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Abstract New insights on the deep regional geological structure of the Naples Bay are herein proposed through the constraints of seismic interpretation. Regional geoseismic sections along the Ischia–Capri–Volturno alignment of the Campania continental margin have been constructed. Main regional morpho-structures are: the Banco di Fuori, a morpho-structure high of Meso-Cenozoic carbonates, bounding southwards the Naples Bay; the Dohrn canyon, separating the eastern side of the Bay, where sedimentary seismic sequences crop out, from the western one, where volcanic seismic units prevail; the Capri structural high, a sedimentary high related to regional uplift of Meso-Cenozoic carbonates along the Capri–Sorrento alignment; the Magnaghi canyon, eroding the Mg volcanic seismic unit southwards of the Procida island; the Capri basin, a deep basin located south of the Naples Bay, filled by Pleistocene–Holocene sediments overlying Meso-Cenozoic carbonatic unit; the Salerno Valley, a half-graben filled by three seismic units corresponding to Quaternary marine deposits, overlying chaotic sequences related to the "Flysch del Cilento" *Auct.*; the Volturno basin, filled by four marine to deltaic seismic sequences, frequently alternating with volcanoclastic levels, overlying deep seismic units, correlated with Miocene flysch deposits (sands and shales) and Meso-Cenozoic carbonates. On the Naples slope between the Dohrn and Magnaghi canyons a large volcanic edifice, only magnetically known, deeply buried under Quaternary volcanites and genetically related to the Procida volcanic complex has been modelled through seismic interpretation.

Keywords Naples Bay · Tyrrhenian sea · Seismic interpretation · Regional geology

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1 Introduction

The aim of this paper is to present a geologic interpretation of deep multichannel seismic sections to improve the regional knowledge on the structural and stratigraphic setting of the Naples Bay in the general framework of the Campania continental margin. This interpretation is based on deep regional multichannel seismic profiles parallel and perpendicular to the continental margin (Southern Italy; Fig. 1).

Three regional geoseismic sections have been constructed based on the interpretation of deep seismic profiles. The Sister4_2 profile crosses the Capri offshore, the Ischia structural high, the Naples Bay and the Volturno Basin (Fig. 1). The Sister9_1 profile traverses the Capri offshore, the Banco di Fuori high, the Dohrn canyon and the Salerno Valley (Fig. 1). The Sister7_2 profile intersects the Capri Basin, the Capri structural high, the Dohrn canyon's thalweg and the Naples Bay outer shelf.

The obtained results allow to give new insights on the stratigraphic and structural relationships between the Naples Bay, the Campania–Latium margin and the Salerno Bay at a regional scale. The main morpho-structures of the Campania continental margin have been recognized and their seismic stratigraphy has been interpreted to get better knowledge on regional meaning of main unconformities and fault systems based on updating geological setting.

New data about the stratigraphy and morpho-structure of a segment of the Campanian margin along the Ischia–Capri alignment, based on seismic analysis and geologic interpretation are here provided. While a large amount of densely spaced seismic surveys of the Naples Bay continental shelf have been previously carried out, these new seismic data give

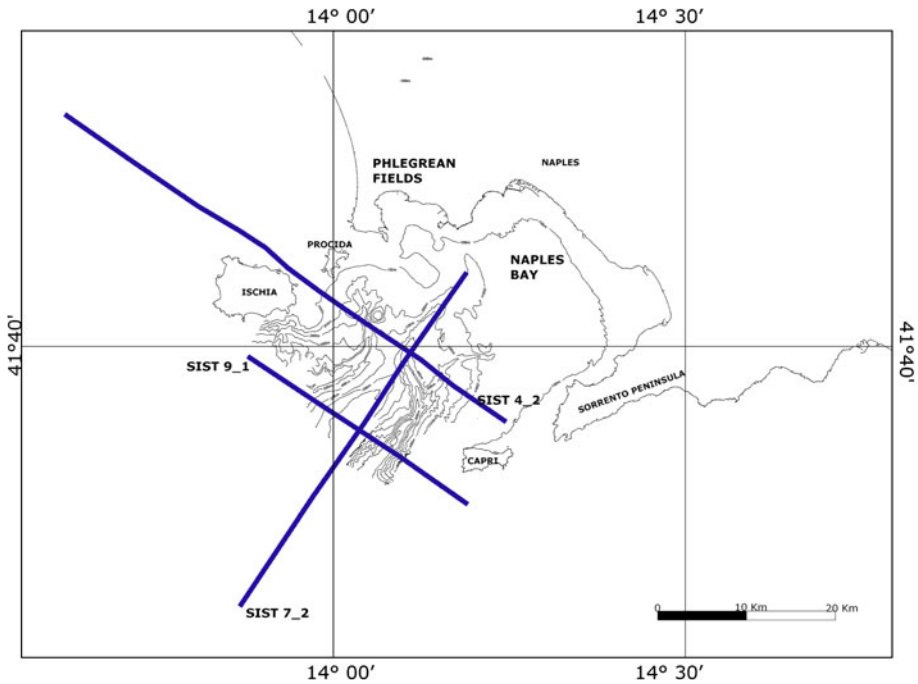

Fig. 1 Location map showing the seismic profiles Sister4_2, Sister9_1 and Sister7_2 on the Ischia–Capri alignment of the Campania continental margin

a geologic framework of main sedimentary basins and intervening structural highs of the whole continental margin at a regional scale on Southern Tyrrhenian outer shelf, slope and bathyal plain. Some of the morpho-structures of the continental margin portrayed by these seismic sections have not been previously described in detail, such as the Ischia volcanic structural high, the Capri sedimentary structural high and the Capri and Volturno basins, whose seismic stratigraphy is still relatively unknown.

A correlation with land geology is attempted to obtain a better geological comprehension of the interpreted structures. Quaternary volcanism of the Campania margin is discussed: a large volcanic edifice buried below Quaternary volcanites, previously known only by its magnetic signature, is here identified and modelled.

The Tyrrhenian Sea is an area of ongoing extension inside large-scale convergence between the continental plates of Europe and Africa, whose extension started about 10 My ago, leading to the Pliocene formation of oceanic crust (Patacca and Scandone 1989). Three continental margins, Sardinia, Northern Sicily and Southern Italy border the Southern Tyrrhenian bathyal plain. This area is seismically active and experienced strong horizontal and vertical movements.

A deep and narrow Benioff zone, plunging from the Ionian Sea towards the Southern Tyrrhenian Basin testifies the occurrence of an eastward migrating subduction plain of the eastern Mediterranean lithosphere (Sartori 2003). From the Oligocene to recent times, the subduction has generated the Western Mediterranean and the Tyrrhenian back-arc basins, as well as the accretionary wedge of the Southern Apenninic Arc.

The extension in the Tyrrhenian Sea started in the Late Miocene and produced the Vavilov and Marsili Plains during the Plio-Quaternary (Kastens et al. 1988). The late onset of the arc volcanism with respect to the duration of the extension in the Tyrrhenian–Ionian system has been explained as a consequence of the initial stages of thinned continental lithosphere (Ritsema 1979; Malinverno and Ryan 1986; Sartori 2003). Age and trends of rifting in the Tyrrhenian sea have been already summarized (Sartori and Capozzi 1998); a Tortonian to Pliocene episode of back-arc extension, when the Sardinia margin and the Vavilov Plain were formed indicating arc migration from W to E; a Pleistocene episode, when the Marsili basin was generated, indicating migration from NW to SE.

In this kind of reconstruction, the Benioff plain has not a homogeneous nature, since its deep portion consists of thinned continental lithosphere that floored the Campania–Lucania carbonate platform of the Southern Apennines. This hypothesis can explain the late onset of arc volcanism (2–1.5 My) in respect to inception of back-arc extension in the Tyrrhenian sea (8–9 My), assuming that no foundered remnant arcs exist inside the system (Sartori 2003).

