
PRN	40,87138889	15,18666667	PROCISA NUOVA		C*
PRP	42,51444444	13,40305556	PROVVIDENZA CENTRALE - POZZO PIEZOME	1.344	A*
PRS	40,54027778	14,98916667	PERSANO	28	B*
PRT	44,14960000	10,92600000	PORRETTA TERME	837	A*
PRV	42,51444444	13,40305556	PROVVIDENZA CENTRALE - CAMERA VALVOL	1.278	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
PRZ	41,37916667	14,11388889	PRESENZANO	130	C*
PSC	41,81204200	13,78919600	PESCASSEROLI	1.242	C*
PSL	41,52583333	13,78361111	POZZO SANTA LUCIA		A*
PSP	40,83609400	15,39679700	PESCOPAGANO	986	A*
PSR	45,94931800	13,01413100	PASSARIANO	86	B*
PSS	41,74555556	13,65361111	PESCOSOLIDO		A*
PST	43,92638889	10,87694444	PISTOIA	100	A*
PTF	41,69630000	14,70240000	PETRELLA TIFERNINA	569	A*
PTI	43,06638889	13,65611111	PETRITOLI	319	B*
PTL	43,42666667	12,44861111	PIETRALUNGA	672	A*
PTR	37,56666667	14,90972222	PATERNO'	228	A*
PTT	38,13441500	14,97504900	PATTI - CABINA PRIMARIA	150	A*
PTT0	38,13441500	14,97504900	PATTI (CAB. ENEL)	189	A*
PTT1	38,14750000	14,97000000	PATTI	27	C*
PTV	45,27527778	10,09194444	PONTEVICO	47	B*
PTZ	40,64823900	15,80811000	POTENZA	766	B*
PVF	44,33310000	10,82520000	PAVULLO DEL FRIGNANO	745	A*
PVS	43,66888889	12,04388889	PIEVE SANTO STEFANO	442	C*
PZ1	40,63333333	15,80000000	POTENZA - SAN REMO		B*
PZ2	40,63333333	15,80000000	POTENZA - SAN VITO		B*
PZ3	40,63333333	15,80000000	POTENZA - SAN VITO ESTERNO		B*
PZ4	40,63333333	15,80000000	POTENZA - OSPIZIO		B*
PZN	38,73250000	16,15805556	PIZZO CALABRO - NUOVA	15	A*
PZS	44,18854900	10,28861000	PIAZZA AL SERCHIO	330	A*
PZZ	38,73444444	16,15888889	PIZZO CALABRO	21	C*
RCA	41,58777778	13,57861111	ROCCA D'ARCE		A*
RCC	41,28750000	13,97972222	ROCCAMONFINA	613	C*
RCR	42,06722222	13,20611111	ROCCACERRO (TAGLIACOZZO)	1.124	A*
RCU	38,12141800	15,66627400	REGGIO CALABRIA	128	B*
RDD	43,49111111	11,38583333	RADDA IN CHIANTI	463	A*
RFC	42,53583333	13,40972222	RIO FUCINO (CAMPOTOSTO)	1.318	A*
RGG	39,61944444	16,17111111	ROGGIANO GRAVINA	225	B*
RGS	36,92484700	14,70325900	RAGUSA	677	A*
RIC	41,48300000	14,83800000	RICCIA	720	A*
RIP	42,26500000	13,59916667	RIPA (FAGNANO)	661	A*
RMN	43,99527778	12,51805556	RIMINI	95	B*
RNC	43,86944444	11,60694444	RINCINE (LONDA)	453	A*
RNR	40,92722222	15,66888889	RIONERO IN VULTURE	673	B*
RNS	44,59545900	8,93601100	RONCO SCRIVIA	434	-
RNV	40,92722222	15,66888889	RIONERO IN VULTURE - NUOVA	673	B*
RNV2	40,92722222	15,66888889	RIONERO IN VULTURE	673	B*
RSN	39,57064800	16,63016100	ROSSANO	433	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
RSS	39,59055556	16,64583333	ROSSANO CALABRO	70	B*
RTI	42,43027778	12,82111111	RIETI (CAB. ENEL)	380	C*
RVM	40,84723700	15,54054100	RUVO DEL MONTE	689	B*
RVR	44,90611111	9,59750000	RIVERGARO	257	B*
SAG	40,93160000	15,18760000	S. ANGELO DEI LOMBARDI	928	B*
SAL	45,60600000	10,51800000	SALO' SCUOLA		C*
SAND	45,64000000	11,60990000	SANDRIGO	51	C*
SANL	40,25275000	16,27176300	SANTARCANGELO	363	B*
SAP	38,62517500	16,52510800	S. ANDREA APOSTOLO JONIO - (CAB. EN	390	A*
SAR	40,07459300	15,65203300	SAPRI	195	A*
SAS	45,60600000	10,51800000	SALO' SCUOLA		C*
SAV	44,24527778	7,32083333	S. ANNA (VALDIERI)	960	B*
SBC	41,91315800	13,10551800	SUBIACO	680	A*
SBR	39,69333333	16,46944444	SIBARI (TERRANOVA)	9	C*
SCC	37,51166667	13,07833333	SCIACCA	65	B*
SCF	42,26472222	13,99777778	SCAFA	128	A*
SCI	38,25581700	15,71467900	SCILLA	81	A*
SCL	39,77388889	15,80333333	SCALEA	2	C*
SCM	41,71082700	14,98374900	S. CROCE DI MAGLIANO	676	A*
SCN	41,91865500	13,87239600	SCANNO	985	A*
SCP	41,80721300	15,16464600	SERRACAPRIOLA	293	B*
SCR	36,82927400	14,52718300	S. CROCE CAMERINA	139	A*
SCRO	41,71000000	14,99000000	S. CROCE DI MAGLIANO		C*
SCS	40,03527778	18,46194444	S. CESAREA TERME	30	A*
SCV	41,30636200	14,88044600	S. MARCO DEI CAVOTI	715	A*
SCZM	40,24982100	16,68980000	SCANZANO MUNICIPIO	30	B*
SCZP	40,26107000	16,74904100	SCANZANO PORTO GRECO	5	D*
SDC	41,71055556	13,81111111	S. DONATO VAL COMINO - SANTUARIO		A*
SDG	41,84257100	15,55893000	S. NICANDRO	255	A*
SDM	42,28944444	13,55777778	S. DEMETRIO NEI VESTINI	658	B*
SDN	39,70820600	16,04610300	S. DONATO DI NINEA	775	A*
SDS	41,68333333	13,79666667	S. DONATO VAL COMINO - COLLE IAVARRA		A*
SDV	45,62722222	13,89888889	S. DORLIGO DELLA VALLE	477	A*
SEL	44,26537000	9,40339000	SESTRI LEVANTE	77	A*
SELE	42,88921600	12,92797500	SELLANO EST		A*
SELI	41,62100000	14,87500000	S. ELIA A PIANISI		A*
SELW	42,88621000	12,92180600	SELLANO OVEST		C*
SEM	46,48555556	10,26888889	SEMOGO	1.350	C*
SEP	41,62501900	14,88016700	S. ELIA A PIANISI	649	A*
SER	43,07117900	12,95313700	SERRAVALLE DI CHIENTI		A*
SFD	38,49719200	15,92248200	SAN FERDINANDO	53	C*
SGF	39,25861111	16,68861111	S. GIOVANNI IN FIORE (PAL)	1.050	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
SGIU	42,37300000	13,39200000	S. GIULIANO L'AQUILA		C*
SGIUA	41,68400000	14,96400000	S. GIULIANO DI PUGLIA A		A*
SGIUB	41,68800000	14,96300000	S. GIULIANO DI PUGLIA B		A*
SGR	41,27166667	14,92638889	S. GIORGIO LA MOLARA	635	A*
SGV	39,26334400	16,68976200	S. GIOVANNI IN FIORE	1.166	A*
SLA	40,92944444	15,17583333	SANT'ANGELO DEI LOMBARDI - ALTO		B*
SLB	40,93000000	15,16611111	SANT'ANGELO DEI LOMBARDI - BASE		B*
SLC	40,39107100	15,63266200	SALA CONSILINA	1.040	A*
SLL	42,79300000	13,79300000	SELLANO		B*
SLL0	38,88388889	16,74277778	SELLIA MARINA	5	C*
SLM	44,63305556	9,40361111	SALSOMINORE	422	C*
SLP	46,81222222	11,25277778	S. LEONARDO VALPASSIRIA	725	B*
SLS	44,63166667	9,06916667	SALSOMINORE (CENTRALE)	410	A*
SMA	39,55639300	16,12507200	S. MARCO ARGENTANO	456	B*
SMAP	41,86900000	15,01100000	S. MARTINO IN PENSILIS		B*
SMAPP	41,86995000	15,00975000	S. MARTINO IN PENSILIS (san pietro)	333	B*
SMAPS	41,87090000	15,01445000	S. MARTINO IN PENSILIS (scuola)	317	B*
SMC1	45,01861111	10,63222222	S. MATTEO DELLE CHIAVICHE (VIADANA)	20	C*
SMC2	45,01861111	10,63222222	S. MATTEO DELLE CHIAVICHE - 2	20	C*
SMF	46,33972222	13,06138889	SOMPLAGO CENTRALE - FINESTRA CONDOTTE	413	B*
SMG	46,33972222	13,06138889	SOMPLAGO CENTRALE - GALLERIA CAVI	413	B*
SMP	44,06410000	10,80370000	S. MARCELLO PISTOIESE	1017	A*
SMT	46,33972222	13,06138889	SOMPLAGO CENTRALE - CUNICOLO POMPE	413	B*
SMU	46,33972222	13,06138889	SOMPLAGO CENTRALE - USCITA GALLERIA	413	B*
SNA	40,25789400	16,24742200	SANT'ARCANGELO	315	C*
SNF	40,54568500	15,55714800	SANT'ANGELO LE FRATTE	633	A*
SNG	43,68500000	13,22666667	SENIGALLIA	100	B*
SNM	43,93432600	12,44929000	SAN MARINO	743	A*
SNN	41,83250000	15,57222222	SANNICANDRO GARGANICO	220	A*
SNS	43,56739000	12,14337500	SANSEPOLCRO	371	C*
SNZ	40,24272200	15,55027700	SANZA	641	A*
SNZ1	45,07388889	9,89638889	S. NAZZARO - 1	42	C*
SNZ2	45,07388889	9,89638889	S. NAZZARO - 2	42	C*
SPA	40,03531600	16,33453600	S. PAOLO ALBANESE	856	A*
SPC	42,74346900	12,73969300	SPOLETO (CANTINA)	134	C*
SPC0	46,33972222	13,06138889	SOMPLAGO CENTRALE - CAMERA VALVOLE	413	B*
SPD	42,51194444	13,37000000	SELLA PEDICATE (CAMPOTOSTO)	1.305	A*
SPL	42,73611111	12,73694444	SPOLETO	365	C*
SPM	42,72166667	12,75166667	SPOLETO (MONTELUCO)	775	A*
SPO	42,73358500	12,74060200	SPOLETO	476	C*
SPR	38,26725800	15,60200400	SPERONE (MESSINA) (CAB. ENEL)	145	B*
SPR0	38,26722222	15,58638889	SPERONE	102	B*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
SPS	39,34020600	16,44912000	SPEZZANO DELLA SILA (CAMIGL.)	1.305	A*
SPT	41,46031200	14,49871000	S. POLO MATESE	717	A*
SRB	44,86638889	10,45527778	SORBOLO	27	C*
SRC	37,08960700	15,29252300	SIRACUSA	112	A*
SRC0	46,22638889	12,99833333	S. ROCCO	420	A*
SRL	43,51694444	13,61944444	SIROLO	81	C*
SRN	38,57555556	16,33194444	SERRA SAN BRUNO	803	B*
SRP	44,84833333	10,44722222	SORBOLO (PEZZANI)	32	C*
SRT	37,16277778	15,03027778	SORTINO	445	A*
SSA	38,16890000	15,78990000	S. STEFANO IN ASPROMONTE	780	A*
SSC	42,87472500	11,87678800	S. CASCIANO DEI BAGNI	632	B*
SSG	43,58666667	12,08305556	SANSEPOLCRO GRAGNANO	521	A*
SSP	43,56916667	12,14694444	SANSEPOLCRO CITTA'	337	C*
SSR	41,69100000	15,37400000	S. SEVERO	139	B*
SSS	44,54500000	10,78611111	SASSUOLO	118	C*
SST	44,23222222	10,76750000	SESTOLA	1.002	A*
SSU	44,50710000	10,78480000	SASSUOLO	439	A*
SSV	41,67944444	15,38611111	S. SEVERO	78	B*
STB	38,80403900	15,23360300	STROMBOLI (COMUNE LIPARI)	104	A*
STF	43,90811200	11,79445700	S. SOFIA	642	A*
STG	41,56666667	14,23250000	S. AGAPITO	405	B*
STL	40,54106500	15,64216900	SATRIANO DI LUCANIA	748	A*
STN	41,01835300	15,11167000	STURNO	684	A*
STR	41,02083333	15,11500000	STURNO	575	A*
STS	43,94222222	11,90527778	S. SOFIA	268	C*
SUL	42,08900000	13,93400000	SULMONA	556	C*
SVL	39,26666667	16,70611111	S. GIOVANNI IN FIORE	981	A*
SVN	37,68308600	15,12996600	S. VENERINA	294	A*
SVP	40,88527778	15,25694444	SELVA PIANA - MORRA		C*
SVT	42,39694444	13,31361111	S. VITTORINO (L'AQUILA)	700	A*
SZZ	41,49750000	13,05472222	SEZZE	286	A*
TAO	37,85235200	15,28628300	TAORMINA	261	A*
TAR	46,50027778	13,62138889	TARVISIO	790	B*
TDG	40,79722222	14,38305556	TORRE DEL GRECO	178	A*
TER	41,55416667	13,77444444	TERELLE		A*
TGG	45,56250000	11,18333333	TREGNAGO (COLLINA)	750	A*
TGL	44,53369200	9,16581100	TORRIGLIA	1030	A*
TGN	40,39138889	15,52611111	TEGGIANO	460	C*
TLB	46,38250000	12,98166667	TOLMEZZO - BASE DIGA	468	A*
TLM1	46,38250000	12,98166667	TOLMEZZO CENTRALE - DIGA AMBIESTA 1	536	A*
TLM2	46,38250000	12,98166667	TOLMEZZO (AMBIESTA - 2)	536	A*
TLS	41,22223700	14,52997400	TELESE TERME	124	A*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
TMA	38,67331000	15,89613800	TROPEA (MAMONE) (CAB. ENEL)	123	A*
TMO	41,98944500	14,97500700	TERMOLI	115	B*
TOR	38,04438700	14,81464000	TORTORICI	554	A*
TP4	44,82260000	7,22050000	TORRE PELICE 4		-
TP7	44,81660000	7,22310000	TORRE PELICE 7		-
TPA	38,67364500	15,88919200	TROPEA	93	A*
TRB	45,18250000	8,27750000	TRINO CENTRALE - BASAMENTO ANNULUS	130	C*
TRC	46,22611111	13,20972222	TARCENTO	230	A*
TRCF	40,62260000	16,13770000	TRICARICO FRANA		B*
TRCM	40,62526900	16,14335500	TRICARICO CASE MONACO	647	B*
TRE1	45,18250000	8,27750000	TRINO CENTRALE - ESTERNO 1	130	C*
TRE2	45,18250000	8,27750000	TRINO CENTRALE - ESTERNO 2	130	C*
TRF	38,26432400	15,63419400	TORRE FARO	3	C*
TRF0	38,26432400	15,63419400	TORRE FARO (MESSINA) (CAB. ENEL)	47	C*
TRG	45,52527778	11,13444444	TREGNAGO	499	A*
TRI1	45,18250000	8,27750000	TRINO CENTRALE - INTERNO 1	130	C*
TRI2	45,18250000	8,27750000	TRINO CENTRALE - INTERNO 2	130	C*
TRL	42,46194444	12,93222222	TERMINILLO	1.225	A*
TRM	37,99055556	13,70111111	TERMINI IMERESE	3	A*
TRN	42,55305556	12,60055556	TERNI	112	C*
TRO	40,61457400	16,14220600	TRICARICO	770	A*
TRP	38,67888889	15,89916667	TROPEA	24	A*
TRQ	45,18250000	8,27750000	TRINO CENTRALE - SALA CONTROLLO SOTT	130	C*
TRR	40,61888889	16,15638889	TRICARICO	650	A*
TRS	39,62972222	16,22500000	TARSIA	102	C*
TRT	44,89250000	8,88250000	TORTONA	210	A*
TRV	41,78111111	14,55055556	TRIVENTO	540	A*
TSC	42,42250000	11,86972222	TUSCANIA	190	A*
TTP	42,01694444	14,16916667	TARANTA PELIGNA	450	A*
TTS	40,60134500	15,72360500	TITO SCALO	828	C*
TVR	43,71138889	11,21888889	TAVARNUZZE (IMPRUNETA)	71	C*
UGN	39,89388889	18,12388889	UGENTO	12	A*
UMB	43,25388889	12,25611111	UMBERTIDE	617	A*
VBM	38,71377600	16,12387100	VIBO MARINA	56	A*
VBV	38,67787200	16,10653300	VIBO VALENTIA	546	A*
VFC	43,15722222	12,60055556	VALFABBRICA - DIAZ C.		C*
VFF	43,15722222	12,60055556	VALFABBRICA - DIAZ F.		C*
VFP	43,15722222	12,60055556	VALFABBRICA - PIANO TERRA		C*
VFS	43,15722222	12,60055556	VALFABBRICA - SOTTOT.		C*
VGD1	44,11916667	10,30194444	VAGLI CENTRALE - BASE DIGA 1	560	C*
VGD2	44,11916667	10,30194444	VAGLI CENTRALE - BASE DIGA 2	560	C*
VGG	39,96611111	16,04916667	VIGGIANELLO	370	D*

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Site classification based on surface geology (vers. 2.0)
VGL	44,11000000	10,28972222	VAGLI - PAESE	587	A*
VIE	41,87700000	16,16500000	VIESTE	6	C*
VLB	41,75916667	13,98888889	VILLETTA BARREA	980	A*
VLC	40,58138889	17,47222222	VILLA CASTELLI	228	A*
VLF	46,46305556	10,42194444	SANTA CATERINA VALFURVA	1.520	A*
VLL	41,67250000	12,77361111	VELLETRI	180	B*
VLM	44,36472222	10,46500000	VILLA MINOZZO	661	A*
VLN	40,17194700	16,44317400	VALIANO (MONTEPULCIANO)	252	C*
VLS1	38,21638889	15,64694444	VILLA SAN GIOVANNI - 1	99	B*
VLS2	38,21755600	15,64696100	VILLA SAN GIOVANNI - 2	144	B*
VLT	43,40166667	10,86805556	VOLTERRA	515	B*
VOBA	45,64290000	10,50400000	VOBARNO	292	B*
VOLT	45,31320000	10,66060000	VOLTA MANTOVANA	107	B*
VRL	44,39270000	9,63340000	VARESE LIGURE	802	-
VRP	41,33321000	14,13168500	VAIRANO PATENORA	209	C*
VSD	41,87916667	16,17111111	VIESTE (DANTE)	30	A*
VSE	42,11111111	14,70972222	VASTO (EUROPA)		B*
VSL	41,51027778	13,78027778	VILLA SANTA LUCIA		C*
VSS	41,87750000	16,16555556	VIESTE	7	C*
VST	42,11055556	14,71027778	VASTO	151	B*
VTT	36,94777778	14,51861111	VITTORIA	162	B*
VZZ	37,16361111	14,75472222	VIZZINI	655	A*
ZCC	44,32416667	10,97083333	ZOCCA	652	A*
ZEN8	45,63780000	10,73190000	S. ZENO DI MONTAGNA	596	B*
ZOVE	45,45360000	11,48760000	ZOVENCEDO	376	A*

References

EC8 (2003). Eurocode8: Design of Structures for Earthquake Resistance, Part1: General Rules, Seismic Actions and Rules for Buildings, December 2003, CEN Central Secretariat, Brussels, ENV 1998-1-1.