2 Geological setting

The Naples Bay lies in the southern part of a structural depression, the Campania Plain (Fig. 2; D'Argenio et al. 1973), located between the eastern side of the Tyrrhenian sea and the Southern Apenninic chain and produced from the back-arc extension that accompanied the NE-verging accretion of the Apenninic thrust belt during the rollback of the subducting foreland plate (Malinverno and Ryan 1986; Faccenna et al. 1996). The western sector of the Naples Bay is surrounded by the Phlegrean Fields volcanic district, where volcanism has been active for at least 50 ky (Rosi and Sbrana 1987). Its actual morphology refers to events which occurred after the emplacement of the Campanian Ignimbrite (CI), a huge pyroclastic flow erupted 35 ky ago, when the area experienced a first phase of calderization (Barberi et al. 1978). In the eastern one, sedimentary processes related to the Sarno–Sebeto

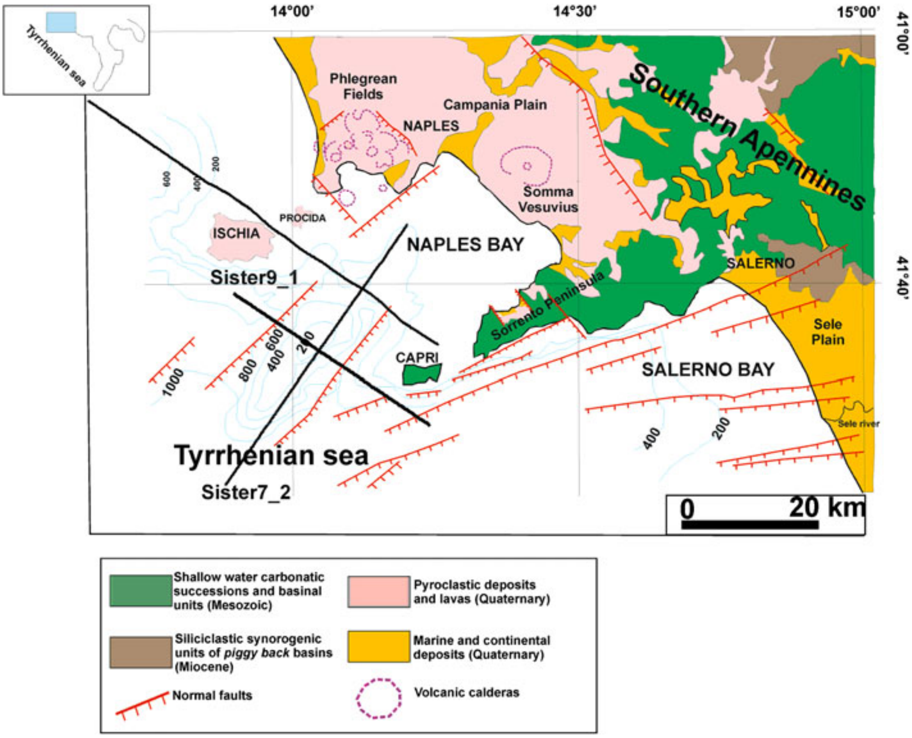

Fig. 2 Sketch map of the three seismic profiles (in *black*) processed and interpreted on the geological map of the western margin of the Apenninic chain. *1* Shallow water carbonatic successions and basinal units (Mesozoic). *2* Siliciclastic synorogenic units of piggy back basins (Miocene). *3* Pyroclastic deposits and lavas (Quaternary). *4* Marine and continental deposits (Quaternary). *5* Normal faults. *6* Volcanic calderas

coastal plain controlled the deposition of marine and coastal seismic units during Late Pleistocene and Holocene, often interlayered with volcanic deposits related to Somma–Vesuvius (Milia et al. 1998; Aiello et al. 2001).

During the Late Quaternary volcanic and sedimentary processes strongly interacted in controlling the stratigraphic setting of the Campania continental margin. In the Naples Bay submarine volcanoes are aligned along a N10° trending morpho-structural lineament, following the Dohrn canyon, which divides the Gulf of Naples in two domains: a sedimentary domain to the east, characterized by sedimentary seismic units and a volcanic domain to the west, with volcanic and sub-volcanic units (Fusi et al. 1991). Buried volcanic complexes, genetically related to the eruptions of the Somma–Vesuvius, Phlegrean Fields and Ischia and Procida, have been identified in the subsurface of the Gulf of Naples (Aiello et al. 2005).

A crustal section of the Campania continental margin (Milia et al. 2003) has displayed an asymmetric linked fault system characterized by a 10–12 km deep detachment level and four half-grabens filled with thick Quaternary clastic and volcanic deposits (Volturno, Lago Patria, Phlegrean Fields and Naples Bay). The section is calibrated by the litho-stratigraphic data of deep exploration wells.

Outcrop and subsurface geological data have revealed the occurrence of NE–SW, E–W and NW–SE normal faults, controlling the individuation of the continental margin and its tectonic evolution (Milia et al. 2003). An older extensional event occurred along NW–SE faults and was followed by the main extensional event linked to the activity of NE–SW normal faults. The latter one, whose activity lasted from 700 to 400 ky, controlled the individuation of half-grabens filled by more than 5 km of Quaternary deposits On the continental margin the effects of wrenching include the rotation of fault-bounded blocks leaving subsiding grabens between them and the slight compression between blocks and uplift zones.

The nature and structure of the crust across the Campania margin up to the bathyal plain in correspondence to the Vavilov Basin has been recently investigated based on deep MCS reflection seismic data (Sartori et al. 2004). Reprocessed time sections have shown the shallow and deep stratigraphic architecture of the Sardinia continental margin and of the adjacent Magnaghi and Vavilov basins. The deep structure of the Campania margin, conjugate to the Sardinia one, is less constrained because of its scarce crustal reflectivity. A large number of listric faults accommodate brittle extension in the upper crust, producing a marked asymmetry between the margins.

In the Campania margin, the basement intensively deformed by seaward dipping listric normal faults is overlain by syn-rift sequences (Tortonian p.p.–Messinian p.p. sequence and Messinian p.p.–Pliocene p.p. sequence) and then by post-rift sequences, Plio-Quaternary in age (Sartori et al. 2004). This basement, poorly reflective around the Gortani Ridge, where MORB basalts have been drilled (ODP site 655; Beccaluva et al. 1990), becomes more reflective towards the Campania margin, where is composed by two main seismic units. Taking into account the drilling data (ODP site 651), these units are interpreted as serpetinized upper mantle, unconformably overlain by pillow lava flows. A continental nature of the crust across the margin is, however, suggested, as revealed also by regional magnetic anomalies; small sub-circular anomalies are located in correspondence to volcanic bodies.

3 Materials and methods

A high-resolution shallow marine seismic survey (Sister-Seismic Investigations in South Tyrrhenian Extensional Regions) has been carried out from the 4th to the 28th June 1999 with the aim to collect regional deep seismic sections on the Southern Tyrrhenian continental margins and in the Tyrrhenian bathyal plain.

Removal/reducing coherent noise such as multiples, contributed to an accurate velocity analysis and to the application of the predictive deconvolution. They have allowed to obtain high-quality seismic data also in areas where the occurrence of pyroclastic levels and volcanic bodies produce a high scattering of acoustic energy. Data have been acquired digitally, using airguns, a 48 channel seismic streamer and a system of seismic acquisition and processing.