Project S4: ITALIAN STRONG MOTION DATA BASE

*Responsibles: Francesca Pacor, INGV Milano – Pavia
and Roberto Paolucci, Politecnico Milano*

http://esse4.mi.ingv.it

Appendix B

NTC topoghraphic classification of ITACA recording station

June 2010

edited by:

UR1 - Vera Pessina, INGV Milano - Pavia

1. Topographic classification

Morphometric analyses of high resolution digital elevation models (DEM), with the support of Geographic Information Systems (GIS), have been implemented to provide a practical tool for the identification of recording stations on topographic sites possibly affected by relevant seismic amplification effects.

Analysis havs been applied to 691 recording stations of the RAN (Italian National Accelerometric Network) with the aim to collect information for the ITACA database.

European and Italian seismic codes suggest topographic aggravation factors in the $1 - 1.4$ range to be applied to seismic actions, depending on simple morphologic parameters (average slope angle, width and height of the relief), on the type of relief (isolated cliff or ridge) and on the location of the site relative to the relief.

According to the Italian Technical Norms (NTC, 2008), reflecting the same prescriptions as in the Part 5 of the EC8 (CEN, 2004), a simplified classification of landforms is identified into four categories:

1. T_1: flat surfaces, isolated slopes or reliefs with average inclination $i \leq 15°$
2. T_2: Slopes with average inclination $i > 15°$
3. T_3: Reliefs with ridge top width much smaller than the base, and average inclination $15° \leq i \leq 30°$
4. T_4: Reliefs with ridge top width much smaller than the base, and average inclination $i > 30°$

1.1 GIS method

Simple GIS functions are used to calculate slope parameters and to classify critical ranges of inclination, while the identification of ridges or reliefs with significant elevation gradients requires to devise more complex procedures, described in this work.

To this end, critical slope and ridge detection maps have been elaborated for the whole national territory, based on the 30x30 m resolution Global Digital Elevation Model GDEM (ASTER instrument developed jointly by METI (Japan) and NASA (USA); available on the site http://www.nasa.gov/topics/earth/features/aster-20090629.html). The original files are GeoTIFF format with geographic lat/long coordinates and a 1arcsecond grid and with estimated accuracy of 20 m at 95% confidence for vertical data. The files covering the whole Italian territory are 95 and, after to be downloaded, they have been made available, for internal use of the project, at the ftpsite: ftp.mi.ingv.it/download/Pessina_ASTER.

Standard procedures exist nowadays in any GIS software for the production of slope maps that can subsequently be classified in three slope ranges according to the building code requirements ($i < 15°$, $15° \leq i < 30°$ and $i \geq 30°$). The identification of crests and ridges, that is critical for a proper identification of the topography class, requires instead more complex procedures.

Once the critical conditions are synthesized into GIS layers, their proximity to strategic structures are checked. Analysis were performed at national scale: into a 100 m ray of the station the simultaneous presence of zones of potential topographic amplification has been detected (Figure 1).
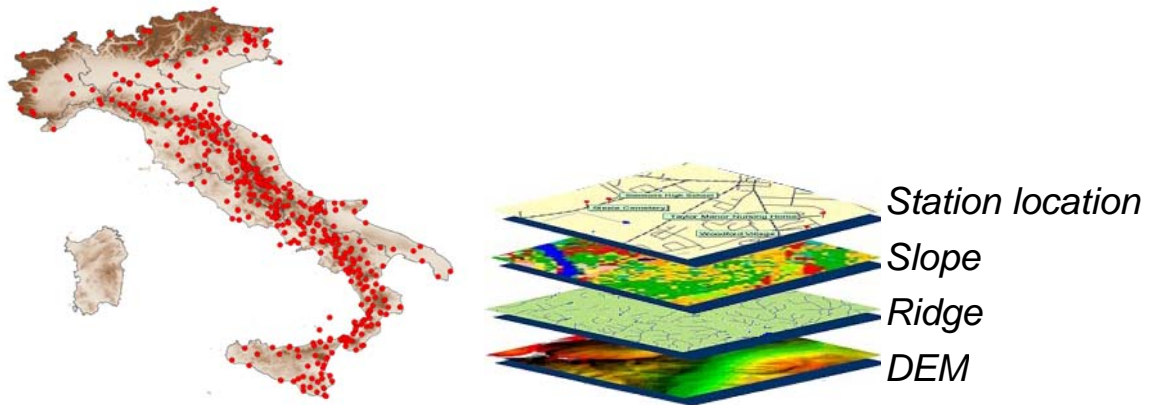
Figure 1. RAN station distribution and synthesized overlay process.

The ArcMap procedure *ad-hoc* implemented with "Model builder" application for the evaluation of critical slope, ridge and elevation gradient maps is shown in Figure 2 and 3, instead, illustrate the results of the ridge detection procedure applied in the Cental Appennine area, close to the stations of Colfiorito, Cesi and Serravalle di Chienti.
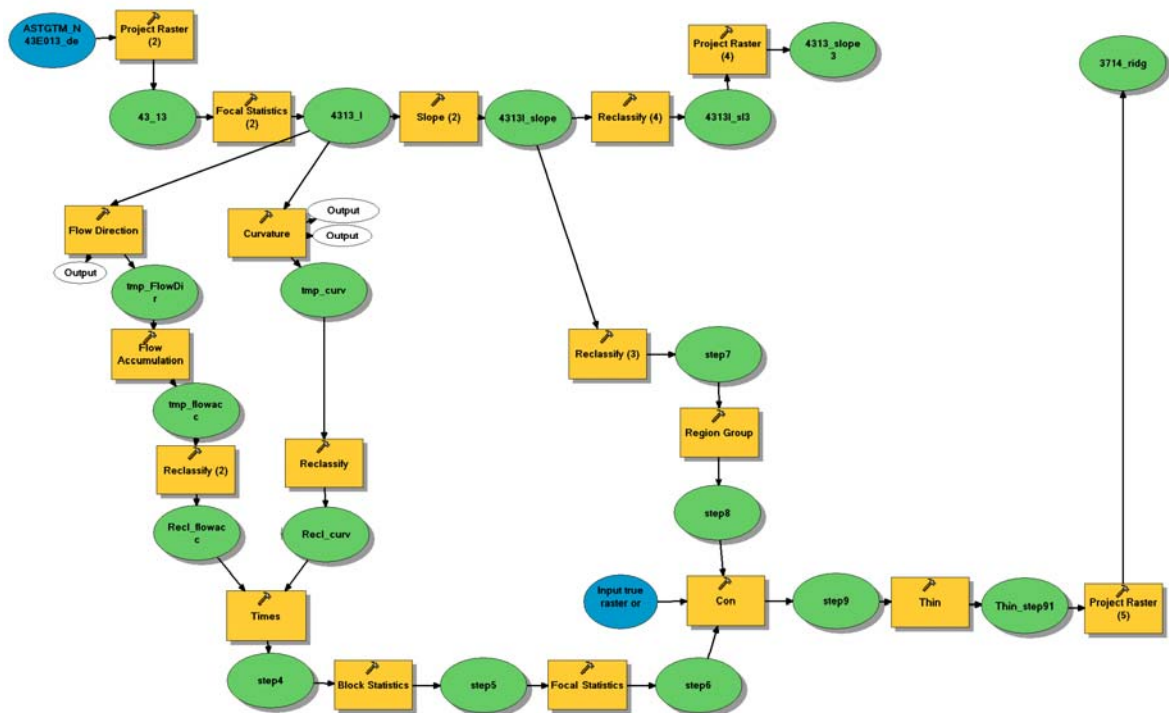
Figure 2. ArcGis model building structure developed for ridge detection: input data are in bleu, produced data in green and geoprocessing tools in yellow.
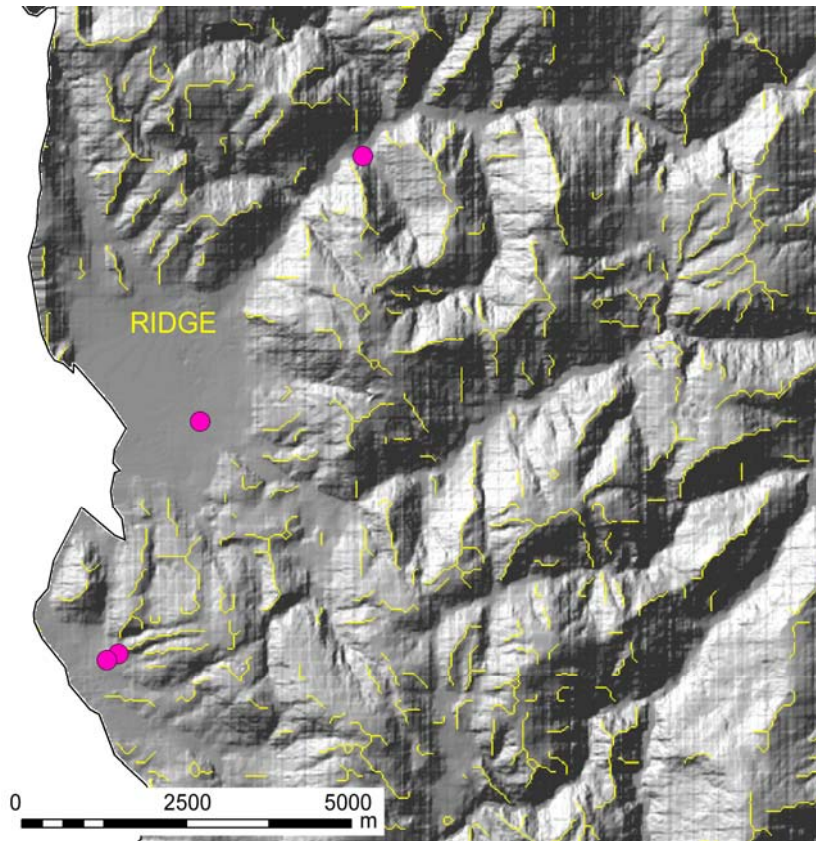
Figure 3. Results of ridge detection (yellow lines) in the Appennine mountains; circles represent the recording station position.

The GIS analysis has shown that the proper identification method depends on the resolution of the Digital Elevation Model (DEM) and on the morphological features of the terrain. For these reasons, sensitivity analysis were carried out referring to different Italian regions characterized by mountains with relatively low height and gentle morphology (Central Italy) and by high mountains and sharp topographic features (Alps or South Appennine zones) (Pessina *et al.*, 2010).

1.2 Analysis on slope and ridge features
Each station was characterized according to the *slope* and *ridge* features.
Data are collected not in the exact position of the station, but in a 100 m buffer in order to reduce errors due to the inaccurate location of the station and to the shift of the grids after the mosaic operation. Through a *Zonal Statistic Analysis* values of a raster (in this case slope angle and ridge presence) are summarized within the zones of another dataset (the 100 m buffer station). Within the polygon of each recording station the software calculates various statistics of the slope and ridge maps, such as minimum and maximum value, mean, median, sum, majority, median, minority or variety. By combining the different values it is possible to identify the localities that can be affected by topographic amplification effects.

1.2.1 Slope
The slope map is reclassified into three classes with values ranging between 0 and 2 ($i \leq 15$, $15° \leq i \leq 30°$ and $i > 30°$ respectively). The considered Zonal Statistic values are the minimum (MIN), maximum (MAX) and SUM; according to their combination, a *slope code* is assigned to each station, as shown in Table 1.

4

Table 1. Table statistical analysis parameters and their combination in the slope-code assessment.

MIN	MAX	SUM	N. of cases	description	*Slope_code*
0	0	0	410	No slope, flat area	0
0	1	1-46	169	If SUM < 4, small part of the area around the station is slope in the [15°-30°] range	0
				If 4 ≤ SUM < 35, significant part of the area around the station is slope in the [15°-30°] range	0.5
				Se SUM ≥ 35, all the area around the station is on slope in the [15°-30°] range	1
0	2	20-76	29	Presence of flat zone, slope in the [15°-30°] range and slope >30°	2
1	1	41-42	8	Full slope in the [15°-30°] range	1
1	2	51-77	14	Full slope > 15°	3
2	2	96	1	Full slope > 30°	4
		Total:	**631**		

1.2.2 Ridge

The ridge map is characterized by values of 0 (no ridge) and 1 (presence of ridge).

Assuming, as in the case of slope characterization, the same MIN, MAX and SUM parameters of the zonal statistical analysis, is the SUM value that fully identify the presence of ridge. Most of the cases in which SUM is > 10 (in a buffer station of 100 m) indicates that the ridge is diameter of the buffer and the station is very close to the ridge. Lesser value of SUM points out the presence of ridge near the station. Table 2 illustrates the combination of the zonal statistic parameters in the assignation of *ridge code* process

Table 2. Table statistical analysis parameters and their combination in the ridge-code assessment.

MIN	MAX	SUM	N. of cases	description	*Ridge_code*
0	0	0	477	No ridge	0
0	1	1-12	153	If SUM < 10, the ridge is closet o the station	0.5
				If SUM ≥10 the station is presumably on the ridge	1
1	1	1	1	Station on the ridge	1
		Total:	**631**		

1.2.3 Buffer overlay

Station with buffer partial or total overlay (see Figure 4) can not be discriminated during the zonal statistical analysis and need to be checked one by one; they are 60 stations.

1.3 Topographic classification

By combining the slope codes [0, 0.5, 1, 2, 3 and 4] with the ridge ones [0, 0.5 and 1] it is possible to assign the topographic index $T_1 \div T_4$ to the stations, as defined in NTC2008. The following situations have been classified (see also Table 3):

T1 Localities without amplification effects, with average slope $i \leq 15°$, corresponding to the T_1 class of the NTC2008. In this group, 381 stations ($\sim 60\%$ of the stations automatically detected) are located in area without ridges in the nearest 100 m, and 96 stations have presence of ridges but on very gentle hills or very elongated elevations, without significant 2D amplification effects. There is a single noteworthy case in which the station of Vagli is located close to a ridge on a steep slope, and the automatic procedure gives an erroneous topographic classification. Indeed, the station is located in the proximity of an artificial lake and the average slope i estimation is affected by the flat surface, while the morphological profile is really different. This situation deserves to go into more depth.

T2 Stations on slopes with average inclination $i > 15°$, without presence of ridge (62 stations) or, when the ridge is close, there is no the simultaneous presence of accentuate slope ($i > 30°$) (46 stations). Most of these cases refers to stations located on a slope or close to a flat morphological platform. According to the NTC2008 they are classified as T_2. Prescriptions indicate that the amplification is null at the base of the slope and maximum at the top: in this stage of analysis it is impossible to effective position of the station on the slope.

T3 Only very few stations (less than 10) were classified as T_3, being characterized by average inclination $15° \leq i \leq 30°$ and presence of reliefs with ridge top width much smaller than the base.

T4 Finally, 4 stations were classified as T_4.

Some combinations of slope and ridge codes do not permit a firm classification in $T_1 - T_4$ class. For instance, 93 stations, about 15% of the total, are not directly classified (NC): most of them are station with no ridge and presence of medium slope within 100 m, generally located at the base of slope and belonging to T_1 or T_2 class. In these cases, a one-by-one classification was performed by the support of GoogleEarth and ArcGis data (checked data √ in Table 3). For instance, Figure 5 illustrates the case of MCR station, classified as T_1. Most of these cases are classified as T1/ T2, but T3 and even T4 cases has been recognised.
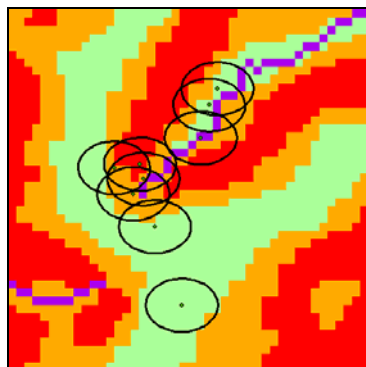
Figure 4. Stations located on the hill of Cerreto di Spoleto. When the 100 m buffer (black perimeters) are not circle because the map is projected in geographic coordinates. When the buffers overlay, it is not possible to extract useful information by the statistic analysis.

Figure 5. Example of visual inspection trought GoogleEarth for the topographic classification (the case of Macerata Feltria MCR station).

Some other combination can be doubtful. These cases are enlighten in Table 3 were all the combinations of slope and ridge codes and the final T_i (i=1,2,3) classification. For these cases a visual check (√) has been performed, by sample, and the prevalent T_i class has been attributed to the combination.

Table 3. Combination of ridge _code and slope_code in the assignment of EC8 topographic classes.

Ridge code	Slope code	N. of cases	Description	EC8	Check
0	0	381	Flat zone	T1	
	0.5	79	Close to slope with 15°< i <30° (T1, T2, T1/T2)	NC	√
	1	29	On slope with 15°< i <30°	T2	
	2	18	No ridge, contemporary presence of flat area and slope i > 15°. Stations **generally** classified as T2, it is impossible detect if they are at the base of slope, in the middle of slope, near terraces or in narrow valley).	T2	
	3	14	On slope with with i > 15°	T2	
	4	1	On slope with with i > 30°	T2	√
0.5	0	92	Flat zone (the presence of ridge evidences small morphologic discontinuities on a territory generally flat). Some visual inspections leat to a T1/T2 classification for stations located at the base of a slope	T1	
	0.5	41	Close to the ridge and presence of slope with 15°< i <30°	T2	
	1	5	Close to the ridge and on slope with 15°< i <30°	T2	
	2	8	Close to the ridge and contemporary presence of flat area and slope i > 15°. Some situations refers to hill as the case of San Marino, Cerreto di Spoleto and Pollina. (T2, T3, T4)	NC	√
	3	4	Close to the ridge and on slope i > 15°.	T4	√
1	0	4	Elongated hills with very gentle slope (i < 15°), not affected by 2D amplification	T1	
	0.5	6	Elongated hills with gentle slope (i < 30°), not affected by 2D amplification, but neither flat (T1/T2, T2, T3)	NC	√
	1	6	Ridge and slope with 15°< i <30°	T3	√
	2	2	Rridge and contemporary presence of flat area and slope i > 15°. (hill)	T3	√

1.4 How to use the topographic information

Within the ITACA database, the topographic classification can be used with the opportune criteria. At the first step, the automatic attribution of T1 can be assumed with a high level of confidence: they represent about 69% of all the stations (see figure B6).
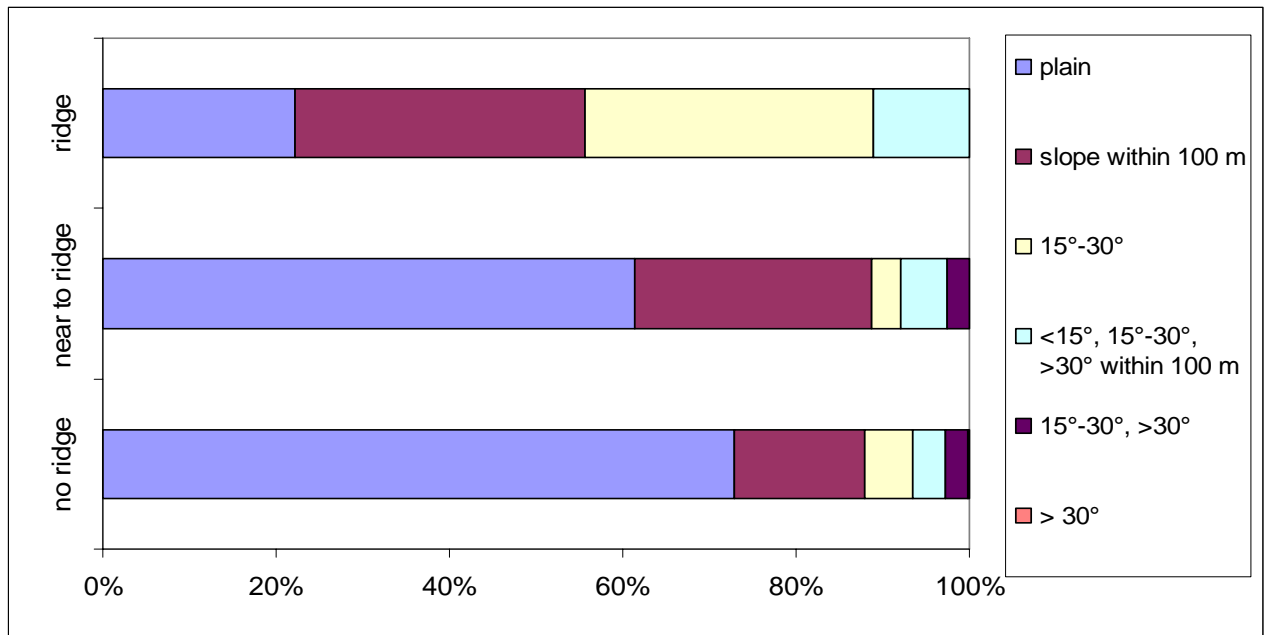
Figure 6. Distribution of the classified stations, accordino to the slope and closeness to ridge.

The remaining 31% of the stations can be deal with caution:

- the manual inspection (√) assures a medium level of confidence, largely for T2, T3 and T4 classification;
- but the one-by-one visual check is not convinced when stations are classified NC (Not automatically Classifiable), indeed, most of the NC cases, even if they are visually detected, can not be univocally classified and they present a large margin of uncertainties. For instance, the PGL (Peglio) station is located close to a ridge of a relief with slope from null ($i \leq 15°$) to moderate ($15° < i \leq 30°$) inclination (see Figure B7): the ridge top width is not much smaller than the base and it can be difficultly classified as T3. Moreover, the inclination of the slope is low and again the station can be difficultly classified as T2. At the end a T1/T2 class was attributed to the PGL station
- Moreover, most of the T2 cases refer to station located on slope, without further indication on the relative position of the slope (at the base, in the middle or at the top of the slope). EC8 and NTC08 norms indicate that the amplification is null at the base of the slope and maximum at the top, varying uniformly along the slop.

Operatively:

1. One third of the stations not classified as T1 could be affected by amplification phenomena and deserve a deeper investigation.
2. In the ITACA characterization form, T2, T3 and T4 stations that have not been investigated (√) can be proper marked to indicate a lower level of confidence in the attribution of topographic classification.
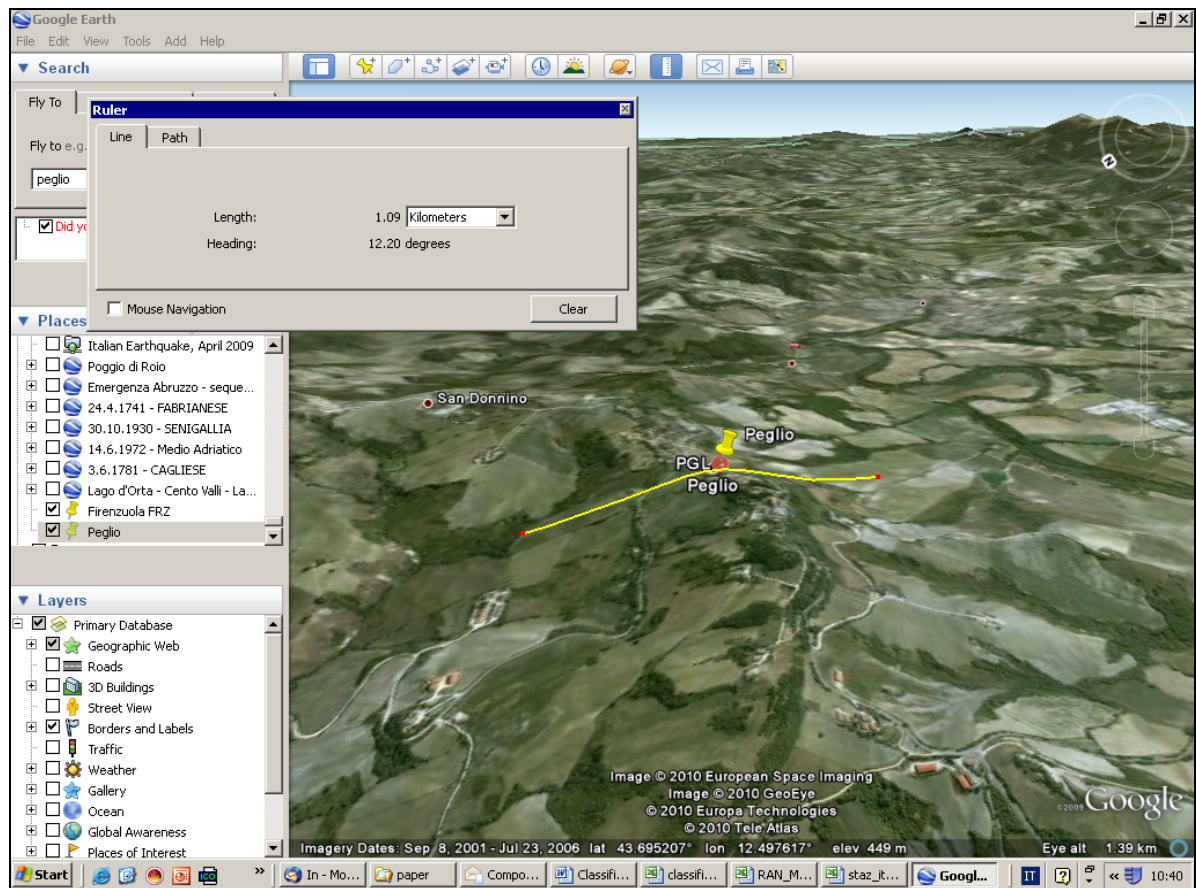
Figure 7. Peglio station, located in proximity of a ridge of a "large" relief, represents one of the cases of doubtful classification.

References

CEN (2004). Eurocode 8: Design of structures for earthquake resistance - Part 5: Foundations, retaining structures and geotechnical aspects, Comité Européen de Normalisation Brussels.

NTC (2008). Norme Tecniche per le Costruzioni. D.M. 14/01/2008, G.U. n. 29 04/02/2008, Suppl. Ord. 30 (*in Italian*).

Pessina V., Fiorini E., Paolucci R. (2010). GIS-Based Identification of Topographic Sitesin Italy with Significant Ground Motion Amplification Effects. 5th Intern. Conf. on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics and Symposium in honour of professor I. M. Idriss, San Diego, CA, May 24-29.

Project S4: ITALIAN STRONG MOTION DATA BASE

Responsibles: Francesca Pacor, INGV MIlano – Pavia
and Roberto Paolucci, Politecnico Milano

Appendix C

EC8 subsoil classification of ITACA stations based on Vs profiles
(V_{S30})

June 2010

edited by:

UR6 - Giuseppe Lanzo, Sapienza University of Rome

1. EC8 subsoil classification

It's well known that the EC8 code (CEN, 2004) divides soil sites into five "Ground Types", namely A, B, C, D and E (excluding the two special categories S1 and S2). These five ground types are identified in terms of their stratigraphic description, the approximate thickness H of soil deposits and the average values of the SPT blow count N_{SPT}, the undrained shear strength Cu and the shear wave velocity V_{S30}. This latter parameter is the equivalent shear wave velocity in the upper 30 m, which is defined according to the following equation:

$$V_{s30} = \frac{30}{\sum \dfrac{h_i}{V_{si}}}$$

where V_{si} is the shear wave velocity of the i-th layer having thickness h_i. The different ground types according to the EC8 classification system are reported for convenience in Table 1.

Table 1 – Ground types according to EC8 classification system

Subsoil	Description of stratigraphic profile	Parameters		
		$V_{s,30}$ [m/s]	N_{SPT} (blows/30cm)	c_u [kPa]
A	Rock or other rock-like geological formation, including at most 5 m of weaker material at the surface	> 800	-	-
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of meters in thickness and characterized by a gradual increase of mechanical properties with depth	360 - 800	> 50	> 250
C	Deep deposits of dense or medium-dense sand, gravel, or stiff clay with thicknesses from several tens to many hundreds of meters	180 - 360	15 - 50	70 - 250
D	Deposits of loose-to-medium noncohesive soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil	< 180	< 15	< 70
E	Soil profile consisting of a surface alluvium layer with $V_{s,30}$ values of type C or D, and thicknesses varying between 5 m and 20 m, underlain by stiffer materials with $V_{s,30}$ > 800 m/s			
S₁	Deposits consisting or containing a layer at least 10 m thick of soft clays/silts with high plasticity index (PI > 40) and high water content	< 100	-	10 -20
S₂	Deposits of liquefiable soils, sensitive clays, or any other soil profile not included in types A-E or S₁			

2. Classification of ITACA stations based on Vs profile (V_{S30})

The activity carried out by RU6 concerned the completion of the catalogue of ITACA recording stations having shear wave velocity profile. The Vs profile was then used to provide site classification according to EC8 system. For the stations with V_S profile geotechnical data, if available, were also collected, organized and synthesized in the station monograph.

Moreover, a synthesis of information relevant to site classification was also reported in the station monograph including the depth of bedrock and the average V_S to bedrock.

The compilation of the stations with V_S profile was made using the data already available or collected in the previous S6 project (DPC-INGV 2004-2006 agreement) and that obtained in the framework of the new S4 Project, collected as well as measured from *ad hoc* in situ tests carried out by different research units. Overall, 102 monographs with V_S profile were compiled using the new standard format.

If the velocity profile was available only to depth d< 30m, a correlation between shallow velocity and V_{S30} was used. Specifically, V_{S30} was determined by means of the relationship calibrated based on the borehole data of the KikNet network (Figini, 2006), which is reported below:

$$\log V_{s,30} = a + b \log V_{s,d}$$

In this equation V_{Sd} is the equivalent shear wave velocity to a depth d< 30m, calculated according to the following equation:

$$V_{s,d} = \frac{d}{\sum \dfrac{h_i}{V_{s,i}}}$$

while a and b are regression coefficients tabulated for each depth d. The a and b values are summarized in Table 2.

Table 2 – Values of the regression coefficients for calculating V_{S30} from V_{Sd} (d<30m)

d (m)	a	b	d (m)	a	b
5	1,228	0,609	18	0,295	0,93
6	1,155	0,637	19	0,255	0,941
7	1,078	0,665	20	0,22	0,951
8	1,02	0,686	21	0,187	0,96
9	0,909	0,726	22	0,157	0,967
10	0,812	0,761	23	0,131	0,974
11	0,722	0,792	24	0,109	0,978
12	0,643	0,819	25	0,086	0,984
13	0,566	0,846	26	0,065	0,988
14	0,497	0,868	27	0,047	0,992
15	0,436	0,888	28	0,031	0,995
16	0,389	0,902	29	0,014	0,998
17	0,339	0,917	30	0	1

A list of the stations for which V_S profile is available is reported in Tables 3 (43 stations with V_S profiles from collected data) and 4 (61 stations with V_S profiles form in situ tests within

the S4 project-Task 3) together with the V_{S30} value and the EC8 site classification. The two stations Aquila Colle Grilli (AQG) and Aquila Valle Aterno (AQA) have been investigated by different research units by means of down-hole as well as MASW tests but the V_S profile reported in the monograph as well as the V_{S30} value are based on the DH test.

Table 3 – List of accelerometer stations with shear wave velocity profile obtained from collected data and EC8 site classification according to V_{S30}

#	Name	Code	V_{S30} (m/s)	EC8
1	AULETTA	ALT	1149	A
2	BISACCIA	BSC	997	A
3	SANNICANDRO GARGANICO	SNN	965	A
4	TARCENTO	TRC	901	A
5	ANCONA ROCCA	ANR	549	B
6	BAGNOLI IRPINO	BGI	498	B
7	BAGNONE	BGN	640	B
8	BENEVENTO	BNV	716	B
9	BORGO CERRETO CS	BCC	486	B
10	BOVINO	BVN	364	B
11	BRIENZA	BRN	402	B
12	CALITRI	CLT	495	B
13	CESENA	CSN	540	B
14	CITTÀ DI CASTELLO	CTC	390	B
15	FORGARIA CORNINO	FRC	454	B
16	LAURIA GALDO	LRG	603	B
17	MERCATO S. SEVERINO	MRT	483	B
18	NORCIA	NRC	687	B
18	PIEVE S. STEFANO	PVS	613	B
20	RIONERO IN VULTURE	RNR	538	B
21	S. SEVERO	SSV	390	B
22	SELLANO EST	SELE	520	B
23	SELLANO OVEST	SELW	518	B
24	STURNO	STR	382	B
25	TOLMEZZO DIGA AMBIESTA	TLM1	522	B
26	TRICARICO	TRR	467	B
27	VALLE ATERNO CENTRO VALLE	AQV	474	B
28	VIESTE	VSS	440	B
29	ANCONA PALOMBINA	ANP	256	C
30	BOJANO	BOJ	306	C
31	BUIA	BUI	258	C
32	FIRENZUOLA	FRE1	312	C
33	FORLì	FOR	295	C
34	GARIGLIANO	GRG2	191	C
35	GUBBIO PIANA	GBP	224	C
36	MAJANO PRATO	MAP	344	C
37	S. GIULIANO SCUOLA	SGIUB	391	C
38	SAN SEPOLCRO	SNS	322	C
30	COLFIORITO	CLF	140	D
40	ARIENZO	ARN	578	E
41	FIVIZZANO	FVZ	495	E
42	NOCERA UMBRA	NCR	534	E
43	S. CASCIANO DEI BAGNI	SSC	485	E

Table 4 – List of accelerometer stations with shear wave velocity profile obtained from in situ tests carried out within the S4 project and EC8 site classification according to V_{S30}

#	RU	Nome	Code	V_{S30} (m/s)	EC8
1	RU2-INGV RM1	BIBBIENA NUOVA	BBN	1000	A
2	"	DICOMANO	DCM	1000	A
3	"	ASSERGI	GSA	488	B
4	"	CASSINO	CSS	630	B
5	"	AVEZZANO	AVZ	199	C
6	"	BORGO8000	BTT	92	D
7	"	RIETI	RTI	170	D
8	RU4-PoliTO	ISPICA	ISI	1482	A
9	"	GENOVA	GNV	987	A
10	"	SANTA CROCE CAMERINA	SCR	894	A
11	"	RAGUSA	RGS	1091	A
12	"	AQUILA FIUME ATERNO	AQA	495	B
13	"	CALTAGIRONE	CLG	373	B
14	"	ECOURS	LS4	473	B
15	"	GEMONA	GMN	445	B
16	"	LASALLE	LS2	496	B
17	"	NOTO	NTE	710	B
18	"	PACHINO	PCH	593	B
19	"	PINEROLO	PNR	383	B
20		RONCO SCRIVIA	RNS	737	B
21	"	SESTRI LEVANTE	SEL	606	B
22	"	TORRE FARO (MESSINA) (CAB. ENEL)	TRF0	302	B
23	"	TORRE PELLICE 4	TP4	547	B
24	"	TORTONA	TRT	483	B
25	"	TORTORICI	TOR	525	B
26	"	VARESE LIGURE	VRL	758	B
27	"	GELA	GEA	245	C
28	"	PATTI (CAB. ENEL)	PTT0	251	C
29	"	TORRE PELLICE 7	TP7	290	C
30	"	CATANIA - PIANA	CAT	160	D
31	"	PALAZZOLO ACREIDE	PLZ	670	E
32	RU6-UNI RM1	AQUIL A FIUME ATERNO	AQA	552	B
33	"	AQUILA COLLE GRILLI	AQG	685	B
34	"	AQUILPARK	AQK	717	B
35	RU7-UniSI	AQUILA COLLE GRILLI	AQG	1150	A
36	"	AQUILA PETTINO	AQP	830	A
37	"	MARATEA	MRA	1020	A
38	"	MONTECASSINO	MTC	1000	A
39	"	MORMANNO	MRM	1400	A
40	"	PESCASSEROLI	PSC	1000	A
41	"	SCANNO	SCN	840	A
42	"	CAPESTRANO	CPS	730	B
43	"	MARSICO VETERE	MRV	680	B
44	"	PIGNOLA	PGA	430	B
45	"	SATRIANO DI LUCANIA	STL	390	B
46	"	TRICARICO	TRO	780	B
47	"	VIBO MARINA	VBM	450	B

48	"	VIBO VALENTIA	VBV	510	B
49	"	SPEZZANO SILA	SPS	320	C
50	RU8-GFZ	BAZZANO	BZZ	679	B
51	"	LAGONEGRO	LGN	431	B
52	"	NORCIA ZONA INDUSTRIALE	NRZI	557	B
53	"	ONNA	MI03	378	B
54	"	SANT ARCANGELO	SNA	420	B
55	"	CATTOLICA	CTL	208	C
56	"	FAENZA	FAZ	293	C
57	"	GRUMENTO NOVA	GRM	283	C
58	"	MODENA	MDN	213	C
59	"	NOVELLARA	NVL	190	C
60	"	ARGENTA	ARG	170	D
61	"	BEVAGNA	BVG	162	D

References

CEN (2004). Eurocode 8: "Design of Structures for Earthquake Resistance – Part I: General Rules, seismic actions and rules for buildings", (EN-1998-1). Brussels, May 2004.

Figini R (2006). Analisi degli effetti di sito sui lunghi periodi degli spettri di risposta di spostamento. Master's Thesis, Politecnico di Milano (in Italian).