Three regional seismic profiles (Sister4_2, Sister9_1 and Sister7_2), have been processed and interpreted, for an overall length of 160 km. The acquisition parameters are represented by the type of seismic source (N.2 Airguns, G/I gun SI/Sodera), by the record length (5 s), by the sample interval (5 s, TWT), by the shot interval (25 m) and by the hydrophones interval (12.5 m).

The software used for the seismic processing are the “ProMax2D” (Landmark Ltd.) and the “Seismic Unix” (Colorado School of Mines).

The complete flux of elaboration applied during the seismic data processing is here briefly resumed (Yilmaz 1988; Fig. 3). Some advanced processes have been applied to a

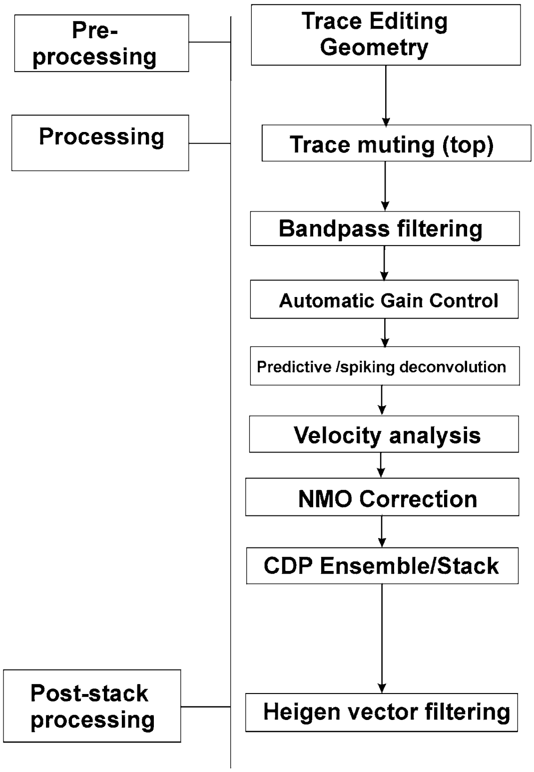

Fig. 3 Flux diagram showing the data elaboration applied to the multichannel seismic profiles

basic flux of elaboration to improve the useful signal occurring in the seismic data. The seismic data have been promoted to produce stacked sections, ready to be interpreted.

The Fourier analysis has been carried out on the seismic traces to identify the frequency content of the signal in several seismograms after the application of a band-pass filter. This enabled to recognize the frequency interval in which the useful signal was concentrated.

The gain application consisted of the compensation of the delay of the signal due to absorption, scattering and decay of the amplitude. It is necessary to restore part of the lost signal to obtain levels of amplitude similar throughout all the seismic data. The corresponding process is the Automatic Gain Control (AGC). An example of shot records typical of the processed data is shown in Fig. 4.

The velocity analysis on sorted seismic traces in CMP-gathers (Common MID Points Gathers, representing the in-phase sum of the seismic traces coming from the same CDP) has been carried out to produce the first stack seismic sections. The same process has been repeated after applying different processes of elaboration to the seismic data, trying to understand if the same processes have produced or not significant improvements. The reflection hyperbola alignment obtained using different velocity values is represented in Fig. 5. The precise NMO correction was obtained using previously estimated correct velocity values.

The stacking allowed to increase the signal/noise ratio, reducing the casual noise included in the data. During the stacking, the coherent signal has increased its width by constructive interference of a factor equivalent to the coverage of the data; on the other side, the casual signal has been added to another noise by slightly increasing its width.

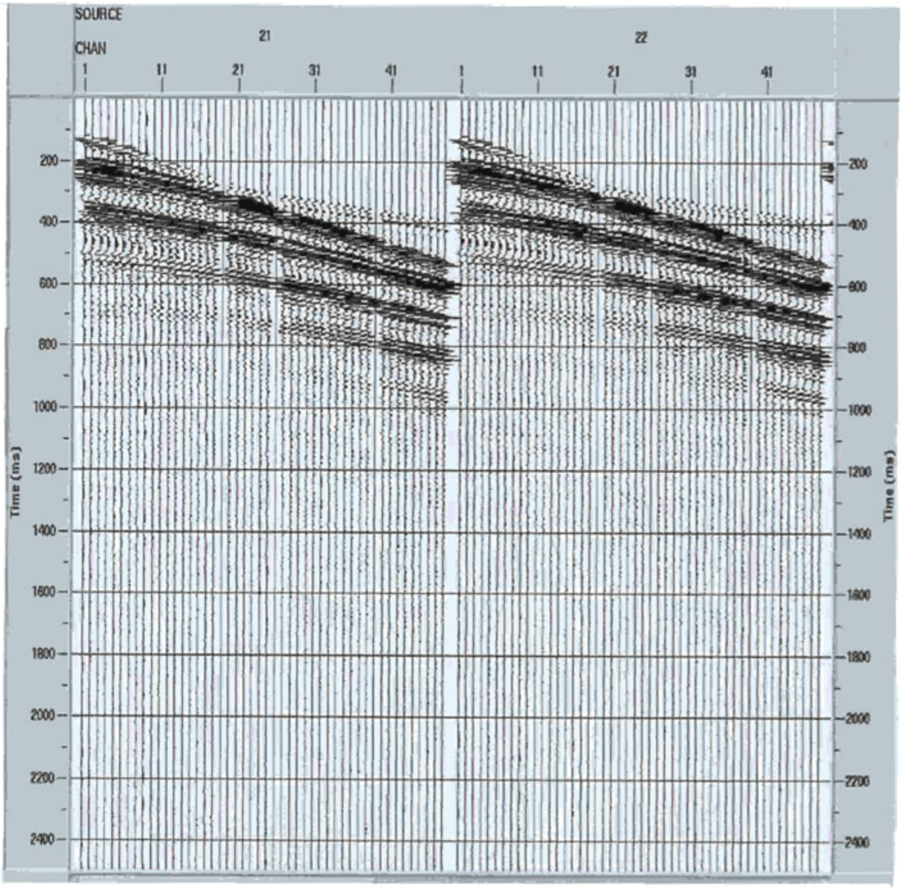

Fig. 4 Shot records of the multichannel seismics

The chosen filter resulted to be enough conservative (0–20–50–70 Hz) and allowed to eliminate the occurring high-frequency noise. A frequency spectrum before and after the band-pass filters is reported in Fig. 6.

The procedure of multiple attenuation consisted of both stacking and predictive deconvolution. The move-out between the primary reflections and the multiple ones was discriminated through the stacking defining a correct velocity function of the primary reflections and relieving the mistaken coherent noise (Yilmaz 1988). The efficiency of stacking improves with the increase of both coverage and maximum offset, increasing the trace numbers to be added to the CMP-gathers.

The predictive deconvolution has been carried out on the seismic data to eliminate, or further reduce, the multiple signals which characterize the same section, allowing to get back the high frequencies and reconstruct the waveform.

The deconvolution consisted of the seismogram convolution with a reverse filter (filter of Wiener) improving the temporal resolution of the datum. An example of application of deconvolution on our seismic data is shown in Fig. 7. After its application, the seismic signal appears more compressed; consequently it is simpler to identify the seismic reflectors during the geological interpretation.