Project S4: ITALIAN STRONG MOTION DATA BASE

Responsibles: Francesca Pacor, INGV Milano – Pavia
and Roberto Paolucci, Politecnico Milano

http://esse4.mi.ingv.it

Appendix # D

Spectral classification of ITACA stations

June 2010

edited by:

UR2 - Antonio Rovelli, INGV Roma
UR2 - Carola Di Alessandro, INGV Roma

1. Scope

According to Zhao et al. (2006) and Fukushima et al. (2007) a site classification scheme is adopted based on the predominant period of the station site. The site predominant period is identified from the average horizontal-to-vertical (H/V) spectral ratios of the 5%-damped response spectra of accelerograms of ITACA. For each station, the geometric mean of acceleration response spectra is computed using a selected database including events with Mw >4.0 and R > 200 km. The site classification is made looking at the period where the spectral peak occurs (see Figure 1). There are four options when the average curve shows a clear peak (exceeding a threshold of 2), the period intervals being defined by the values 0.2, 0.4 and 0.6 sec (CL-I to CL-IV corresponding respectively to the first four period intervals shown in Figure 1). When the average spectral ratio has a flat behaviour and no peak exceeds the value of 2, the station is classified as CL-V. This is a very important class because it implies absence of amplification of horizontal motions and is indicative of hard rock stations. The last two cases are attributed when (CL-VI) a broad amplification or multiple peaks occur at periods T > 0.2 s, and (CL-VII) many peaks are everywhere including the range T < 0.2 sec.
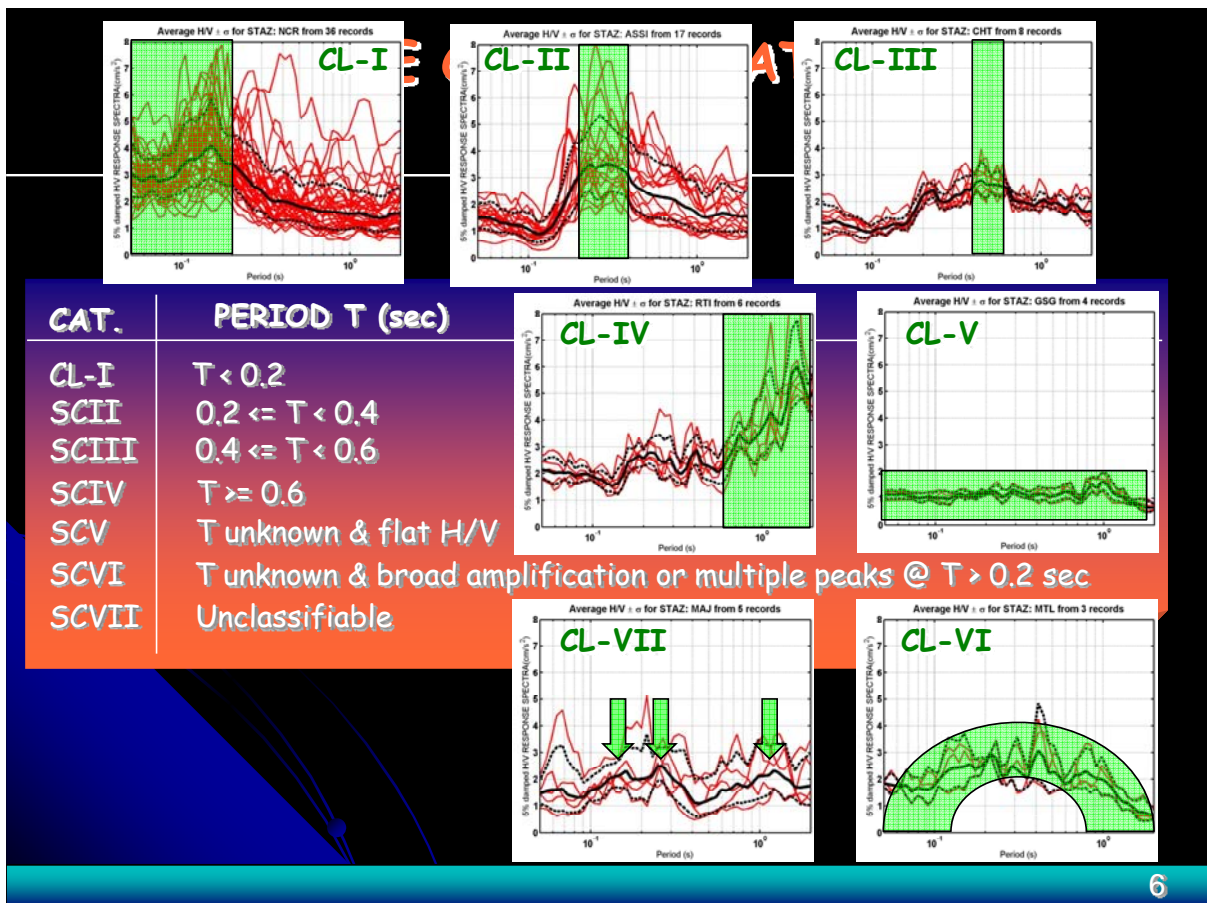
Figure 1. Site classification based on predominat period in H/V spectral ratios of 5% damped response spectra. The figure shows one example for each of the seven site classes that have been defined in the project.

2. Site classification based on the predominant period of the ITACA stations

This classification was made for accelerometer stations for which single and multiple instrumental recordings were available. Overall 209 sites were classified (see Table 1). The percentage distribution of spectral classes for ITACA sites is shown in Figure 2.

Table 1. Spectral classification for 209 ITACA sites.

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Spectral classification
ACR	39,48905900	16,37986000	ACRI	707	CL-II
ALD	39,92981000	16,46534900	ALBIDONA	708	CL-III
ALT	40,55611111	15,39500000	AULETTA (PETINA)	343	CL-VII
AMN	39,13672600	16,07964700	AMANTEA (CAB. ENEL)	98	CL-III
AMT	42,63246000	13,28617600	AMATRICE	950	CL-VII
ANNI	43,05339000	12,85663000	ANNIFO		CL-VII
ANP	43,60222222	13,47416667	ANCONA - PALOMBINA	47	CL-VI
ANR	43,62111111	13,51277778	ANCONA - ROCCA	48	CL-VI
ANT	42,41811000	13,07859800	ANTRODOCO	568	CL-VI
AQG	42,37347400	13,33702600	L'AQUILA - V. ATERNO - COLLE GRILLI	721	CL-VII
AQI	42,34490000	13,40090000	L'AQUILA - V. ATERNO - AQUIL PARK I	730	CL-IV
AQK	42,34496700	13,40094900	L'AQUILA - V. ATERNO - AQUIL PARK IN	726	CL-IV
AQM	42,37864300	13,34926200	L'AQUILA - V. ATERNO - IL MORO	724	CL-I
AQV	42,37722222	13,34388800	L'AQUILA - V. ATERNO - CENTRO VALLE	692	CL-II
ARI	41,15250000	15,09111111	ARIANO IRPINO	750	CL-V
ARN	41,02694444	14,46888889	ARIENZO	92	CL-II
ARQ	42,77222222	13,29444444	ARQUATA DEL TRONTO	700	CL-V
ASG	45,85583333	11,47388889	ASIAGO (ROANA)	974	CL-VII
ATN	41,62027778	13,80138889	ATINA	440	CL-II
ATP	41,64500000	13,78333333	ATINA - PRETURA ESTERNO		CL-I
AUP	46,50645400	13,25634300	AUPA	960	CL-II
AVZ	42,02745800	13,42592900	AVEZZANO	746	CL-IV
BBB	43,70944444	11,82583333	BIBBIENA	400	CL-I
BGI	40,83083333	15,06805556	BAGNOLI IRPINO	672	CL-V
BGL	43,99583100	10,57691600	BAGNI DI LUCCA	450	CL-III
BGN	44,32055556	9,99027778	BAGNONE	362	CL-VII
BNV	41,11694444	14,79750000	BENEVENTO	205	CL-II
BRB	43,95420500	11,21286700	BARBERINO DI MUGELLO	426	CL-I
BRC	46,18694444	12,55361111	BARCIS	427	CL-I
BRG	44,06833330	10,46111111	BARGA	268	CL-V
BRN	40,47194444	15,63444444	BRIENZA	691	CL-I
BRS	42,32388889	13,59027778	BARISCIANO	920	CL-II
BSC	41,00972222	15,37611111	BISACCIA	887	CL-V
BSS	42,19000000	13,84361111	BUSSI	266	CL-VII
BSZ	44,03151300	11,46733600	BORGO S. LORENZO (NUOVA)	682	CL-V
BUI	46,22166667	13,09027778	BUIA	163	CL-IV
BVG	42,93238900	12,61105600	BEVAGNA	205	CL-IV
BVN	41,24861100	15,34222200	BOVINO	605	CL-VII
CAG	43,05444400	12,82888800	CASSIGNANO		CL-I
CAMO	41,61700000	15,10200000	CASALNUOVO MONTEROTARO		CL-II

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Spectral classification
CASA	41,73900000	14,84600000	CASACALENDA		CL-III
CAST	41,70100000	14,73200000	CASTELLINO DEL BIFERNO		CL-VII
CAT	37,44694444	15,04666667	CATANIA (PIANA)	10	CL-IV
CDI	37,49411000	14,64298800	CASTEL DI IUDICA	471	CL-VI
CDR	45,95888889	12,98416667	CODROIPO	42	CL-II
CDS	41,78714000	14,11187000	CASTEL DI SANGRO	932	CL-VII
CESM	43,00466500	12,90333200	CESI MONTE		CL-II
CESV	43,00388800	12,90111100	CESI VALLE		CL-I
CHT	42,36982700	14,14780900	CHIETI	109	CL-III
CLC	43,02938800	12,89127700	COLFIORITO CASERMETTE		CL-I
CLF	43,03589800	12,92053800	COLFIORITO	753	CL-IV
CLG	37,21163600	14,52077000	CALTAGIRONE	531	CL-VII
CLN	42,08522400	13,52072200	CELANO	803	CL-VII
CLT	40,89833333	15,43861111	CALITRI	595	CL-III
CMM	41,86832000	14,44984000	CASTIGLIONE MESSER MARINO	1.137	CL-IV
CNG	45,88305556	12,28833333	CONEGLIANO 5	63	CL-IV
CNV	45,96898700	12,44904500	CANEVA	101	CL-II
CONT	42,40900000	12,76600000	CONTIGLIANO		CL-V
COR	39,11772200	16,38002000	CORACI (CAB. ENEL)	879	CL-IV
COS	39,28907000	16,25768300	COSENZA (NUOVA)	376	CL-II
CPS	42,27200000	13,75800000	CAPESTRANO	585	CL-III
CSAD	43,00700000	12,59100000	CASTELNUOVO (ASSISI)		CL-II
CSC	42,71888889	13,01333333	CASCIA	677	CL-V
CSN	44,13700500	12,24140800	CESENA	100	CL-II
CSN0	41,52305556	13,86361111	CASSINO - SANT'ELIA		CL-VI
CSR	42,75500000	13,00416667	CASCIA - PETRUCCI	617	CL-IV
CSV	42,29750000	13,62916667	CASTELNUOVO (SAN PIO)	819	CL-VI
CSZ	39,30416667	16,24722222	COSENZA	240	CL-IV
CTC	43,46305556	12,25305556	CITTÀ DI CASTELLO	308	CL-VII
CVL	39,81685300	16,19475400	CASTROVILLARI	483	CL-VII
CVT	44,00527778	11,93750000	CIVITELLA DI ROMAGNA	226	CL-II
DCM	43,89123500	11,51801100	DICOMANO	200	CL-I
FAZ	44,29801600	11,89074600	FAENZA (NUOVA)	71	CL-III
FHC	42,76111111	13,21027778	FORCA CANAPINE (ARQUATA TRONTO)	1.473	CL-II
FIE	43,80725100	11,29438500	FIESOLE	351	CL-VII
FLT	46,01944444	11,91194444	FELTRE	305	CL-I
FOR	44,19940900	12,04191600	FORLI' (NUOVA)	77	CL-IV
FORC	42,96100000	12,95200000	FORCELLA		CL-II
FRC	46,22111111	12,99666667	FORGARIA CORNINO	216	CL-III
FRE	44,12928000	11,39785000	FIRENZUOLA	457	CL-III
FRR	38,05111111	16,13250000	FERRUZZANO (AFRICO NUOVO)	18	CL-III
GBB	43,35700000	12,60200000	GUBBIO	407	CL-II
GBP	43,31381600	12,58955000	GUBBIO PIANA		CL-II

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Spectral classification
GLD	41,50972222	14,75694444	GILDONE	755	CL-V
GRD	42,17850500	14,17985100	GUARDIAGRELE	702	CL-I
GRG1	41,25833333	13,83277778	GARIGLIANO - FREE FIELD 1	5	CL-IV
GRM	40,31027778	15,88527778	GRUMENTO NOVA	575	CL-VII
GRR	37,72611111	15,16277778	GIARRE	240	CL-IV
GVD	45,61000000	10,38361111	GAVARDO (GAZZINO - VALLIO TERME)	315	CL-I
LARI	41,80500000	14,91900000	LARINO		CL-V
LDP	42,03916900	14,18263000	LAMA DEI PELIGNI	780	CL-V
LNS	42,56500000	12,98416667	LEONESSA	950	CL-VI
LPR	38,46815100	14,95690300	LIPARI	67	CL-IV
LRG	40,02111111	15,89000000	LAURIA GALDO	739	CL-I
LRS	40,04611111	15,83500000	LAURIA	425	CL-VI
LSN	41,85277778	15,36000000	LESINA	7	CL-I
LVN	40,78481300	15,30462600	LAVIANO	558	CL-IV
MAJ	46,18233900	13,06892200	MAJANO (NUOVA)	214	CL-VII
MCS	43,99436600	12,10744100	MERCATO SARACENO (NUOVA)	190	CL-II
MFG	38,18881200	15,54062700	MESSINA FORTE GONZAGA	199	CL-VII
MLC	45,81277778	10,85305556	MALCESINE	77	CL-VII
MNF	43,06277778	13,18472222	MONTE FIEGNI (FIASTRA)	642	CL-V
MRL	40,75822100	15,47856500	MURO LUCANO	779	CL-IV
MRS	43,94444444	12,18055556	MERCATO SARACENO	190	CL-VII
MRT	40,78944444	14,76277778	MERCATO S. SEVERINO	155	CL-IV
MRV	40,36135900	15,82648200	MARSICO VETERE	747	CL-II
MSS1	38,20694444	15,51583333	MESSINA 1	456	CL-II
MTL	43,24949700	13,00842800	MATELICA	365	CL-VI
MZZ	38,23412300	15,24513500	MILAZZO (NUOVA)	125	CL-IV
NAS	38,11861111	14,78611111	NASO	470	CL-II
NCB	43,10277700	12,80527700	NOCERA UMBRA BISCONTINI		CL-I
NCM	43,14917000	12,79722200	NOCERA UMBRA SALMATA		CL-V
NCO	38,55304300	15,93804300	NICOTERA (SCUOLA)	271	CL-VII
NCR	43,11158300	12,78466600	NOCERA UMBRA	478	CL-I
NCS	37,75111111	14,40027778	NICOSIA	780	CL-II
NCT	38,97500000	16,31388889	NICASTRO	246	CL-IV
NOCE	43,12000000	12,79200000	NOCERA UMBRA P.I.		CL-I
NOT	36,90000000	15,06833333	NOTO	171	CL-IV
NRC	42,79138889	13,09638889	NORCIA	609	CL-VII
NRN	42,51500000	12,51916667	NARNI	300	CL-IV
NVL	44,84194444	10,73055556	NOVELLARA	23	CL-IV
NVR	38,01633100	15,13192700	NOVARA DI SICILIA	550	CL-I
NZZ	44,78222222	8,35694444	NIZZA MONFERRATO	165	CL-VI
ORC	41,95360600	13,64234600	ORTUCCHIO (NUOVA)	732	CL-I
PCH	36,71083333	15,09111111	PACHINO	47	CL-I
PGG	42,32222222	13,54000000	POGGIO PICENZE	760	CL-IV

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Spectral classification
PGL	43,69555556	12,49833333	PEGLIO	465	CL-III
PIT	43,98964700	10,94455200	PISTOIA	537	CL-I
PLL	38,02444444	15,65444444	PELLARO (CAB. ENEL)	80	CL-II
PMI	38,35537700	15,85329200	PALMI	340	CL-VII
PNC	42,84888889	11,70555556	PIANCASTAGNAIO	760	CL-II
PNN	43,81722222	12,26138889	PENNABILLI	525	CL-III
PNR	44,87777778	7,34444444	PINEROLO	355	CL-VII
PNS	42,84555556	11,68666667	PIANCASTAGNAIO (NATALI)	740	CL-II
PNT	41,49861111	13,68277778	PONTECORVO	115	CL-VII
PSC	41,81204200	13,78919600	PESCASSEROLI	1.242	CL-V
PSR	45,94931800	13,01413100	PASSARIANO	86	CL-II
PST	43,92638889	10,87694444	PISTOIA	100	CL-I
PTL	43,42666667	12,44861111	PIETRALUNGA	672	CL-I
PTT	38,13441500	14,97504900	PATTI - CABINA PRIMARIA	150	CL-IV
PTT1	38,14750000	14,97000000	PATTI	27	CL-IV
PTZ	40,64823900	15,80811000	POTENZA	766	CL-I
PVS	43,66888889	12,04388889	PIEVE SANTO STEFANO	442	CL-I
PZZ	38,73444444	16,15888889	PIZZO CALABRO	21	CL-I
RCC	41,28750000	13,97972222	ROCCAMONFINA	613	CL-II
RCU	38,12141800	15,66627400	REGGIO CALABRIA	128	CL-IV
RIP	42,26500000	13,59916667	RIPA (FAGNANO)	661	CL-IV
RNR	40,92722222	15,66888889	RIONERO IN VULTURE	673	CL-V
RSN	39,57064800	16,63016100	ROSSANO	433	CL-II
RTI	42,43027778	12,82111111	RIETI (CAB. ENEL)	380	CL-IV
SCF	42,26472222	13,99777778	SCAFA	128	CL-IV
SCI	38,25581700	15,71467900	SCILLA	81	CL-III
SCL	39,77388889	15,80333333	SCALEA	2	CL-VI
SCRO	41,71000000	14,99000000	S. CROCE DI MAGLIANO		CL-IV
SCV	41,30636200	14,88044600	S. MARCO DEI CAVOTI	715	CL-VI
SDN	39,70820600	16,04610300	S. DONATO DI NINEA	775	CL-II
SELE	42,88921600	12,92797500	SELLANO EST		CL-III
SELI	41,62100000	14,87500000	S. ELIA A PIANISI		CL-III
SELW	42,88621000	12,92180600	SELLANO OVEST		CL-VII
SEM	46,48555556	10,26888889	SEMOGO	1.350	CL-II
SER	43,07117900	12,95313700	SERRAVALLE DI CHIENTI		CL-V
SGV	39,26334400	16,68976200	S. GIOVANNI IN FIORE	1.166	CL-III
SLC	40,39107100	15,63266200	SALA CONSILINA	1.040	CL-III
SMAP	41,86900000	15,01100000	S. MARTINO IN PENSILIS		CL-IV
SMC2	45,01861111	10,63222222	S. MATTEO DELLE CHIAVICHE - 2	20	CL-IV
SMT	46,33972222	13,06138889	SOMPLAGO CENTRALE - CUNICOLO POMPE	413	CL-V
SNG	43,68500000	13,22666667	SENIGALLIA	100	CL-IV
SNN	41,83250000	15,57222222	SANNICANDRO GARGANICO	220	CL-II
SPA	40,03531600	16,33453600	S. PAOLO ALBANESE	856	CL-I

Station_Code	Latitude	Longitude	Station_Name	Altitude (m)	Spectral classification
SPL	42,73611111	12,73694444	SPOLETO	365	CL-II
SPM	42,72166667	12,75166667	SPOLETO (MONTELUCO)	775	CL-II
SPS	39,34020600	16,44912000	SPEZZANO DELLA SILA (CAMIGL.)	1.305	CL-III
SRB	44,86638889	10,45527778	SORBOLO	27	CL-III
SRC0	46,22638889	12,99833333	S. ROCCO	420	CL-I
SRT	37,16277778	15,03027778	SORTINO	445	CL-IV
SSA	38,16890000	15,78990000	S. STEFANO IN ASPROMONTE	780	CL-VII
SSG	43,58666667	12,08305556	SANSEPOLCRO GRAGNANO	521	CL-II
SST	44,23222222	10,76750000	SESTOLA	1.002	CL-II
SSV	41,67944444	15,38611111	S. SEVERO	78	CL-VI
STF	43,90811200	11,79445700	S. SOFIA	642	CL-V
STG	41,56666667	14,23250000	S. AGAPITO	405	CL-I
STR	41,02083333	15,11500000	STURNO	575	CL-III
STS	43,94222222	11,90527778	S. SOFIA	268	CL-VI
SVN	37,68308600	15,12996600	S. VENERINA	294	CL-II
SVT	42,39694444	13,31361111	S. VITTORINO (L'AQUILA)	700	CL-I
TAO	37,85235200	15,28628300	TAORMINA	261	CL-II
TDG	40,79722222	14,38305556	TORRE DEL GRECO	178	CL-IV
TLM1	46,38250000	12,98166667	TOLMEZZO CENTRALE - DIGA AMBIESTA 1	536	CL-III
TOR	38,04438700	14,81464000	TORTORICI	554	CL-I
TPA	38,67364500	15,88919200	TROPEA	93	CL-II
TRC	46,22611111	13,20972222	TARCENTO	230	CL-I
TRF	38,26432400	15,63419400	TORRE FARO	3	CL-II
TRG	45,52527778	11,13444444	TREGNAGO	499	CL-I
TRN	42,55305556	12,60055556	TERNI	112	CL-II
TRR	40,61888889	16,15638889	TRICARICO	650	CL-VI
TRT	44,89250000	8,88250000	TORTONA	210	CL-I
TTP	42,01694444	14,16916667	TARANTA PELIGNA	450	CL-II
UMB	43,25388889	12,25611111	UMBERTIDE	617	CL-I
VBM	38,71377600	16,12387100	VIBO MARINA	56	CL-II
VBV	38,67787200	16,10653300	VIBO VALENTIA	546	CL-I
VGD1	44,11916667	10,30194444	VAGLI CENTRALE - BASE DIGA 1	560	CL-VII
VGG	39,96611111	16,04916667	VIGGIANELLO	370	CL-VI
VGL	44,11000000	10,28972222	VAGLI - PAESE	587	CL-III
VLB	41,75916667	13,98888889	VILLETTA BARREA	980	CL-II
VSE	42,11111111	14,70972222	VASTO (EUROPA)		CL-III
VSS	41,87750000	16,16555556	VIESTE	7	CL-VII
VTT	36,94777778	14,51861111	VITTORIA	162	CL-VII
VZZ	37,16361111	14,75472222	VIZZINI	655	CL-VI
ZCC	44,32416667	10,97083333	ZOCCA	652	CL-VI
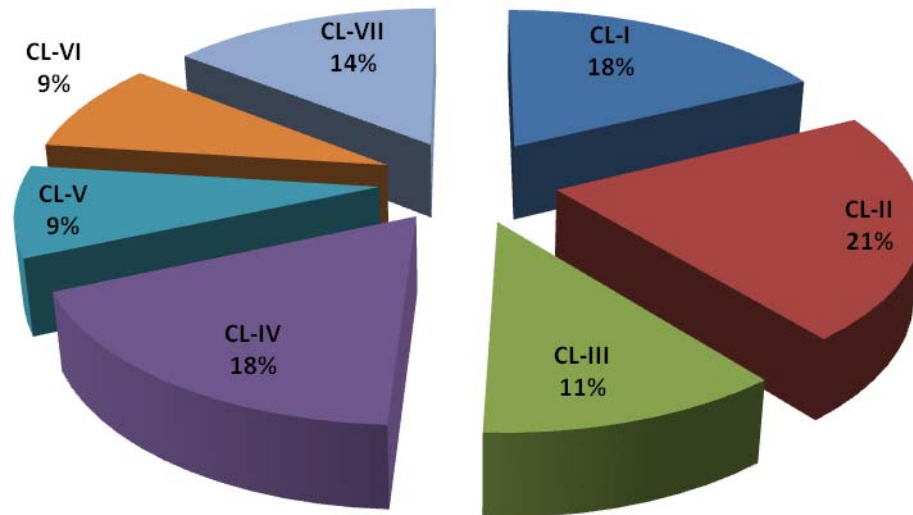
Figure 2. Percentage distribution of different spectral classes for ITACA sites with single or multiple recordings.

References

Di Alessandro, C., L. F. Bonilla, A. Rovelli, O. Scotti (2008). Influence of site classification on computing empirical ground-motio prediction equations in Italy, EOS Trans. Am. Geophys. Un., 89 (53), Fall Meeting Suppl., Abstract S12A-05.

Fukushima Y., L. F. Bonilla, O. Scotti, and J. Douglas (2007). Site classification using horizontal-to-vertical response spectral ratios and its impact when deriving empirical ground motion prediction equations, J. Earthq Eng., 11, 712-724.

Zhao, J. X., K. Irikura, J. Zhang, Y. Fukushima, P. G. Somerville, A. Asano, Y. Ohno, T. Oouchi, T. Takahashi and H. Ogawa (2006). An Empirical Site-Classification Method for Strong-Motion Stations in Japan Using H/V Response Spectral Ratio, Bull. Seism. Soc. Am., 96, 914-925.

Project S4: ITALIAN STRONG MOTION DATA BASE

*Responsibles: Francesca Pacor, INGV Milano – Pavia
and Roberto Paolucci, Politecnico Milano*

http://esse4.mi.ingv.it

Appendix # E

EC8 subsoil and topographic classification of ITACA stations
(version 3.0)

June 2010

edited by:

UR2 - Giuseppe Di Capua, INGV Roma
UR6 - Giuseppe Lanzo, Sapienza University of Rome
UR2 - Silvia Peppoloni, INGV Roma

1. Scope and methodology

The EC8 site classification based on the surface geology (see Appendix A) was subsequently "corrected" in the following cases:

a) availability of more detailed geological information;
b) geological "expert" evaluation;
c) flat H/V spectra from earthquake recordings (classified as CL-V by Di Alessandro et al., 2008) to evaluate rock site (subsoil class: A) (see Appendix D);
d) photos of the sites;
e) Shear wave velocity profiles from in situ measurements (see Appendix C).

The EC8 topographic classification using a GIS based semiautomatic method with "by-hand" corrections using topographic maps and/or Google Earth software have also been provided for many stations (see Appendix B).
At the end of the second year activity the EC8 site classification, version 3.0, according to the EC8 subsoil classes (Table 1) and EC8 topographic categories (Table 2), has been produced for ITACA stations (see Table 3 at end of this Appendix).
The subsoil class values are marked with an asterisk when they were assessed only by the surface geology. The values of topographic category are marked with an asterisk when they were evaluated by GIS method, but they have not been verified using topographic maps and/or Google Earth software.

Table 1. EC8 subsoil classes.

Subsoil class	Description	Vs_{30} (m/s)
A	Rock or other rock-like geological formation, including at most 5m of weaker material at the surface	> 800
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of m in thickness, characterised by a gradual increase of mechanical properties with depth	360 – 800
C	Deep deposits of dense or medium-dense sand, gravel or stiff clay with thickness from several tens to many hundreds of m	180 – 360
D	Deposits of loose-to-medium cohesionless soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil	<180
E	A soil profile consisting of a surface alluvium layer with Vs values of type C or D and thickness varying between about 5m and 20m, underlain by stiffer material with vs > 800 m/s	-------

Table 2. EC8 topographic categories.

Topographic category	Description
T1	Flat surfaces, isolated slopes or reliefs with average inclination i ≤ 15°
T2	Slopes with average inclination i > 15°
T3	Reliefs with ridge top width much smaller than the base, and average inclination 15° ≤ i ≤ 30°
T4	Reliefs with ridge top width much smaller than the base, and average inclination i > 30°

The figure 1 shows the percentage distribution of EC8 subsoil classes obtained for ITACA sites, using the methodology described in the Deliverable D10. Most sites fall into class A, while the percentage of sites in classes B is slightly higher than that of sites in class C. Few sites are in classes D and E, but this was an expected result, on the basis of the geology and the stratigraphic conditions more commonly encountered in the Italian territory.
Figure 2 shows, for each EC8 subsoil class obtained for sites with Vs profile (Vs_{30}), the distribution of EC8 categories classified for the same sites by the surface geology.
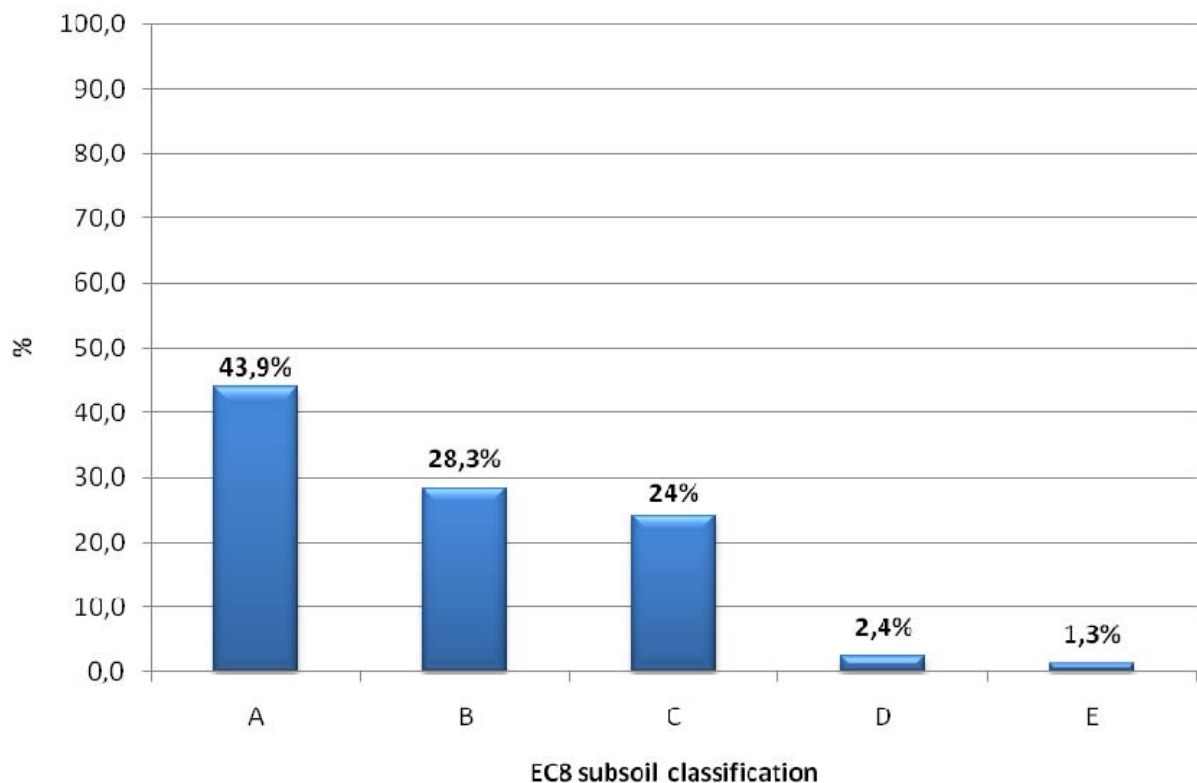
Figure 1. Percentage distribution of EC8 subsoil classes (version 3.0) for ITACA sites.

A very good correspondence is observed for class A (82% of sites in class A* by surface geology also fall into class A when considering the Vs_{30}). The correspondence in the class B is much less evident. If we consider the class C, the correspondence is obtained in 48% of sites, while a lack of correspondence is obtained for sites in class D, which on the basis of surface geology in all cases fall into class C*. Sites in class E are classified as class A* and B* by surface geology, but this was an expected result for the inherent difficulty of classifying the sites using only a geological methodology.

According to the spectral classification, CL-V sites are those with predominant period not known and flat H/V. These are considered rock sites and then fall into EC8 class A.

If we consider, for CL-V sites, the site classification by surface geology in the 67% (18 sites) the site has been classified in class A*, in the 22% (4 sites) in class B* and in the 11% (2 sites) class C* (Figure 3). A similar comparison is not very significant when sites classified CL-V have been also classified with the Vs_{30}, since in this case the velocity profiles are only available for four sites. In any case, 2 sites fall into class A and other 2 into class B.
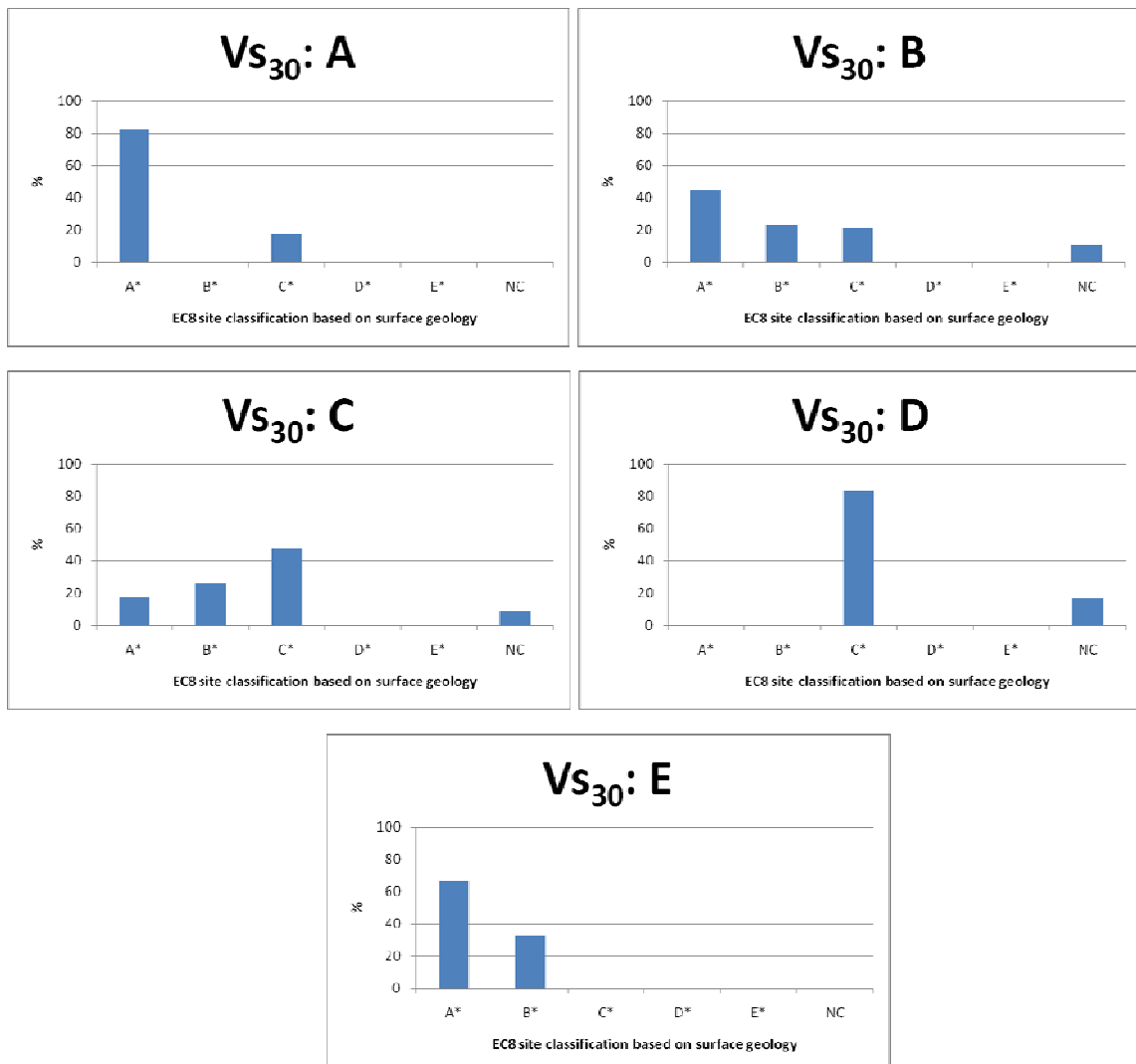
Figure 2. Percentage distribution of EC8 subsoil classes by surface geology for ITACA sites classified by Vs_{30}.
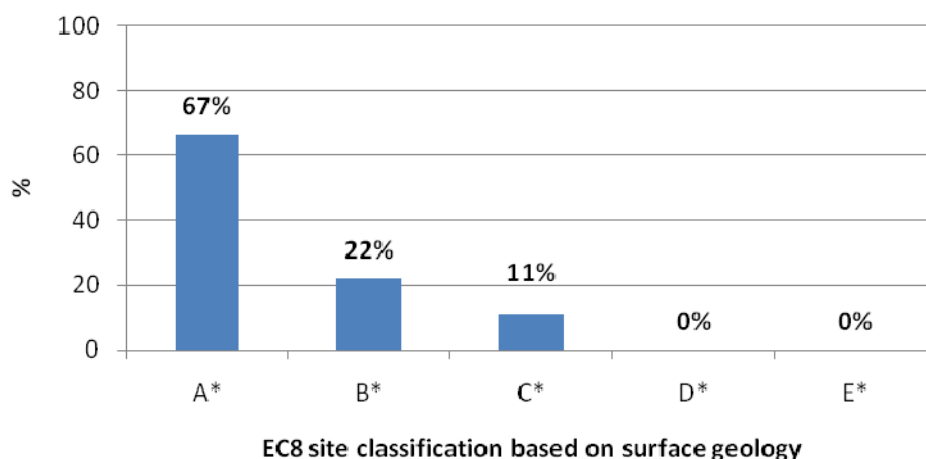
Figure 3. Percentage distribution of EC8 subsoil classes by surface geology for ITACA sites classified in CL-V spectral class.

Table 3. EC8 subsoil classification (version 3.0) and EC8 topographic classification (version 1.0) of ITACA sites.