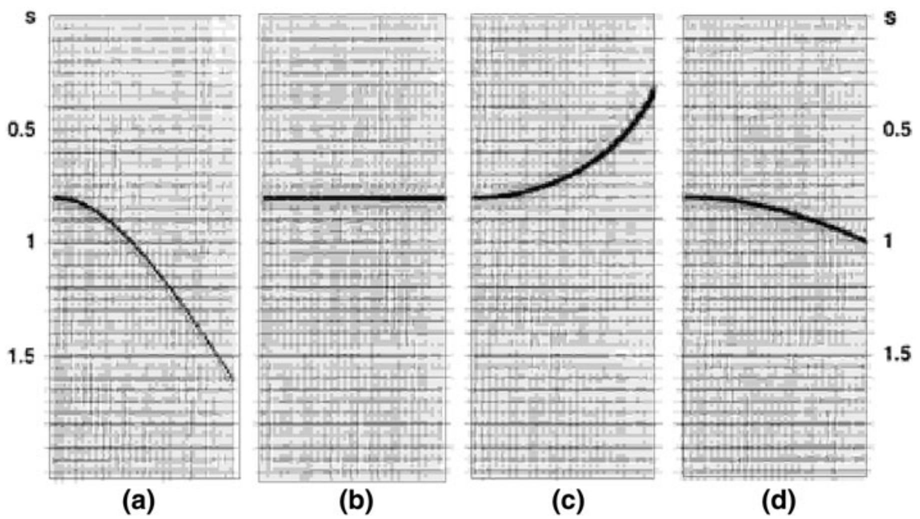

Fig. 5 Variations of the hyperbola of a seismic reflector according with the velocity values used in the NMO correction

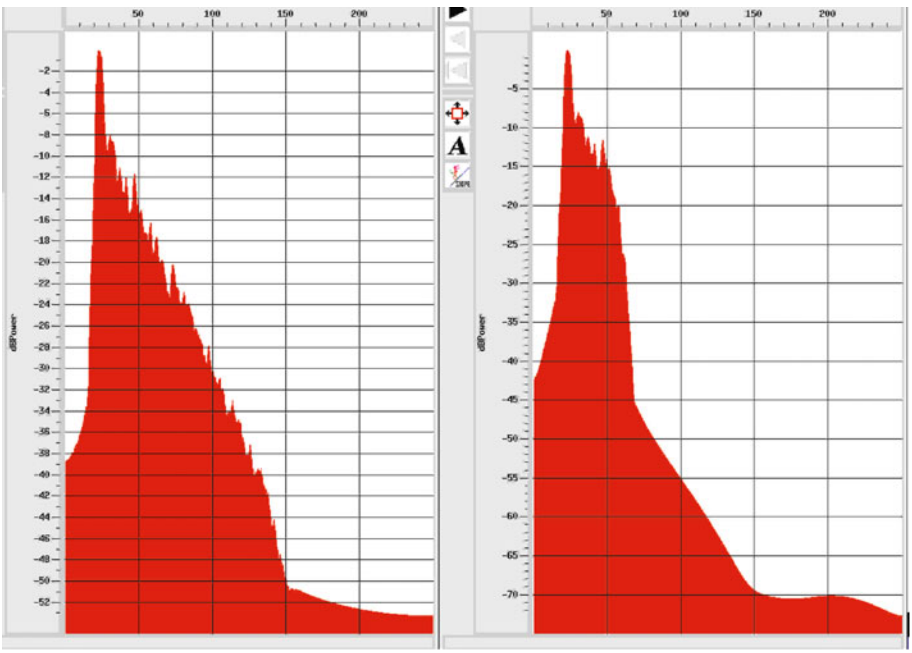

Fig. 6 Frequency spectrum before and after the application of the bandpass filters

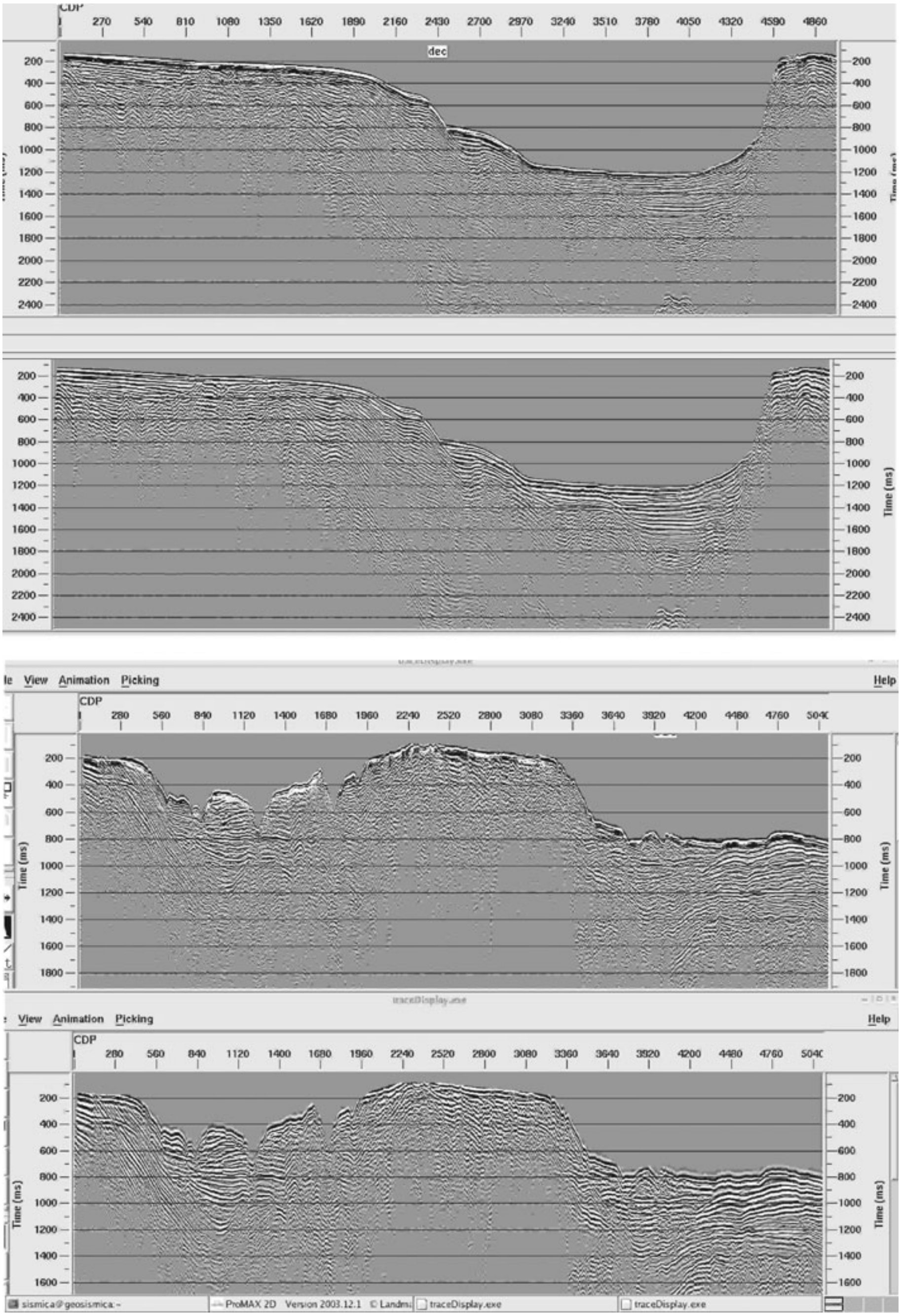

Fig. 7 Examples of application of the spiking deconvolution. The seismic signal appears more spike (compressed) on the upper seismic section. Consequently, it is simpler to define the different reflectors during the seismic interpretation

4 Results

4.1 Geoseismic interpretation of the seismic profile Sister4_2

The seismic profile Sister4_2, NE–SW trending, extends for a length of about 66 km (Fig. 1). It starts on the continental slope offshore Bocca Piccola, a saddle located between the Sorrento Peninsula and the Capri Island and crosses the Dohrn and Magnaghi canyons reaching the structural high of the Ischia volcanic complex (Fig. 8). The seismic section ends on the continental slope of the Northern Campania continental margin in correspondence with the Volturno Basin.

The seismic profile shows the stratigraphic setting of the Campania margin in the Naples Bay (offshore Bocca Piccola, Dohrn and Magnaghi canyons, Ischia volcanic complex) and its tectono-stratigraphic relationships with the Northern Campania continental margin in the Volturno Basin. The seismo-stratigraphic analysis allowed to recognize both sedimentary and volcanic rock bodies.

The regional seismic interpretation of the Sister4_2 multichannel line is shown in Fig. 9. Three main sectors corresponding to physiographic and depositional units have been distinguished: (a) the continental slope surrounding the Capri Island and the Bocca Piccola offshore, (b) the Magnaghi canyon and (c) the Ischia offshore and the Volturno Basin. These morpho-depositional units are here discussed.

A good reflectivity has been observed next to the Sorrento Peninsula and Volturno river mouth, where sedimentary seismic sequences have been identified. On the contrary, the central sector of the profile, corresponding to the Magnaghi canyon and the structural high of Ischia island, shows several levels of volcanites and/or buried volcanic complexes, characterized by a poor reflectivity due to a strong dispersal of the acoustic energy.

An area of poor penetration of the seismic signal, related to the occurrence of Meso-Cenozoic carbonates (MC unit) has been recognized at the south-eastern corner of the line (Fig. 9). This area represents the offshore prolongation of the Capri island structural high;

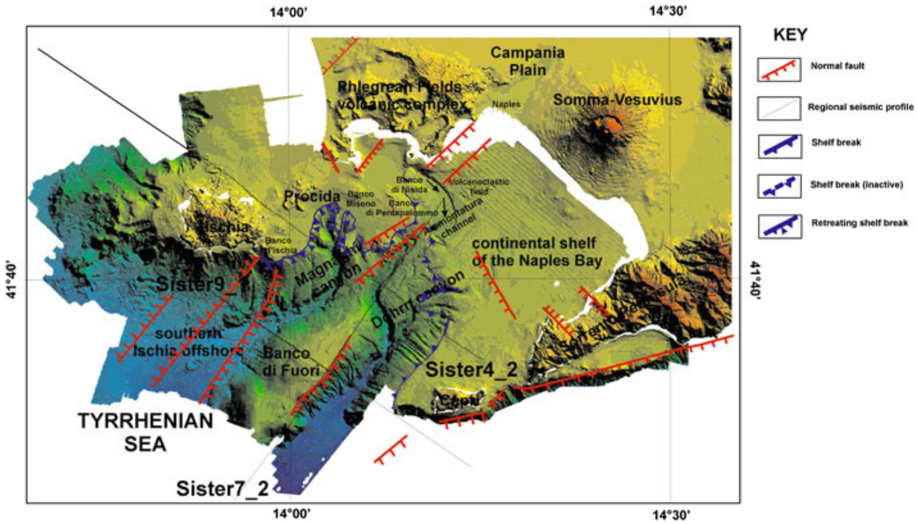

Fig. 8 Sketch interpretation of regional morpho-structures on onshore/offshore Digital Elevation Model of the Naples Bay. *1* Normal fault. *2* Regional seismic profile. *3* Shelf break. *4* Shelf break (inactive). *5* Retreating shelf break

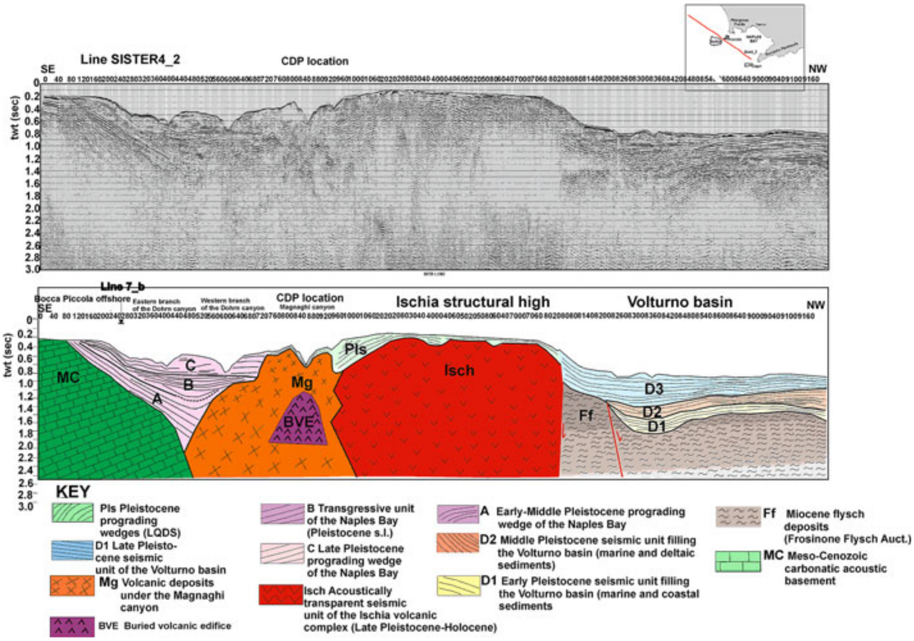

Fig. 9 Regional seismic profile Sister4_2 and corresponding interpretation. Naples Bay. *MC* Seismic unit characterized by a scarce penetration of the seismic signal, correlated to Meso-Cenozoic carbonates. Acoustic basement of the Naples Bay. *A* NW-dipping progradational unit with eroded topsets and preserved clinoforms; alternating intervals of highly continuous obliquous to parallel reflectors and acoustically transparent intervals. Early–Middle Pleistocene relic prograding wedge. *B* Wedge shaped, transgressive unit, developed in outer shelf and slope settings; highly continuous sigmoidal to obliquous clinoforms. Pleistocene s.l. siliciclastic marine deposits occurring in the central part of the basin. *C* Progradational unit with well-preserved offlap breaks thickening seawards; laterally grading to the volcanic units Mg and Isch; deeply incised in correspondence to the Dohrn canyon. Late Pleistocene prograding wedge supplied by the Sarno river mouth and by the Sorrento Peninsula tectonic uplift. *Mg* Seismic unit lacking of internal reflectivity and correlated to volcanic deposits under the Magnaghi canyon. *BVE* buried volcanic edifice (Late Pleistocene?). *Isch* Seismic unit lacking of internal reflectivity and correlated to the volcanic deposits of the Ischia volcanic complex (55–18 ky). *Pls* Pleistocene prograding wedges of the Late Quaternary depositional sequence. *Hol* Holocene wedge. Volturno Basin: *Mc* Seismic unit characterized by a scarce penetration of the seismic signal, correlated to Meso-Cenozoic carbonates. Acoustic basement of the Volturno Basin. *Ff* Seismic unit characterized by discontinuous reflectors correlated to Miocenic flysch deposits. Acoustic basement of the Volturno Basin. *D1* Seismic unit characterized by weak and discontinuous reflectors, interpreted as marine and transitional sediments; onlapping the unit Ff. First unit of the basin filling (Early Pleistocene). *D2* Seismic unit characterized by weak and continuous reflectors, interpreted as marine and deltaic sediments; second unit of the basin filling (Middle Pleistocene). *D3* Seismic unit characterized by parallel seismic reflectors alternating with acoustically transparent intervals, interpreted as coastal shales alternating with volcanoclastic deposits. Third unit of the basin filling (Late Pleistocene). *Hol* Holocene wedge

in the corresponding emerged sector, Meso-Cenozoic carbonatic rocks, related to the western margin of the Campania–Lucania carbonate platform extensively cropping out (D'Argenio et al. 1973; Barattolo and Pugliese 1987).