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
ACR	39,48905900	16,37986000	ACRI	707	A*	T1
ALC	37,97444444	12,95805556	ALCAMO	303	A*	T1
ALD	39,92981000	16,46534900	ALBIDONA	708	A*	T2*
ALF	44,50138889	12,03305556	ALFONSINE	6	C*	T1
ALT	40,55611111	15,39500000	AULETTA (PETINA)	343	A	T2
AMN	39,13672600	16,07964700	AMANTEA (CAB. ENEL)	98	A*	T1
AMT	42,63246000	13,28617600	AMATRICE	950	A*	T1
ANC	43,62027778	13,51611111	ANCONA	92	A*	T1
ANNI	43,05339000	12,85663000	ANNIFO		C*	T1
ANP	43,60222222	13,47416667	ANCONA - PALOMBINA	47	C	T1
ANR	43,62111111	13,51277778	ANCONA - ROCCA	48	B	T1
ANT	42,41811000	13,07859800	ANTRODOCO	568	A*	T1
ANT0	43,58361111	13,51305556	ANCONA - TORRE D'AGO		A*	T1
ANZ	41,44972222	12,62638889	ANZIO	10	C*	T1
ANZI	40,51601000	15,92506000	ANZI	1092	A*	T3
APR	46,15444444	10,15805556	APRICA	1210	C*	T1
AQA	42,37553000	13,33929800	L'AQUILA - V. ATERNO - F. ATERNO	693	B	T1
AQF	42,38053900	13,35474000	L'AQUILA - V. ATERNO - FERRIERA	836	B*	T2
AQG	42,37347400	13,33702600	L'AQUILA - V. ATERNO - COLLE GRILLI	721	B	T1
AQI	42,34490000	13,40090000	L'AQUILA - V. ATERNO - AQUIL PARK I	730	B*	T1*
AQK	42,34496700	13,40094900	L'AQUILA - V. ATERNO - AQUIL PARK IN	726	B	T1
AQM	42,37864300	13,34926200	L'AQUILA - V. ATERNO - IL MORO	724	A*	T1
AQP	42,38368600	13,36859800	L'AQUILA - V. ATERNO - M. PETTINO	1193	A	T3

6

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
AQT1	42,37805556	13,34555556	L'AQUILA - V. ATERNO - PONTICELLO 1		B*	T1
AQT2	42,37805556	13,34555556	L'AQUILA - V. ATERNO - PONTICELLO 2		B*	T1
AQU	42,35388000	13,40193000	AQUILA CASTELLO	729	B*	T1*
AQV	42,37722222	13,34388800	L'AQUILA - V. ATERNO - CENTRO VALLE	692	B	T1
ARE	38,56294300	16,21143300	ARENA (CAB. ENEL)	534	B*	T2*
ARG	44,63074500	11,82516200	ARGENTA	1	D	T1
ARI	41,15250000	15,09111111	ARIANO IRPINO	750	A*	T2*
ARL	41,05706800	14,54292800	AIROLA	504	A*	T2*
ARN	41,02694444	14,46888889	ARIENZO	92	E	T1
ARO	43,46630100	11,88286800	AREZZO (NUOVA)	345	A*	T1
ARQ	42,77222222	13,29444444	ARQUATA DEL TRONTO	700	A*	T2
ARR	41,14176200	15,08204200	ARIANO IRPINO	644	B*	T1
ART	43,83472222	7,85138889	ARMA DI TAGGIA	10	C*	T1
ARZ	43,46444444	11,88916667	AREZZO	300	A*	T1
ASG	45,85583333	11,47388889	ASIAGO (ROANA)	974	A*	T1
ASS	43,07498200	12,60414100	ASSISI	390	A*	T3
ATC	41,62250000	13,79416667	ATINA - COLLE		A*	T2*
ATM	41,60250000	13,78555556	ATINA - MONTE PRATO		A*	T3
ATN	41,62027778	13,80138889	ATINA	440	A*	T2
ATP	41,64500000	13,78333333	ATINA - PRETURA ESTERNO		A*	T2
ATQ	41,64500000	13,78333333	ATINA - PRETURA PRIMO PIANO		A*	T2
ATR	41,64500000	13,78333333	ATINA - PRETURA PIANO TERRA		A*	T2
ATS	41,64083333	13,79361111	ATINA - SERBATOIO		A*	T2
ATS0	41,64083300	13,79361100	ATINA SERBATOIO		A*	T2
ATT	41,64500000	13,78333333	ATINA - PRETURA TERRAZZA		A*	T2
AUG	37,24158900	15,23996400	AUGUSTA (CAB. ENEL)	53	A*	T1
AUL	44,20875900	9,97307000	AULLA	176	A*	T1
AUP	46,50645400	13,25634300	AUPA	960	B*	T1
AVL	40,92266000	14,78720000	AVELLINO	423	B*	T1
AVS	46,29193300	13,05580000	AVASINIS - TRASAGHIS	206	C*	T1
AVT	40,31972222	17,70361111	AVETRANA	32	A*	T1
AVZ	42,02745800	13,42592900	AVEZZANO	746	C	T1
BAG8	45,82280000	10,46640000	BAGOLINO	807	A*	T2*
BBB	43,70944444	11,82583333	BIBBIENA	400	B*	T1
BBN	43,74764600	11,82142800	BIBBIENA (NUOVA)	471	A	T1
BCC	42,81295300	12,91629400	BORGO CERRETO - CAMPO SPORTIVO	355	B	T1
BCL	38,18222222	15,23333333	BARCELLONA P. GOTTO (MILAZZO)	26	C*	T1
BCN	40,63434600	15,38237600	BUCCINO	660	C*	T1
BCT	42,81561100	12,91538300	BORGO CERRETO - TORRE	370	A*	T1
BDA	44,51055556	9,62833333	BEDONIA - PISCINE	530	B*	T1
BDG	44,50805556	9,11888889	BEDONIA (GALLARETO)		A*	T2*
BDT	43,70677200	12,18803600	BADIA TEDALDA	795	A*	T3
BGI	40,83083333	15,06805556	BAGNOLI IRPINO	672	B	T3

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
BGL	43,99583100	10,57691600	BAGNI DI LUCCA	450	A*	T2*
BGN	44,32055556	9,99027778	BAGNONE	362	B	T1
BGR	43,88951100	11,99129100	BAGNO DI ROMAGNA	556	A*	T1
BLS	41,58166667	13,80222222	BELMONTE CASTELLO		A*	T2*
BLV	40,65056500	15,51283200	BALVANO	979	B*	T1*
BND	44,48888889	9,76888889	BEDONIA	477	C*	T1
BNE	41,12755600	14,78488200	BENEVENTO (NUOVA)	221	B*	T1
BNO	41,11972222	14,79472222	BENEVENTO - OSPEDALE	208	B*	T1
BNT	37,78080200	14,84471800	BRONTE	925	A*	T1
BNV	41,11694444	14,79750000	BENEVENTO	205	B	T1
BOI	41,48083333	14,47277778	BOIANO	495	A*	T2
BOJ	41,48445100	14,47210300	BOJANO (NUOVA)	537	C	T1
BORM	46,46940000	10,37640000	BORMIO	1235	A*	T1
BRA	46,00388889	9,76000000	BRANZI	825	C*	T1
BRB	43,95420500	11,21286700	BARBERINO DI MUGELLO	426	A*	T1
BRC	46,18694444	12,55361111	BARCIS	427	A*	T1
BRG	44,06833330	10,46111111	BARGA	268	A*	T1
BRH	44,20888889	11,76333333	BRISIGHELLA	150	B*	T1
BRM	44,12888889	11,11750000	BRASIMONE (CAMUGNANO)	842	A*	T1
BRN	40,47194444	15,63444444	BRIENZA	691	B	T1
BRO	38,60277778	16,34277778	BROGNATURO	770	A*	T1*
BRR	44,50833333	9,98888889	BERCETO (RABBONI)	813	C*	T1
BRS	42,32388889	13,59027778	BARISCIANO	920	B*	T1
BRT	44,50805556	9,98777778	BERCETO	812	C*	T1
BRZ	44,38083333	6,97000000	BERSEZIO	1590	B*	T1
BSA	41,00924700	15,35827100	BISACCIA (NUOVA)	934	A*	T1*
BSC	41,00972222	15,37611111	BISACCIA	887	A	T1
BSL	43,95666667	11,37694444	BORGO S. LORENZO	197	B*	T1
BSM	44,12083333	11,14166667	BRASIMONE - CENTRALE	890	A*	T2
BSS	42,19000000	13,84361111	BUSSI	266	E*	T2
BSZ	44,03151300	11,46733600	BORGO S. LORENZO (NUOVA)	682	A*	T1
BTT	41,99833333	13,54305556	BORGO OTTOMILA	652	D	T1
BTT2	41,99833333	13,54305556	BORGO OTTOMILA - 2 (CELANO)		C*	T1
BUI	46,22166667	13,09027778	BUIA	163	C	T1
BVG	42,93238900	12,61105600	BEVAGNA	205	D	T1
BVM	37,93150000	15,93600000	BOVA MARINA	184	A*	T1*
BVN	41,24861100	15,34222200	BOVINO	605	B	T1
BZZ	42,33750000	13,46611111	BAZZANO	597	B	T1
CAG	43,05444400	12,82888800	CASSIGNANO		A*	T2
CAMO	41,61700000	15,10200000	CASALNUOVO MONTEROTARO		A*	T1
CAN	41,20300000	15,47500000	CANDELA		B*	T1
CAPR	45,63720000	9,93450000	CAPRIOLO	215	B*	T1
CAS	47,04944444	12,12722222	CASERE (PREDOI)	1590	C*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
CASA	41,73900000	14,84600000	CASACALENDA		A*	T1*
CAST	41,70100000	14,73200000	CASTELLINO DEL BIFERNO		A*	T2*
CAT	37,44694444	15,04666667	CATANIA (PIANA)	10	D	T1
CATP	37,52762600	15,08040000	CATANIA PARCO GIOENI	155	A*	T1
CDA	45,15833333	9,70222222	CODOGNO (AGENZIA)	60	B*	T1
CDG	45,15833333	9,69805556	CODOGNO	60	B*	T1
CDI	37,49411000	14,64298800	CASTEL DI IUDICA	471	A*	T1
CDM	42,00277778	14,19972222	COLLE DI MACINE	793	A*	T2*
CDN	45,95888889	12,98416667	CODROIPO (NUOVA)	42	B*	T1
CDR	45,95888889	12,98416667	CODROIPO	42	B*	T1
CDRV1	42,81760000	12,91400000	CERRETO DI SPOLETO CEDRAV-1 (Master)	542	C*	T2
CDRV2	42,81671900	12,91465000	CERRETO DI SPOLETO CEDRAV-2 (Slave-a	545	C*	T2
CDRV3	42,81772600	12,91488000	CERRETO DI SPOLETO CEDRAV-3 (Last)	542	A*	T4
CDS	41,78714000	14,11187000	CASTEL DI SANGRO	932	A*	T2
CER	41,25950000	15,91020000	CERIGNOLA	176	B*	T1
CESM	43,00466500	12,90333200	CESI MONTE		A*	T1
CESV	43,00388800	12,90111100	CESI VALLE		C*	T1
CGL	43,53527778	12,62916667	CAGLI	277	A*	T2
CHT	42,36982700	14,14780900	CHIETI	109	B	T1
CLA	46,27217900	12,51455000	CLAUT	513	B*	T2
CLC	43,02938800	12,89127700	COLFIORITO CASERMETTE		C*	T1
CLF	43,03589800	12,92053800	COLFIORITO	753	D	T1
CLG	37,21163600	14,52077000	CALTAGIRONE	531	B	T1
CLL	43,47879800	11,26910400	CASTELLINA IN CHIANTI	687	A*	T1*
CLM	40,43553200	15,38344100	CORLETO MONFORTE	703	A*	T1
CLN	42,08522400	13,52072200	CELANO	803	A*	T2
CLP	40,91694444	15,43805556	CALITRI - PITTOLI	600	B*	T1
CLT	40,89833333	15,43861111	CALITRI	595	B	T3
CLV	37,81833333	13,89000000	CALTAVUTURO	620	A*	T1
CMB	41,56280000	14,65230000	CAMPOBASSO	709	B*	T1
CML	40,74698300	13,90129200	CASAMICCIOLA	171	B*	T2*
CMM	41,86832000	14,44984000	CASTIGLIONE MESSER MARINO	1137	A*	T2
CMO	46,09115000	13,51476600	CASTELMONTE	605	A*	T3
CMR	41,83342700	14,71202900	CASTELMAURO	708	A*	T1
CNA	45,97222222	12,43583333	CANEVA CENTRALE - POZZO	150	A*	T2
CNB	40,87527778	15,32694444	CONZA - BASE	450	B*	T2
CNC	41,07750000	14,02416667	CANCELLO ARNONE	7	D*	T1
CNF	44,11052300	10,41111900	CASTELNUOVO DI GARFAGNANA	306	A*	T1
CNG	45,88305556	12,28833333	CONEGLIANO 5	63	B*	T1
CNM	41,61822500	15,10451700	CASALNUOVO MONTEROTARO (NUOVA)	462	A*	T1
CNP	40,87111111	15,30750000	CONZA - PIANA	443	B*	T1
CNT	41,90000000	12,48333333	CANTERNO - CENTRALE		C*	T1
CNV	45,96898700	12,44904500	CANEVA	101	C*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
CNV0	40,87166667	15,32916667	CONZA - VETTA	594	B*	T2*
CONC	45,60600000	10,21700000	CONCESIO	126	B*	T1
CONT	42,40900000	12,76600000	CONTIGLIANO		A*	T2*
COP	40,37823500	16,04064400	CORLETO PERTICARA	775	A*	T1*
COR	39,11772200	16,38002000	CORACI (CAB. ENEL)	879	A*	T1*
COS	39,28907000	16,25768300	COSENZA (NUOVA)	376	A*	T2*
CPC	44,92333333	11,87555556	COPPARO (COCCANILE)	2	C*	T1
CPP	44,89361111	11,82916667	COPPARO	4	C*	T1
CPS	42,27200000	13,75800000	CAPESTRANO	585	B	T2*
CR1	40,88972222	15,29638889	CAIRANO 1	455	B*	T1
CR2	40,88694444	15,31222222	CAIRANO 2	450	C*	T1
CR3	40,88666667	15,33416667	CAIRANO 3	438	B*	T1
CR4	40,88611111	15,34805556	CAIRANO 4	443	B*	T1
CRA	39,28888800	16,24555500	COSENZA (Ragonesi) (cab. ENEL)	315	A*	T1
CRC	41,45972222	14,71944444	CERCEMAGGIORE	926	A*	T3
CRD	46,52500000	12,11805556	CORTINA D'AMPEZZO	1550	B*	T2*
CRG	46,24611111	8,34000000	CREGO (CRODO)	625	B*	T2*
CRL	37,81805556	13,29388889	CORLEONE	600	A*	T1
CRN	39,07750000	17,11138889	CROTONE (MONTEDISON)	60	B*	T1
CRO	43,26784100	11,98055000	CORTONA	371	A*	T1
CRP1	45,05027778	9,88000000	CAORSO PAESE 1	44	C*	T1
CRP2	45,05027778	9,88000000	CAORSO PAESE 2	44	C*	T1
CRR1	42,81972222	12,91722222	CERRETO DI SPOLETO - COMUNE 1	557	A*	T4
CRR2	42,81972222	12,91722222	CERRETO DI SPOLETO - COMUNE 2	557	A*	T4
CRR3	42,81861111	12,91694444	CERRETO DI SPOLETO - PALAZZO NOBILI	545	A*	T2
CRS	45,07361111	9,87027778	CAORSO - CENTRALE	45	C*	T1
CRT	39,07750000	17,12666667	CROTONE	9	C*	T1
CRV	40,70777778	17,65166667	CAROVIGNO	144	A*	T1
CS2	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 37,73	38	C*	T1
CS3	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 39,00	39	C*	T1
CS4	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 61,70 - 1	62	C*	T1
CS5	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 61,70 - 2	62	C*	T1
CS6	45,07361111	9,87027778	CAORSO CENTRALE - QUOTA 90,00	90	C*	T1
CSA	43,00799700	12,59058100	CASTELNUOVO (ASSISI)	188	C*	T1
CSAD	43,00700000	12,59100000	CASTELNUOVO (ASSISI)		C*	T1
CSC	42,71888889	13,01333333	CASCIA	677	A*	T3
CSC1	42,81722222	12,91500000	CERRETO DI SPOLETO - CONSERVATORIO 1	500	C*	T3
CSC2	42,81722222	12,91500000	CERRETO DI SPOLETO - CONSERVATORIO 2	500	C*	T3
CSD	42,75305556	12,00416667	CASTEL VISCARDO	488	A*	T1
CSE1	45,07361111	9,87027778	CAORSO CENTRALE - EMERGENZA 1		C*	T1
CSE2	45,07361111	9,87027778	CAORSO CENTRALE - EMERGENZA 2		C*	T1
CSF	46,28111111	11,43722222	CASTEL DI FIEMME (CAPRIANA)	950	C*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
CSI	42,71888889	13,01333333	CASCIA - PRONTO INTERVENTO		A*	T3
CSL	40,63166667	16,92805556	CASTELLANETA	227	B*	T1
CSN	44,13700500	12,24140800	CESENA	100	B	T1*
CSN0	41,52305556	13,86361111	CASSINO - SANT'ELIA		C*	T1
CSO	42,09625200	13,08346000	CARSOLI	653	C*	T1
CSO1	42,10090300	13,08811200	CARSOLI1	712	A*	T2
CSP	44,37777778	11,58000000	CASTEL SAN PIETRO TERME	99	B*	T1
CSR	42,75500000	13,00416667	CASCIA - PETRUCCI	617	A*	T2
CSS	41,48579000	13,82309000	CASSINO	174	B	T2
CST	45,65916667	11,90166667	CASTELFRANCO 5	42	B*	T1
CST1	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 1	550	A*	T4
CST2	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 2	550	A*	T4
CST3	42,82027778	12,91750000	CERRETO DI SPOLETO - TEATRO 3	550	A*	T4
CSV	42,29750000	13,62916667	CASTELNUOVO (SAN PIO)	819	B*	T1
CSZ	39,30416667	16,24722222	COSENZA	240	B*	T1
CTC	43,46305556	12,25305556	CITTÀ DI CASTELLO	308	B	T1
CTD	42,38750000	12,94750000	CITTADUCALE	485	B*	T2
CTL	43,95510500	12,73582600	CATTOLICA	12	C	T1
CTN	38,91555556	16,58833333	CATANZARO	377	A*	T1
CTS	43,48500000	12,22361111	CITTA' DI CASTELLO (REGNANO)	297	C*	T1
CTV	38,34983100	16,08051300	CITTANOVA	469	B*	T1
CTZ	38,94073500	16,58507500	CATANZARO (PONTEGRANDE)	489	A*	T1
CVD	46,08805556	13,23194444	CIVIDALE DEL 6	126	B*	T1
CVL	39,81685300	16,19475400	CASTROVILLARI	483	A*	T1
CVM	42,99409100	11,28230500	CIVITELLA MARITTIMA	352	A*	T1
CVT	44,00527778	11,93750000	CIVITELLA DI ROMAGNA	226	A*	T2
DCM	43,89123500	11,51801100	DICOMANO	200	A	T1
DMN	44,31500000	7,27111111	DEMONTE	770	C*	T1
EBO	40,54027778	14,98916667	EBOLI	18	B*	T1
FAZ	44,29801600	11,89074600	FAENZA (NUOVA)	71	C	T1
FDF	38,78915800	16,30006200	FILADELFIA (CIMITERO)	654	A*	T1*
FGV	43,60145600	11,41161900	FIGLINE VALDARNO	345	A*	T1
FHC	42,76111111	13,21027778	FORCA CANAPINE (ARQUATA TRONTO)	1473	A*	T2
FIE	43,80725100	11,29438500	FIESOLE	351	A*	T1
FLD	38,77963300	16,29089500	FILADELFIA (CAB.ENEL)	591	B*	T1*
FLP	46,02444444	11,91833333	FELTRE (PASQUER)	275	C*	T1
FLT	46,01944444	11,91194444	FELTRE	305	A*	T1*
FMC	40,88138889	15,25500000	TEORA - CONTRADA FIUMICELLO		B*	T1*
FMG	42,26802800	13,11722000	FIAMIGNANO	1071	A*	T2
FNP	38,01722222	14,16472222	FINALE DI POLLINA	62	A*	T1
FNZ	44,30416667	11,88722222	FAENZA	28	C*	T1
FOR	44,19940900	12,04191600	FORLI' (NUOVA)	77	C	T1
FORC	42,96100000	12,95200000	FORCELLA		A*	T2