In the Capri structural high two main seismic units have been identified (A and C Fig. 9), unconformably overlying the Meso-Cenozoic carbonates. They are interpreted as two relic prograding wedges; the oldest one (A seismic unit), probably Early–Middle Pleistocene in age, is characterized by continuous and strongly inclined reflectors, truncated close to the sea bottom by an erosional unconformity.

The overlying prograding wedge (C Fig. 9) is characterized by sub-parallel continuous reflectors, probably dating back to the Late Pleistocene. Along the continental slope it is incised by the Dohrn canyon branches.

The continental slope between the Magnaghi canyon and the structural high of Ischia Island shows an acoustically transparent seismic facies, genetically related to the volcanites and volcano-clastites of the Ischia volcanic complex (Isch seismic unit Fig. 9).

Volcanic deposits, lacking of internal reflectivity characterize the offshore southward the Procida island and are deeply incised by the Magnaghi canyon (Mg unit Fig. 9). A mound-shaped seismic unit corresponding to a previously unknown buried volcanic edifice and located in correspondence to the Magnaghi canyon (BVE Fig. 9) interstratifies with the volcanites of the Mg unit under the canyon itself (for further description see the paragraph 4.4).

Inclined reflectors are located on the northern flank of the canyon (Pls unit Fig. 9). They are interpreted as prograding wedges related to portions of the Late Pleistocene depositional sequence (Forced Regression System Tract and Lowstand System Tract; Posamentier and Vail 1988).

Channel–levee complexes, Holocene in age, have been recognized at the border of the Magnaghi canyon (Hol1 Fig. 9). A thin drape, probably Holocene in age, overlying the whole structural high of the Ischia volcanic complex (Hol2 Fig. 9), has been interpreted as the Highstand System Tract of the Late Quaternary depositional sequence. Its attribution, carried out based on seismo-stratigraphic data, showing the occurrence of parallel and continuous seismic reflectors is supported by the stratigraphic framework for the last 23-ky marine record of the Ischia offshore based on AMC ^{14}C dating and tephrostratigraphic analysis of gravity cores (de Alteriis et al. 2010). Two collapse events have been recovered in the marine record, i.e. the DA/DF1 deposit, dated between 3 ky B.P. and 2.4 ky B.P. (Holocene deposits) and a former, pre-Holocene DA/DF older than 23 ky B.P. Three ash layers recognized in the post DA/DF1 marine sequence have been correlated to Ischian eruptions occurred between Middle Ages and Roman times; two tephras recovered in the pre-DF1 succession have been correlated with the explosive activity occurred on Ischia and Procida islands from 23 to 17.5 ky B.P. (de Alteriis et al. 2010). This chronostratigraphic reconstruction improved the knowledge of eruptive and collapse events affecting the Ischia offshore during Late Pleistocene–Holocene and their dispersal at sea.

The Volturno Basin area displays here four seismic units (Fig. 9). Lithologies of seismic units have been qualitatively calibrated using the litho-stratigraphic data of the "Castelvolturno 2" exploration well (Ippolito et al. 1973) and the onshore seismic section of Mariani and Prato (1988).

The lowermost unit of the basin fill (D1 unit Fig. 9) is characterized by parallel and continuous seismic reflectors, interpreted as Pleistocene coastal shales alternating with volcano-clastic sediments. The D1 unit overlies the Ff seismic unit showing discontinuous chaotic reflectors and correlating with Miocene flysch deposits, i.e. alternating sands and shales widely cropping out in Central Apennines ("Flysch di Frosinone" *Auct.*; Parotto and Praturlon 1975; Fig. 9).

The overlying seismic unit (D2 in Fig. 9), with moderate amplitudes and marked lateral continuity reflectors, has been interpreted as Pleistocene marine and deltaic sediments. This interpretation is supported both by the lithostratigraphic data of the "Castelvolturno 2" deep borehole (Ippolito et al. 1973) and by the onshore seismic sections in the Volturno plain (Mariani and Prato 1988). The onshore sections suggest the occurrence of a seismic unit composed of discontinuous reflectors with high amplitude and sigmoidal patterns, composed of alternating deltaic sands and shales, Pleistocene in age. This unit is genetically related to the D2 unit in the Volturno Basin. In the Volturno plain lithostratigraphic well data show a thick sequence (about 1,000 m) of Pleistocene alternating deltaic sands and shales, interlayered with pyroclastites and lavas.

The overlying seismic unit (D3 Fig. 9) is characterized by parallel to sub-parallel seismic reflectors with high amplitude. It is formed by alternating sands and shales of deltaic environments, Pleistocene in age, similarly to the onshore section (Mariani and Prato 1988).

The uppermost seismic unit of the Volturno Basin (D4 Fig. 9) shows weak and discontinuous seismic reflectors, interpreted as Late Pleistocene marine and deltaic sediments. The corresponding seismic unit of the onshore section is composed of parallel reflectors having low continuity and varying amplitude, related to coastal clays of the Late Pleistocene.

4.2 Geoseismic interpretation of the seismic profile Sister9_1

The NE–SW trending seismic profile Sister9_1 extends for a length of about 38 km from the southern offshore of the Ischia Island to the south-western offshore of the Capri Island up to the Salerno Valley (Fig. 10).

The Sister 9_1 line crosses a small basin adjacent to the Magnaghi canyon (herein named the Magnaghi canyon basin), runs towards the Banco di Fuori and reaches the Dohrn canyon up to the Salerno Valley. The seismic units identified on this profile appear to be synsedimentary. Strong wedging and stratal growth of the seismic sequences are observed. The line intersects some main tectonic lineaments, as the Capri–Sorrento fault and the Dohrn canyon fault (Fig. 10) (previously described).

In the Ischia offshore an acoustically transparent seismic facies, pointing out volcanic and volcanoclastic deposits has been interpreted as the Mg unit (Fig. 10). Southeastward a depression adjacent to the Magnaghi canyon is filled by continuous and parallel reflectors, interpreted as Holocene marine sediments (Hol Fig. 10).

The southern slope of the Banco di Fuori is down thrown by a NE–SW striking normal fault, i.e. the Dohrn canyon fault; Figs. 10 and 11). The seismic facies of this morpho-structure is characterized by a scarce penetration of the seismic signal. It is interpreted as the carbonatic unit (MC unit Fig. 10).The Dohrn canyon fault has a throw of about 1.8 s (two way travel times; Fig. 10), downthrowing the top of the Meso-Cenozoic carbonates from 0.8 s (twt) in the hanging wall (Banco di Fuori) to about 2.8 s (twt) in the foot wall (Dohrn canyon).

Two thick seismic units overlying the north-western flank of the bank (A and B units Fig. 10) were recognized. They are interpreted as two relic Pleistocene prograding wedges (already described in the seismic profile Sister4_2). A thin layer of Holocene sediments occurs all along the area.

The structural high of the Capri Island shows north-westwards dipping parallel and continuous seismic reflectors (Fig. 10). This seismic sequence has been interpreted as the B unit, recognized also in the seismic profile Sister4_2. It overlies on the reflectors of the A unit, interpreted as an Early–Middle Pleistocene prograding wedge, overlying the Meso-Cenozoic carbonatic unit. Meso-Cenozoic carbonates extensively crops out in the structural high of the Sorrento Peninsula–Capri island (Barattolo and Pugliese 1987; Perrone 1988).

Towards the Salerno Valley the seismic body is faulted by a NNW–SSE striking structure, locally known as the Capri–Sorrento fault, a master fault individuated during the Early Pleistocene. This fault bounds the Salerno Bay from the Naples Bay and apparently, has no relationships with the magmatic chamber of the Phlegrean Fields (Milia and Torrente 1997; Aiello et al. 2009).

The Capri–Sorrento master fault appears as a flight of steps composed of normal faults, as suggested by the structural patterns of normal faults downthrowing the Mesozoic carbonates (Fig. 10).

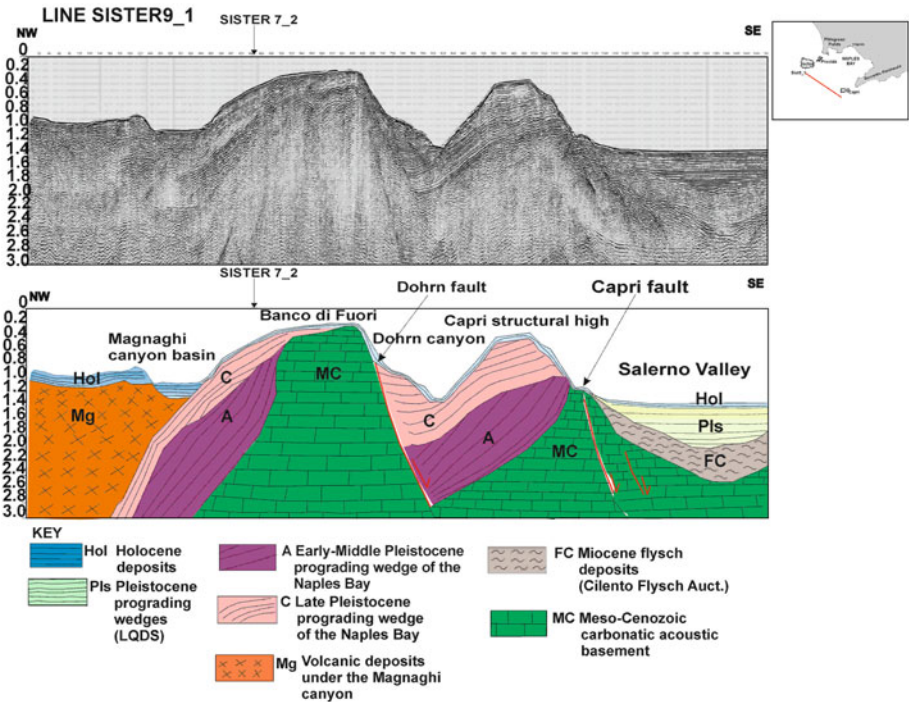

Fig. 10 Regional seismic profile Sister9_1 and corresponding geological interpretation: *MC* Acoustic basement: Meso-Cenozoic carbonates cropping out offshore the Sorrento Peninsula and the Capri Island. *FC* Acoustic basement. Cenozoic siliciclastic deposits related to the "Flysch del Cilento" *Auct*., underlying the sedimentary filling of the Salerno Valley. *A* Early Pleistocene relic prograding wedge representing the lower unit in the stratigraphic architecture of the Naples Bay, characterized by oblique prograding clinoforms. *B* Late Pleistocene prograding wedge representing the upper unit in the stratigraphic architecture of the Naples Bay, characterized by low-angle sigmoidal to oblique clinoforms, supplied by the palaeo-Sarno river mouth. *Mg* Late Pleistocene volcanic seismic unit characterized by an acoustically transparent seismic facies and constituting the stratigraphic architecture of the Ischia offshore under the Magnaghi canyon. *Pls* Late Pleistocene seismic unit representing the upper unit of the basin filling of the Salerno Valley, composed of marine sediments. *Hol* Holocene highstand drape

The sedimentary filling of the Salerno Valley consists from the top of two seismic units lying above an interpreted carbonate substrate. The uppermost one (Hol unit; Fig. 10) is characterized by continuous and parallel seismic reflectors. It is probably related to Holocene marine sediments, overlying the lowermost unit, interpreted as Middle–Late Pleistocene deposits (Pls unit Fig. 10).

The underlying unit displays weak and discontinuous reflectors, with a chaotic acoustic facies. Its seismic facies, typical of flysch deposits, coupled to regional geological evidence coming from the correlation with the onshore geology suggest its interpretation as Miocene siliciclastic deposits ("Flysch del Cilento" Auct.; FC unit Fig. 10; Bonardi et al. 1988). The deepest seismic unit (MC unit Fig. 10), characterized by an acoustically transparent facies with low penetration of the seismic signal is interpreted as the Meso-Cenozoic carbonates, constituting the deep bulk of the stratigraphic architecture of the Naples Bay. The carbonatic unit, strongly downthrown by main regional faults (Dohrn fault and Capri fault; Fig. 10) is here recognized in the whole south-eastern Naples Bay, from Banco di Fuori to Capri high and Salerno Valley.

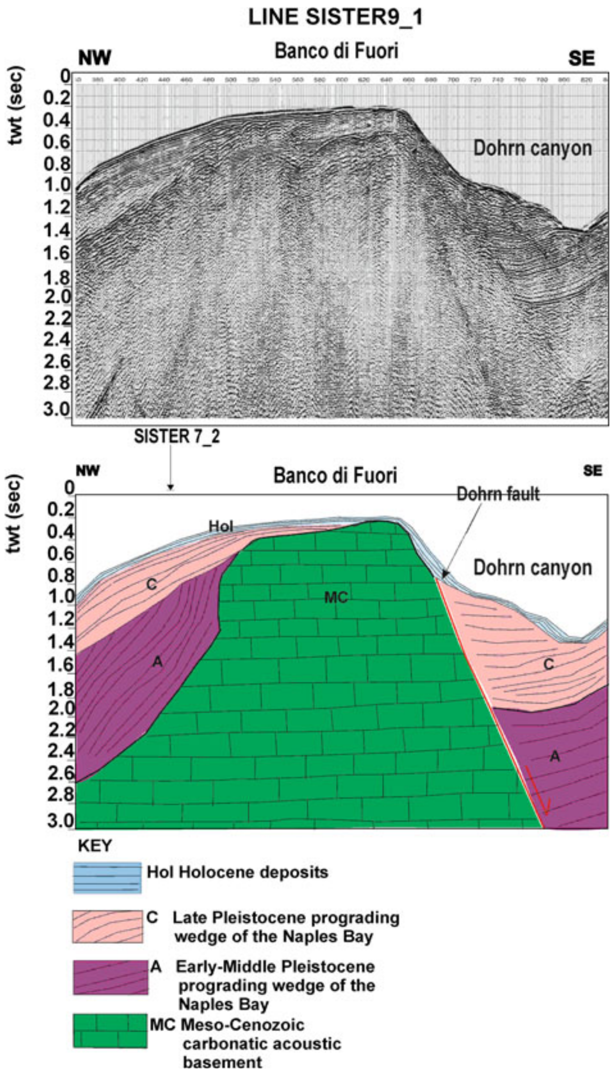

Fig. 11 Detail of the seismic profile Sister9_1 (Banco di Fuori–Dohrn canyon) and corresponding geological interpretation. *MC* Acoustic basement. Meso-Cenozoic carbonates cropping out offshore the Sorrento Peninsula and the Capri island. *A* Early Pleistocene relic prograding wedge representing the lower unit in the stratigraphic architecture of the Naples Bay, characterized by obliquous prograding clinoforms. *B* Late Pleistocene prograding wedge representing the upper unit in the stratigraphic architecture of the Naples Bay, characterized by low-angle sigmoidal to obliquous clinoforms, supplied by the palaeo-Sarno river mouth. *Hol* Holocene deposits

4.3 Geoseismic interpretation of the seismic profile Sister7_2

The SW–NE seismic profile Sister7_2 whose length exceeds 50 kilometres, crosses: (a) the Capri Basin, (b) the Banco di Fuori structure, (c) the Dohrn canyon's thalweg and (d) the outer shelf of the Naples Bay (Fig. 12 and index map).