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
FRC	46,22111111	12,99666667	FORGARIA CORNINO	216	B	T1
FRE	44,12928000	11,39785000	FIRENZUOLA	457	A*	T1
FRE1	44,11806900	11,38287300	FIRENZUOLA1	461	C	T1*
FRL	44,21111111	12,07777778	FORLI'	2	B*	T1
FRN	44,68555556	10,10777778	FORNOVO	275	B*	T1
FRR	38,05111111	16,13250000	FERRUZZANO (AFRICO NUOVO)	18	A*	T1
FRR	40,49214200	16,45776900	FERRANDINA	530	B*	T2*
FRS	44,72527778	10,09166667	FORNOVO (SANT'ANDREA)	200	A*	T1
FRZ	38,03794667	16,08746333	FIRENZUOLA	420	A*	T1
FSMI	42,95350200	12,69961000	FOLIGNO S. MARIA INFRAPORTAS		C*	T1
FST	44,11750000	11,37750000	FIRENZUOLA (SANTERNO)	420	C*	T1
FVZ	44,23824700	10,13108900	FIVIZZANO	429	E	T1
GAI	45,65927500	10,61626500	GAINO (TOSCOLANO MADERNO)	398	B*	T2*
GBB	43,35700000	12,60200000	GUBBIO	407	A*	T1
GBP	43,31381600	12,58955000	GUBBIO PIANA		C	T1
GEL	37,08416667	14,26888889	GELA (AGENZIA)	12	C	T1
GLD	41,50972222	14,75694444	GILDONE	755	A*	T1
GLL	41,66111111	13,79777778	GALLINARO		A*	T2*
GLT	43,23310100	12,78900100	GUALDO TADINO	621	C*	T1
GMB	38,16666667	15,82694444	GAMBARIE (S. STEFANO)	1305	A*	T2*
GMN	46,29196000	13,12313000	GEMONA DEL FRIULI	222	B	T1
GNL	40,84331500	16,03311900	GENZANO DI LUCANIA		B*	T1
GNV	44,43173200	8,93167600	GENOVA	361	A	T2
GRD	42,17850500	14,17985100	GUARDIAGRELE	702	A*	T2*
GRG1	41,25833333	13,83277778	GARIGLIANO - FREE FIELD 1	5	C	T1
GRG2	41,25833333	13,83277778	GARIGLIANO - FREE FIELD 2	5	C	T1
GRM	40,31027778	15,88527778	GRUMENTO NOVA	575	C	T1
GRN	41,81250000	13,31833333	GUARCINO	1200	A*	T2*
GRR	37,72611111	15,16277778	GIARRE	240	A*	T1
GRS	45,36972222	7,28000000	GROSCAVALLO	1060	C*	T1
GSA	42,42068900	13,51936200	GRAN SASSO (LAB. INFN ASSERGI)	1062	B	T1
GSG	42,46000000	13,55000000	GRAN SASSO (LAB. INFN GALLERIA)	1200	A*	T1
GSN	41,30166667	14,44583333	GIOIA SANNITICA	275	C*	T1
GSS	40,63090000	16,28190000	GRASSANO		C*	T1
GTR	38,44805500	15,91805500	GIOIA TAURO (CAB. ENEL)	20	B*	T1
GVD	45,61000000	10,38361111	GAVARDO (GAZZINO - VALLIO TERME)	315	E*	T1
GVR	45,57888889	10,43638889	GAVARDO	196	B*	T1
GVT	40,64500800	15,85582300	COSTA DELLA GAVETA	720	A*	T1
ISD	45,27333333	10,96833333	ISOLA DELLA SCALA	31	B*	T1
ISG	42,50333333	13,64972222	ISOLA DEL GRAN SASSO	433	A*	T1
ISI	36,79776000	14,89235700	ISPICA	276	A	T1
ISP	42,50361111	13,64972222	ISOLA DEL GRAN SASSO-CABINA PRIMARIA	435	B*	T1
ISR	41,61063400	14,23587900	ISERNIA	539	A*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
LARI	41,80500000	14,91900000	LARINO		A*	T1*
LCA	37,11416667	13,91250000	LICATA (AGENZIA)	11	C*	T1
LCT	37,10944444	13,92805556	LICATA	7	A*	T1
LDP	42,03916900	14,18263000	LAMA DEI PELIGNI	780	A*	T1
LEON	45,45820000	10,12340000	CAPRIANO DEL COLLE	92	C*	T1
LGN	40,13111100	15,75849600	LAGONEGRO	809	B	T1
LMT	38,88722222	16,25750000	LAMEZIA TERME	9	C*	T1
LMZ	38,91867100	16,25281100	LAMEZIA TERME (S.EUFEMIA)	63	C*	T1
LNG	44,65555556	10,31305556	LANGHIRANO (LESIGNANO BAGNI)	207	C*	T1
LNM	40,87833333	15,19194444	LIONI - MACELLO		C*	T1
LNS	42,56500000	12,98416667	LEONESSA	950	C*	T1
LNT	37,28841000	15,00225900	LENTINI	117	A*	T1
LOD	45,30722222	9,50400000	LODI	80	B*	T1
LPD1	42,01861111	14,16916667	LAMA DEI PELIGNI		C*	T1
LPR	38,46815100	14,95690300	LIPARI	67	A*	T1
LRG	40,02111111	15,89000000	LAURIA GALDO	739	B	T1
LRN	41,79802300	14,91743300	LARINO	503	A*	T2
LRS	40,04611111	15,83500000	LAURIA	425	A*	T2*
LS2	45,74640000	7,07040000	LA SALLE		B	-
LS4	45,74630000	7,07890000	ECOURS		B	-
LSN	41,85277778	15,36000000	LESINA	7	C*	T1
LSP	44,09614000	9,80791300	LA SPEZIA	107	A*	T2
LSS	42,55824300	12,96889400	LEONESSA (NUOVA)	1065	A*	T2
LTB	40,08760000	15,98090000	LATRONICO BAGNI		A*	T1
LTC	41,41750000	12,80638889	LATINA CENTRALE - COLONNA TERMICA	5	D*	T1
LTN1	41,41750000	12,80638889	LATINA - CENTRALE 1	5	D*	T1
LTN2	41,41750000	12,80638889	LATINA - CENTRALE 2	5	D*	T1
LTP	41,41750000	12,80638889	LATINA CENTRALE - PILE C A P	5	D*	T1
LTR	40,08765000	16,00948300	LATRONICO		A*	T2*
LTS	40,08910000	16,01130000	LATRONICO SCUOLA		A*	T1*
LVN	40,78481300	15,30462600	LAVIANO	558	A*	T1
LVR	43,49996600	10,41260100	LIVORNO	295	A*	T1
MAA	46,18666667	13,06944444	MAJANO - ASCENSORE	169	C	T1
MAD	46,36444444	9,36000000	MADESIMO	1510	A*	T1
MAI	46,18666667	13,07333333	MAIANO	164	C*	T1
MAJ	46,18233900	13,06892200	MAJANO (NUOVA)	214	B*	T1
MAP	46,18666667	13,06944444	MAJANO - PRATO	169	C	T1
MAR	40,67561700	16,58278500	MATERA	410	A*	T1
MAT	46,18666667	13,06944444	MAJANO - PIANO TERRA	169	C	T1
MCN	41,33929400	14,66354000	MORCONE	665	A*	T2*
MCR	43,79916667	12,44833333	MACERATA FELTRIA	290	C*	T2
MCS	43,99436600	12,10744100	MERCATO SARACENO (NUOVA)	190	A*	T1
MDC	44,48500000	11,64027778	MEDICINA	21	C*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
MDG	44,15972222	11,78777778	MODIGLIANA	197	A*	T1
MDN	44,64696700	10,88989200	MODENA	37	C	T1
MDT	44,13472222	11,83000000	MODIGLIANA (TREBBIO)	574	A*	T1
MER8	45,67250000	9,41820000	MERATE	350	B*	T1
MFG	38,18881200	15,54062700	MESSINA FORTE GONZAGA	199	A*	T2
MI01	42,35803500	13,50976800	PESCOMAGGIORE	740	A*	T1
MI02	42,35448700	13,47428300	PAGANICA	648	C*	T1
MI03	42,32741500	13,47569200	ONNA	581	C*	T1
MI03	42,32741500	13,47569200	ONNA	581	B	-
MI05	42,28947300	13,52525500	SANT'EUSANIO FORCONESE		B*	T1
MILA	45,48030000	9,23210000	MILANO	125	B*	T1
MJS	46,17805556	13,06250000	MAJANO - SAN MARTINO		B*	T1
MLC	45,81277778	10,85305556	MALCESINE	77	A*	T2*
MLD	44,11750000	12,07083333	MELDOLA	126	B*	T1
MLF	40,99440000	15,65270000	MELFI		B*	T1*
MLL	40,84340700	15,01105300	MONTELLA	671	A*	T1
MLR	40,24022700	15,86313800	MOLITERNO		A*	T1
MLT	38,61027778	16,07083333	MILETO	363	B*	T1*
MLZ	38,23194444	15,24388889	MILAZZO	53	E*	T2*
MMB	42,35888889	11,52972222	MONTALTO CENTRALE - BASE REATTORE	7	C*	T1
MMP	42,24855000	12,74855400	MOMPEO	474	A*	T3
MN4	42,35888889	11,52972222	MONTALTO CENTRALE - MOD N4	7	C*	T1
MNC1	42,35888889	11,52972222	MONTALTO DI CASTRO - CENTRALE 1	7	C*	T1
MNC2	42,35888889	11,52972222	MONTALTO DI CASTRO - CENTRALE 2	7	C*	T1
MND	41,63833333	15,89166667	MANFREDONIA	55	A*	T1
MNE	42,35888889	11,52972222	MONTALTO CENTRALE - PEDESTAL	7	C*	T1
MNF	43,06277778	13,18472222	MONTE FIEGNI (FIASTRA)	642	A*	T2
MNG	41,70324700	15,95898100	MONTE S. ANGELO	809	A*	T1
MNN	41,63400000	15,91100000	MANFREDONIA	27	A*	T1
MNP	42,25027778	14,03888889	LETTOMANOPPELLO	270	C*	T1
MNS	45,25277778	11,72277778	MONSELICE	5	C*	T1
MNT	43,13972222	11,18333333	MONTICIANO	361	A*	T1
MOG	44,17031900	11,76685300	MODIGLIANA	469	A*	T1*
MRA	39,98711000	15,73094000	MARATEA	535	A	T1
MRC	41,34388889	14,69166667	MORCONE	403	B*	T1
MRC	40,36240000	16,68820000	MARCONIA		B*	T1*
MRD	44,88833333	11,07277778	MIRANDOLA	18	C*	T1
MRH	41,34138889	16,19250000	MARGHERITA DI SAVOIA	3	C*	T1
MRL	40,75822100	15,47856500	MURO LUCANO	779	A*	T2
MRM	39,88320500	15,98955500	MORMANNO	919	A	T2*
MRN	44,88638889	11,07277778	MIRANDOLA (NAPOLI)	18	C*	T1
MRN	40,42533500	15,72930100	MARSICO NUOVO	795	C*	T1*
MRR	44,06194444	11,60250000	MARRADI	370	A*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
MRS	43,94444444	12,18055556	MERCATO SARACENO	190	A*	T1
MRT	40,78944444	14,76277778	MERCATO S. SEVERINO	155	B	T1
MRV	40,36135900	15,82648200	MARSICO VETERE	747	B	T1
MSC	42,52611111	13,34638889	MASCIONI (CAMPOTOSTO)	1332	A*	T1*
MSR	39,07695800	16,78974000	MESORACA (FILIPPA) (CAB. ENEL)	495	A*	T2*
MSS1	38,20694444	15,51583333	MESSINA 1	456	A*	T2*
MSS2A	38,20856100	15,51596600	MESSINA 2 (NUOVA)	475	A*	T2*
MST	37,92555556	14,36361111	MISTRETTA	925	A*	T2
MTC	41,49027778	13,81277778	MONTECASSINO (CASSINO)	512	A	T2*
MTL	43,24949700	13,00842800	MATELICA	365	C*	T1
MTM	46,19500000	13,53138889	MONTEMAGGIORE (SAVOGNA)	965	A*	T1
MTR	42,52402100	13,24479600	MONTEREALE	975	A*	T3
MTV	43,53277778	11,55694444	MONTEVARCHI	143	B*	T1
MZR	37,65277778	12,61083333	MAZARA DEL VALLO	17	B*	T1
MZZ	38,23412300	15,24513500	MILAZZO (NUOVA)	125	C*	T2*
NAD	40,87175000	14,28001000	NAPOLI EST	139	B*	T1
NAP	40,79925500	14,17960700	NAPOLI OVEST	205	B*	T3
NAS	38,11861111	14,78611111	NASO	470	A*	T2
NCB	43,10277700	12,80527700	NOCERA UMBRA BISCONTINI		C*	T1
NCH	38,96277778	16,31361111	NICASTRO (LAMEZIA TERME)	175	C*	T1
NCM	43,14917000	12,79722200	NOCERA UMBRA SALMATA		A*	T1
NCO	38,55304300	15,93804300	NICOTERA (SCUOLA)	271	A*	T1
NCR	43,11158300	12,78466600	NOCERA UMBRA	478	E	T1
NCR2	43,11158300	12,78466600	NOCERA UMBRA 2		E	T1
NCS	37,75111111	14,40027778	NICOSIA	780	B*	T2*
NCT	38,97500000	16,31388889	NICASTRO	246	C*	T1
NEVI	44,58100300	10,31287500	NEVIANO DEGLI ARDUINI	522	A*	T2*
NIC	38,55304000	15,93804600	NICOTERA (CAB. ENEL)	272	A*	T1
NIC0	38,55333333	15,93361111	NICOTERA	180	A*	T2
NIM	38,54416600	15,93500000	NICOTERA MARINA (CAB. ENEL)	25	C*	T1
NOCE	43,12000000	12,79200000	NOCERA UMBRA P.I.		A*	T1
NOR	42,79244200	13,09242200	NORCIA LE CASTELLINA		D*	T1
NOT	36,90000000	15,06833333	NOTO	171	A*	T1*
NRA	42,79583333	13,08861111	NORCIA - ALTAVILLA		D*	T1
NRC	42,79138889	13,09638889	NORCIA	609	B	T1
NRI	42,78861111	13,09694444	NORCIA - INA CASA		B*	T1
NRM	42,79527778	13,08472222	NORCIA - MULINO		D*	T1
NRN	42,51500000	12,51916667	NARNI	300	A*	T3
NRO	42,79750000	13,08388889	NORCIA - ORELLI		D*	T1
NRP	42,76916667	13,09694444	NORCIA - PANIFICIO		B*	T1
NRZI	42,78141600	13,09700000	NORCIA ZONA INDUSTRIALE		B	T1
NSC	37,15138889	14,39138889	NISCEMI	319	B*	T1
NTE	36,90959500	15,06923700	NOTO (AREA ENEL)	235	B	T1*

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
NVL	44,84194444	10,73055556	NOVELLARA	23	C	T1
NVR	38,01633100	15,13192700	NOVARA DI SICILIA	550	A*	T1
NVR0	38,01634600	15,13191900	NOVARA DI SICILIA (CAB. ENEL)	638	A*	T2
NZZ	44,78222222	8,35694444	NIZZA MONFERRATO	165	B*	T1*
OPB	40,86916667	15,20722222	OPPIDO BALZATA		A*	T1
ORC	41,95360600	13,64234600	ORTUCCHIO (NUOVA)	732	A*	T1
ORT	41,95611111	13,64583333	ORTUCCHIO	662	C*	T1
OVD	44,63670700	8,64244300	OVADA		C*	T1
PAGA	42,36000000	13,46000000	PAGANICA		C*	T1
PCB	42,55666667	13,33638889	POGGIO CANCELLI (BASE DIGA)	1298	A*	T1
PCH	36,71083333	15,09111111	PACHINO	47	B	T1
PDM	41,35535400	14,38537600	PIEDIMONTE MATESE	340	C*	T2
PGA	40,56859200	15,77885800	PIGNOLA	1018	B	T1
PGC	42,55861111	13,33916667	POGGIO CANCELLI (CAMPOTOSTO)	1334	A*	T1
PGG	42,32222222	13,54000000	POGGIO PICENZE	760	B*	T1
PGL	43,69555556	12,49833333	PEGLIO	465	A*	T3
PGN	41,45194444	13,79083333	PIGNATARO	58	B*	T1
PIC	42,85037600	11,68497500	PIANCASTAGNAIO	832	A*	T1
PIT	43,98964700	10,94455200	PISTOIA	537	A*	T2
PLB	42,06333333	12,76472222	PALOMBARA SABINA	350	A*	T1
PLC	40,18250000	16,65916667	POLICORO	26	C*	T1
PLL	38,02444444	15,65444444	PELLARO (CAB. ENEL)	80	C*	T1
PLM	38,36388800	15,85833333	PALMI (CAB. ENEL)	350	B*	T1*
PLN	37,99333333	14,14611111	POLLINA	700	A*	T4
PLP	45,82833333	7,03000000	PLANPINCIEUX (COURMAYER)	1580	B*	T2*
PLS	42,08250000	12,76472222	PALOMBARA SABINA S.S.636	265	A*	T1
PLT	39,00234200	16,31933800	PLATANIA (CAB. ENEL)	748	A*	T2*
PLZ	37,06834700	14,90975600	PALAZZOLO ACREIDE	657	E	T1*
PMI	38,35537700	15,85329200	PALMI	340	B*	T1*
PNC	42,84888889	11,70555556	PIANCASTAGNAIO	760	A*	T1
PNM	44,37995100	9,88165000	PONTREMOLI	355	C*	T2*
PNN	43,81722222	12,26138889	PENNABILLI	525	A*	T2
PNR	44,87777778	7,34444444	PINEROLO	355	B	T1
PNS	42,84555556	11,68666667	PIANCASTAGNAIO (NATALI)	740	A*	T1
PNT	41,49861111	13,68277778	PONTECORVO	115	A*	T1
PO11	45,25833333	8,19833333	TRINO CENTRALE - AREA PO1	155	B*	T1
PO12	45,25833333	8,19833333	TRINO CENTRALE - AREA PO2	155	B*	T1
POLC	40,19670000	16,70330000	POLICORO CINEMA		C*	T1*
POLM	40,20875900	16,66969300	POLICORO MUNICIPIO	89	B*	T1*
POPL	42,15700000	13,84200000	POPOLI		C*	T1
PPL	36,68341800	15,13377500	PORTOPALO DI CAPO PASSERO (CAB. ENEL	43	A*	T1
PRC	42,51111111	13,40972222	PROVVIDENZA CENTRALE - SALA TURBINE	1030	A*	T2

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
PRCI	42,87833300	13,03916600	PRECI		A*	T2
PRF	44,82527778	10,31194444	PARMA (FORNACE)	48	C*	T1
PRI	44,76944444	10,28277778	PARMA (ILSEA)	83	C*	T1
PRM	43,97833333	11,78250000	PREMILCUORE	450	A*	T2*
PRN	40,87138889	15,18666667	PROCISA NUOVA		C*	T1
PRP	42,51444444	13,40305556	PROVVIDENZA CENTRALE - POZZO PIEZOME	1344	A*	T2
PRS	40,54027778	14,98916667	PERSANO	28	B*	T1
PRT	44,14960000	10,92600000	PORRETTA TERME	837	A*	T1
PRV	42,51444444	13,40305556	PROVVIDENZA CENTRALE - CAMERA VALVOL	1278	A*	T2
PRZ	41,37916667	14,11388889	PRESENZANO	130	C*	T1
PSC	41,81204200	13,78919600	PESCASSEROLI	1242	A	T2*
PSL	41,52583333	13,78361111	POZZO SANTA LUCIA		A*	T2
PSP	40,83609400	15,39679700	PESCOPAGANO	986	A*	T1*
PSR	45,94931800	13,01413100	PASSARIANO	86	B*	T1
PSS	41,74555556	13,65361111	PESCOSOLIDO		A*	T2
PST	43,92638889	10,87694444	PISTOIA	100	A*	T2
PTF	41,69630000	14,70240000	PETRELLA TIFERNINA	569	A*	T1
PTI	43,06638889	13,65611111	PETRITOLI	319	B*	T2
PTL	43,42666667	12,44861111	PIETRALUNGA	672	A*	T3
PTR	37,56666667	14,90972222	PATERNO'	228	A*	T1
PTT	38,13441500	14,97504900	PATTI - CABINA PRIMARIA	150	A*	T1
PTT0	38,13441500	14,97504900	PATTI (CAB. ENEL)	189	C	T1
PTT1	38,14750000	14,97000000	PATTI	27	C*	T1
PTV	45,27527778	10,09194444	PONTEVICO	47	B*	T1
PTZ	40,64823900	15,80811000	POTENZA	766	B*	T1
PVF	44,33310000	10,82520000	PAVULLO DEL FRIGNANO	745	A*	T1
PVS	43,66888889	12,04388889	PIEVE SANTO STEFANO	442	B	T1*
PZ1	40,63333333	15,80000000	POTENZA - SAN REMO		B*	T2
PZ2	40,63333333	15,80000000	POTENZA - SAN VITO		B*	T2
PZ3	40,63333333	15,80000000	POTENZA - SAN VITO ESTERNO		B*	T2
PZ4	40,63333333	15,80000000	POTENZA - OSPIZIO		B*	T2
PZN	38,73250000	16,15805556	PIZZO CALABRO - NUOVA	15	A*	T2
PZS	44,18854900	10,28861000	PIAZZA AL SERCHIO	330	A*	T1*
PZZ	38,73444444	16,15888889	PIZZO CALABRO	21	C*	T1
RCA	41,58777778	13,57861111	ROCCA D'ARCE		A*	T4
RCC	41,28750000	13,97972222	ROCCAMONFINA	613	C*	T1
RCR	42,06722222	13,20611111	ROCCACERRO (TAGLIACOZZO)	1124	A*	T1
RCU	38,12141800	15,66627400	REGGIO CALABRIA	128	B*	T1
RDD	43,49111111	11,38583333	RADDA IN CHIANTI	463	A*	T1
RFC	42,53583333	13,40972222	RIO FUCINO (CAMPOTOSTO)	1318	A*	T2*
RGG	39,61944444	16,17111111	ROGGIANO GRAVINA	225	B*	T1*
RGS	36,92484700	14,70325900	RAGUSA	677	A	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
RIC	41,48300000	14,83800000	RICCIA	720	A*	T2
RIP	42,26500000	13,59916667	RIPA (FAGNANO)	661	A*	T1*
RMN	43,99527778	12,51805556	RIMINI	95	B*	T1*
RNC	43,86944444	11,60694444	RINCINE (LONDA)	453	A*	T2
RNR	40,92722222	15,66888889	RIONERO IN VULTURE	673	B	T1
RNS	44,59545900	8,93601100	RONCO SCRIVIA	434	B	-
RNV	40,92722222	15,66888889	RIONERO IN VULTURE - NUOVA	673	B*	T1
RNV2	40,92722222	15,66888889	RIONERO IN VULTURE	673	B*	T1
RSN	39,57064800	16,63016100	ROSSANO	433	A*	T2*
RSS	39,59055556	16,64583333	ROSSANO CALABRO	70	B*	T1
RTI	42,43027778	12,82111111	RIETI (CAB. ENEL)	380	D	T1
RVM	40,84723700	15,54054100	RUVO DEL MONTE	689	B*	T1
RVR	44,90611111	9,59750000	RIVERGARO	257	B*	T1
SAG	40,93160000	15,18760000	S. ANGELO DEI LOMBARDI	928	B*	T1*
SAL	45,60600000	10,51800000	SALO' SCUOLA		C*	T1
SAND	45,64000000	11,60990000	SANDRIGO	51	C*	T1
SANL	40,25275000	16,27176300	SANTARCANGELO	363	B*	T3
SAP	38,62517500	16,52510800	S. ANDREA APOSTOLO JONIO - (CAB. EN	390	A*	T1*
SAR	40,07459300	15,65203300	SAPRI	195	A*	T1*
SAS	45,60600000	10,51800000	SALO' SCUOLA		C*	T1
SAV	44,24527778	7,32083333	S. ANNA (VALDIERI)	960	B*	T2*
SBC	41,91315800	13,10551800	SUBIACO	680	A*	T2
SBR	39,69333333	16,46944444	SIBARI (TERRANOVA)	9	C*	T1
SCC	37,51166667	13,07833333	SCIACCA	65	B*	T1
SCF	42,26472222	13,99777778	SCAFA	128	A*	T1
SCI	38,25581700	15,71467900	SCILLA	81	A*	T1*
SCL	39,77388889	15,80333333	SCALEA	2	C*	T1
SCM	41,71082700	14,98374900	S. CROCE DI MAGLIANO	676	B*	T1
SCN	41,91865500	13,87239600	SCANNO	985	A	T2*
SCP	41,80721300	15,16464600	SERRACAPRIOLA	293	B*	T1
SCR	36,82927400	14,52718300	S. CROCE CAMERINA	139	A	T1
SCRO	41,71000000	14,99000000	S. CROCE DI MAGLIANO		C*	T1
SCS	40,03527778	18,46194444	S. CESAREA TERME	30	A*	T1
SCV	41,30636200	14,88044600	S. MARCO DEI CAVOTI	715	A*	T1
SCZM	40,24982100	16,68980000	SCANZANO MUNICIPIO	30	B*	T1*
SCZP	40,26107000	16,74904100	SCANZANO PORTO GRECO	5	D*	T1*
SDC	41,71055556	13,81111111	S. DONATO VAL COMINO - SANTUARIO		A*	T2*
SDG	41,84257100	15,55893000	S. NICANDRO	255	A*	T1
SDM	42,28944444	13,55777778	S. DEMETRIO NEI VESTINI	658	B*	T1
SDN	39,70820600	16,04610300	S. DONATO DI NINEA	775	A*	T2*
SDS	41,68333333	13,79666667	S. DONATO VAL COMINO - COLLE IAVARRA		A*	T1
SDV	45,62722222	13,89888889	S. DORLIGO DELLA VALLE	477	A*	T1
SEL	44,26537000	9,40339000	SESTRI LEVANTE	77	B	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
SELE	42,88921600	12,92797500	SELLANO EST		B	T2
SELI	41,62100000	14,87500000	S. ELIA A PIANISI		A*	T1
SELW	42,88621000	12,92180600	SELLANO OVEST		B	T1
SEM	46,48555556	10,26888889	SEMOGO	1350	C*	T2*
SEP	41,62501900	14,88016700	S. ELIA A PIANISI	649	A*	T1
SER	43,07117900	12,95313700	SERRAVALLE DI CHIENTI		A*	T1
SFD	38,49719200	15,92248200	SAN FERDINANDO	53	C*	T1
SGF	39,25861111	16,68861111	S. GIOVANNI IN FIORE (PAL)	1050	A*	T1
SGIU	42,37300000	13,39200000	S. GIULIANO L'AQUILA		C*	T2*
SGIUA	41,68400000	14,96400000	S. GIULIANO DI PUGLIA A		A*	T2*
SGIUB	41,68800000	14,96300000	S. GIULIANO DI PUGLIA B		B	T1*
SGR	41,27166667	14,92638889	S. GIORGIO LA MOLARA	635	A*	T1*
SGV	39,26334400	16,68976200	S. GIOVANNI IN FIORE	1166	A*	T1*
SLA	40,92944444	15,17583333	SANT'ANGELO DEI LOMBARDI - ALTO		B*	T1
SLB	40,93000000	15,16611111	SANT'ANGELO DEI LOMBARDI - BASE		B*	T1
SLC	40,39107100	15,63266200	SALA CONSILINA	1040	A*	T2*
SLL	42,79300000	13,79300000	SELLANO		B*	T1
SLL0	38,88388889	16,74277778	SELLIA MARINA	5	C*	T1
SLM	44,63305556	9,40361111	SALSOMINORE	422	C*	T2*
SLP	46,81222222	11,25277778	S. LEONARDO VALPASSIRIA	725	B*	T2
SLS	44,63166667	9,06916667	SALSOMINORE (CENTRALE)	410	A*	T2
SMA	39,55639300	16,12507200	S. MARCO ARGENTANO	456	B*	T1*
SMAP	41,86900000	15,01100000	S. MARTINO IN PENSILIS		B*	T2
SMAPP	41,86995000	15,00975000	S. MARTINO IN PENSILIS (san pietro)	333	B*	T1
SMAPS	41,87090000	15,01445000	S. MARTINO IN PENSILIS (scuola)	317	B*	T1
SMC1	45,01861111	10,63222222	S. MATTEO DELLE CHIAVICHE (VIADANA)	20	C*	T1
SMC2	45,01861111	10,63222222	S. MATTEO DELLE CHIAVICHE - 2	20	C*	T1
SMF	46,33972222	13,06138889	SOMPLAGO CENTRALE - FINESTRA CONDOTTE	413	A*	T2
SMG	46,33972222	13,06138889	SOMPLAGO CENTRALE - GALLERIA CAVI	413	A*	T2
SMP	44,06410000	10,80370000	S. MARCELLO PISTOIESE	1017	A*	T3
SMT	46,33972222	13,06138889	SOMPLAGO CENTRALE - CUNICOLO POMPE	413	A*	T2
SMU	46,33972222	13,06138889	SOMPLAGO CENTRALE - USCITA GALLERIA	413	A*	T2
SNA	40,25789400	16,24742200	SANT'ARCANGELO	315	B	T1
SNF	40,54568500	15,55714800	SANT'ANGELO LE FRATTE	633	A*	T2*
SNG	43,68500000	13,22666667	SENIGALLIA	100	B*	T1
SNM	43,93432600	12,44929000	SAN MARINO	743	A*	T4
SNN	41,83250000	15,57222222	SANNICANDRO GARGANICO	220	A	T1
SNS	43,56739000	12,14337500	SANSEPOLCRO	371	C	T1
SNZ	40,24272200	15,55027700	SANZA	641	A*	T2
SNZ1	45,07388889	9,89638889	S. NAZZARO - 1	42	C*	T1
SNZ2	45,07388889	9,89638889	S. NAZZARO - 2	42	C*	T1
SPA	40,03531600	16,33453600	S. PAOLO ALBANESE	856	A*	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
SPC	42,74346900	12,73969300	SPOLETO (CANTINA)	134	C*	T1
SPC0	46,33972222	13,06138889	SOMPLAGO CENTRALE - CAMERA VALVOLE	413	A*	T2
SPD	42,51194444	13,37000000	SELLA PEDICATE (CAMPOTOSTO)	1305	A*	T2*
SPL	42,73611111	12,73694444	SPOLETO	365	C*	T1
SPM	42,72166667	12,75166667	SPOLETO (MONTELUCO)	775	A*	T2
SPO	42,73358500	12,74060200	SPOLETO	476	A*	T2
SPR	38,26725800	15,60200400	SPERONE (MESSINA) (CAB. ENEL)	145	B*	T1
SPR0	38,26722222	15,58638889	SPERONE	102	B*	T1
SPS	39,34020600	16,44912000	SPEZZANO DELLA SILA (CAMIGL.)	1305	C	T1
SPT	41,46031200	14,49871000	S. POLO MATESE	717	A*	T2*
SRB	44,86638889	10,45527778	SORBOLO	27	C*	T1
SRC	37,08960700	15,29252300	SIRACUSA	112	A*	T1
SRC0	46,22638889	12,99833333	S. ROCCO	420	A*	T2
SRL	43,51694444	13,61944444	SIROLO	81	C*	T1
SRN	38,57555556	16,33194444	SERRA SAN BRUNO	803	B*	T1
SRP	44,84833333	10,44722222	SORBOLO (PEZZANI)	32	C*	T1
SRT	37,16277778	15,03027778	SORTINO	445	A*	T1*
SSA	38,16890000	15,78990000	S. STEFANO IN ASPROMONTE	780	A*	T2
SSC	42,87472500	11,87678800	S. CASCIANO DEI BAGNI	632	E	T1*
SSG	43,58666667	12,08305556	SANSEPOLCRO GRAGNANO	521	A*	T1*
SSP	43,56916667	12,14694444	SANSEPOLCRO CITTA'	337	C*	T1
SSR	41,69100000	15,37400000	S. SEVERO	139	B*	T1
SSS	44,54500000	10,78611111	SASSUOLO	118	C*	T1
SST	44,23222222	10,76750000	SESTOLA	1002	A*	T1
SSU	44,50710000	10,78480000	SASSUOLO	439	A*	T2
SSV	41,67944444	15,38611111	S. SEVERO	78	B	T1
STB	38,80403900	15,23360300	STROMBOLI (COMUNE LIPARI)	104	A*	T1
STF	43,90811200	11,79445700	S. SOFIA	642	A*	T2*
STG	41,56666667	14,23250000	S. AGAPITO	405	B*	T1
STL	40,54106500	15,64216900	SATRIANO DI LUCANIA	748	B	T1
STN	41,01835300	15,11167000	STURNO	684	A*	T1
STR	41,02083333	15,11500000	STURNO	575	B	T1
STS	43,94222222	11,90527778	S. SOFIA	268	C*	T1
SUL	42,08900000	13,93400000	SULMONA	556	C*	T2
SVL	39,26666667	16,70611111	S. GIOVANNI IN FIORE	981	A*	T1
SVN	37,68308600	15,12996600	S. VENERINA	294	A*	T1
SVP	40,88527778	15,25694444	SELVA PIANA - MORRA		C*	T1
SVT	42,39694444	13,31361111	S. VITTORINO (L'AQUILA)	700	A*	T1
SZZ	41,49750000	13,05472222	SEZZE	286	A*	T2*
TAO	37,85235200	15,28628300	TAORMINA	261	A*	T2*
TAR	46,50027778	13,62138889	TARVISIO	790	B*	T1
TDG	40,79722222	14,38305556	TORRE DEL GRECO	178	A*	T1
TER	41,55416667	13,77444444	TERELLE		A*	T2*

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
TGG	45,56250000	11,18333333	TREGNAGO (COLLINA)	750	A*	T1*
TGL	44,53369200	9,16581100	TORRIGLIA	1030	A*	T2
TGN	40,39138889	15,52611111	TEGGIANO	460	C*	T1
TLB	46,38250000	12,98166667	TOLMEZZO - BASE DIGA	468	A	T2
TLM1	46,38250000	12,98166667	TOLMEZZO CENTRALE - DIGA AMBIESTA 1	536	B	T2
TLM2	46,38250000	12,98166667	TOLMEZZO (AMBIESTA - 2)	536	A*	T2
TLS	41,22223700	14,52997400	TELESE TERME	124	A*	T2
TMA	38,67331000	15,89613800	TROPEA (MAMONE) (CAB. ENEL)	123	A*	T1
TMO	41,98944500	14,97500700	TERMOLI	115	B*	T1
TOR	38,04438700	14,81464000	TORTORICI	554	B	T2*
TP4	44,82260000	7,22050000	TORRE PELICE 4		B	-
TP7	44,81660000	7,22310000	TORRE PELICE 7		C	-
TPA	38,67364500	15,88919200	TROPEA	93	A*	T1
TRB	45,18250000	8,27750000	TRINO CENTRALE - BASAMENTO ANNULUS	130	C*	T1
TRC	46,22611111	13,20972222	TARCENTO	230	A	T1
TRCF	40,62260000	16,13770000	TRICARICO FRANA		B*	T1*
TRCM	40,62526900	16,14335500	TRICARICO CASE MONACO	647	B*	T3*
TRE1	45,18250000	8,27750000	TRINO CENTRALE - ESTERNO 1	130	C*	T1
TRE2	45,18250000	8,27750000	TRINO CENTRALE - ESTERNO 2	130	C*	T1
TRF	38,26432400	15,63419400	TORRE FARO	3	C*	T1
TRF0	38,26432400	15,63419400	TORRE FARO (MESSINA) (CAB. ENEL)	47	C	T1
TRG	45,52527778	11,13444444	TREGNAGO	499	A*	T2*
TRI1	45,18250000	8,27750000	TRINO CENTRALE - INTERNO 1	130	C*	T1
TRI2	45,18250000	8,27750000	TRINO CENTRALE - INTERNO 2	130	C*	T1
TRL	42,46194444	12,93222222	TERMINILLO	1225	A*	T2*
TRM	37,99055556	13,70111111	TERMINI IMERESE	3	A*	T1
TRN	42,55305556	12,60055556	TERNI	112	C*	T1
TRO	40,61457400	16,14220600	TRICARICO	770	B	T1*
TRP	38,67888889	15,89916667	TROPEA	24	A*	T2*
TRQ	45,18250000	8,27750000	TRINO CENTRALE - SALA CONTROLLO SOTT	130	C*	T1
TRR	40,61888889	16,15638889	TRICARICO	650	B	T1
TRS	39,62972222	16,22500000	TARSIA	102	C*	T1
TRT	44,89250000	8,88250000	TORTONA	210	B	T1
TRV	41,78111111	14,55055556	TRIVENTO	540	A*	T2*
TSC	42,42250000	11,86972222	TUSCANIA	190	A*	T1
TTP	42,01694444	14,16916667	TARANTA PELIGNA	450	A*	T1
TTS	40,60134500	15,72360500	TITO SCALO	828	C*	T1*
TVR	43,71138889	11,21888889	TAVARNUZZE (IMPRUNETA)	71	C*	T1
UGN	39,89388889	18,12388889	UGENTO	12	A*	T1
UMB	43,25388889	12,25611111	UMBERTIDE	617	A*	T1
VBM	38,71377600	16,12387100	VIBO MARINA	56	B	T1
VBV	38,67787200	16,10653300	VIBO VALENTIA	546	B	T1

Station_code	Latitude	Longitude	Station_name	Altitude (m)	EC8 site classification (vers. 3.0)	EC8 topographic classification (vers. 1.0)
VFC	43,15722222	12,60055556	VALFABBRICA - DIAZ C.		C*	T1
VFF	43,15722222	12,60055556	VALFABBRICA - DIAZ F.		C*	T1
VFP	43,15722222	12,60055556	VALFABBRICA - PIANO TERRA		C*	T1
VFS	43,15722222	12,60055556	VALFABBRICA - SOTTOT.		C*	T1
VGD1	44,11916667	10,30194444	VAGLI CENTRALE - BASE DIGA 1	560	C*	T2
VGD2	44,11916667	10,30194444	VAGLI CENTRALE - BASE DIGA 2	560	C*	T2
VGG	39,96611111	16,04916667	VIGGIANELLO	370	D*	T1*
VGL	44,11000000	10,28972222	VAGLI - PAESE	587	A*	T3
VIE	41,87700000	16,16500000	VIESTE	6	C*	T1
VLB	41,75916667	13,98888889	VILLETTA BARREA	980	A*	T2*
VLC	40,58138889	17,47222222	VILLA CASTELLI	228	A*	T1
VLF	46,46305556	10,42194444	SANTA CATERINA VALFURVA	1520	A*	T2*
VLL	41,67250000	12,77361111	VELLETRI	180	B*	T1
VLM	44,36472222	10,46500000	VILLA MINOZZO	661	A*	T1
VLN	40,17194700	16,44317400	VALIANO (MONTEPULCIANO)	252	C*	T1
VLS1	38,21638889	15,64694444	VILLA SAN GIOVANNI - 1	99	B*	T1
VLS2	38,21755600	15,64696100	VILLA SAN GIOVANNI - 2	144	B*	T1*
VLT	43,40166667	10,86805556	VOLTERRA	515	B*	T2*
VOBA	45,64290000	10,50400000	VOBARNO	292	B*	T1
VOLT	45,31320000	10,66060000	VOLTA MANTOVANA	107	B*	T1
VRL	44,39270000	9,63340000	VARESE LIGURE	802	B	-
VRP	41,33321000	14,13168500	VAIRANO PATENORA	209	A*	T1
VSD	41,87916667	16,17111111	VIESTE (DANTE)	30	A*	T1*
VSE	42,11111111	14,70972222	VASTO (EUROPA)		B*	T1
VSL	41,51027778	13,78027778	VILLA SANTA LUCIA		C*	T2*
VSS	41,87750000	16,16555556	VIESTE	7	B	T1
VST	42,11055556	14,71027778	VASTO	151	B*	T1
VTT	36,94777778	14,51861111	VITTORIA	162	B*	T1
VZZ	37,16361111	14,75472222	VIZZINI	655	A*	T2*
ZCC	44,32416667	10,97083333	ZOCCA	652	A*	T1
ZEN8	45,63780000	10,73190000	S. ZENO DI MONTAGNA	596	B*	T1
ZOVE	45,45360000	11,48760000	ZOVENCEDO	376	A*	T2*

References

EC8 (2003). Eurocode8: Design of Structures for Earthquake Resistance, Part1: General Rules, Seismic Actions and Rules for Buildings, December 2003, CEN Central Secretariat, Brussels, ENV 1998-1-1.

NTC (2008). Norme Tecniche per le Costruzioni, DM 14 gennaio 2008, Gazzetta Ufficiale, n. 29 del 4 febbraio 2008, Supplemento Ordinario n. 30, Istituto Poligrafico e Zecca dello Stato, Roma.