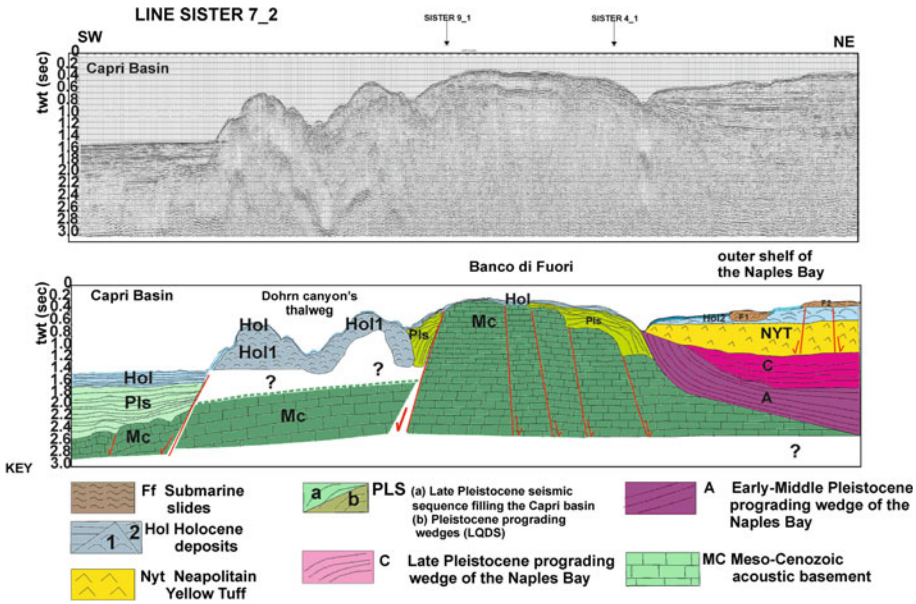

Fig. 12 Regional seismic profile Sister7_2 and corresponding geological interpretation. *MC* Acoustic basement. Meso-Cenozoic carbonates cropping out offshore the Sorrento Peninsula and the Capri island. *A* Early Pleistocene relic prograding wedge, representing the lower unit in the stratigraphic architecture of the Naples Bay, characterized by obliquous prograding clinoforms and parallel reflectors (perpendicularly to the direction of progradation). *B* Late Pleistocene prograding wedge representing the upper unit in the stratigraphic architecture of the Naples Bay, characterized by low-angle sigmoidal to obliquous clinoforms and parallel reflectors (perpendicular to the direction of progradation), supplied by the palaeo-Sarno river mouth. *Pls* Late Pleistocene seismic sequence representing the basin filling of the Capri Basin. *Hol* Holocene deposits, characterized by parallel and continuous seismic reflectors in the Capri Basin. *Hola* Holocene deposits on the outer shelf of the Naples Bay characterized by alternances of marine and volcanoclastic sediments; interlayered slide deposits (Bb). *Holb* Holocene deposits, characterized by an acoustically transparent seismic facies in correspondence to channel–levee complexes in the Dohrn canyon's thalweg

Three seismic units (Hol, Pls and MC units; Fig. 12), have been identified in the Capri Basin (a), which develops at water depths of about 1,125 m. The individuation of the Capri Basin has been probably controlled by a master fault bounding the Dohrn canyon thalweg (Fig. 12).

From the top the most recent seismic unit (Hol Fig. 12) is characterized by strong reflectors, parallel and laterally continuous. The latter are related to Holocene marine sediments, overlying Late Pleistocene marine sediments, showing reflectors with the same seismo-acoustic characteristics (Pls Fig. 12). These two units stand for the filling of the Capri Basin, probably ranging in age from Middle–Late Pleistocene to Holocene.

The lower seismic unit (MC unit Fig. 12) shows an acoustically transparent seismic facies due to poor penetration of the seismic signal. It is correlated to the Meso-Cenozoic carbonates, representing the rock bodies which extensively crop out in the Capri Island (Barattolo and Pugliese 1987; De Castro 1991). This deep seismic unit relates to thick carbonatic succession of the Campania–Lucania carbonate platform margin (sensu D'Argenio et al. 1973).

The Banco di Fuori morpho-structure high (b) is characterized by Meso-Cenozoic carbonates (MC unit Fig. 12) cropping out at the sea bottom and covered by a thin layer of

Holocene sediments. It is a NE–SW trending morpho-structure high located in the centre of the Naples Bay, between the Capri and the Ischia islands, looking as an asymmetrical ridge with the south-eastern flank steeper than the north-western one (see also Figs. 10 and 11).

The Dohrn canyon thalweg (c) is characterized by a seismic unit with parallel to discontinuous reflectors alternating with chaotic intervals, interpreted as turbidite channel and levee complexes, probably Holocene in age (Hol1 Fig. 12). The occurrence of the seismic unit corresponding to Meso-Cenozoic carbonates under the canyon has been hypothesized (Fig. 12).

The outer shelf of the Naples Bay (d) displays four seismic units (Fig. 12). The two oldest ones have been interpreted as two relic prograding wedges, dating back to the Pleistocene. These wedges, already described in the paragraphs 4.1 and 4.2 represent the main bulk of the Naples Bay stratigraphy (A and C seismic units). The overlying volcanic seismic unit, characterized by an acoustically transparent seismic facies and a wedge-shaped external geometry has been interpreted as the Neapolitain Yellow Tuff (NYT Fig. 12; Scarpati and Cole 1993).This interpretation is confirmed by the correlation with the onshore geology in the adjacent emerged sectors. Large outcrops of NYT may be observed along the coastal cliffs of the Naples town from Posillipo to Nisida.

The highest seismic unit (Hol unit) is characterized by parallel and continuous seismic reflectors, interpreted as Holocene marine deposits (Hol2 Fig. 12). Weak and discontinuous seismic intervals (Bb Fig. 12), interlayered in the Hol unit, are here interpreted as submarine slide deposits, probably composed of volcanoclastic sands and pumice levels.

4.4 Some implications of seismo-stratigraphic data on the Campania volcanism: a buried volcanic edifice between the Dohrn and Magnaghi canyons

A previously unknown, mound-shaped buried volcanic edifice interstratifies with the volcanites and volcanoclastites of the Mg unit (Fig. 13). It is located under the Magnaghi canyon, at depths ranging between 1.0 and 1.5 twt (s). The stratigraphic position of the volcanic edifice, in the lowermost part of the Mg unit, suggests that it should be genetically related with the oldest phases of volcanic activity of the Procida volcanic complex.

An important round-shaped magnetic anomaly has been identified in the central slope of the Naples Bay between the two canyons and correlated to a large buried volcanic edifice. Even though the field anomaly seems to correspond to a bathymetric depression (Secomandi et al. 2003) it was already interpreted as a large buried volcanic edifice. The geological interpretation of the seismic profile Sister4_2 has allowed to confirm that the volcanic structure related to this basin shows a mounded-shaped external geometry and buried below a volcanic sequence thick about 720 m (Fig. 13).

5 Discussion and conclusions

The regional geological interpretation of the seismic profiles concurred to obtain new data on the structural and stratigraphic setting of the Naples Bay along the Ischia–Capri alignment and its relationships with the Campania–Latium margin and the Salerno Gulf. The study sections are all localized in the Naples Bay; two of them end up in correspondence to the Campania–Latium Tyrrhenian margin (Sister4_2 and Sister7_2), while the third one end up in correspondence to the Salerno Gulf (Sister9_1; Fig. 1).

The main regional morpho-structures of the Campania continental margin along the Ischia–Capri alignment are here discussed.

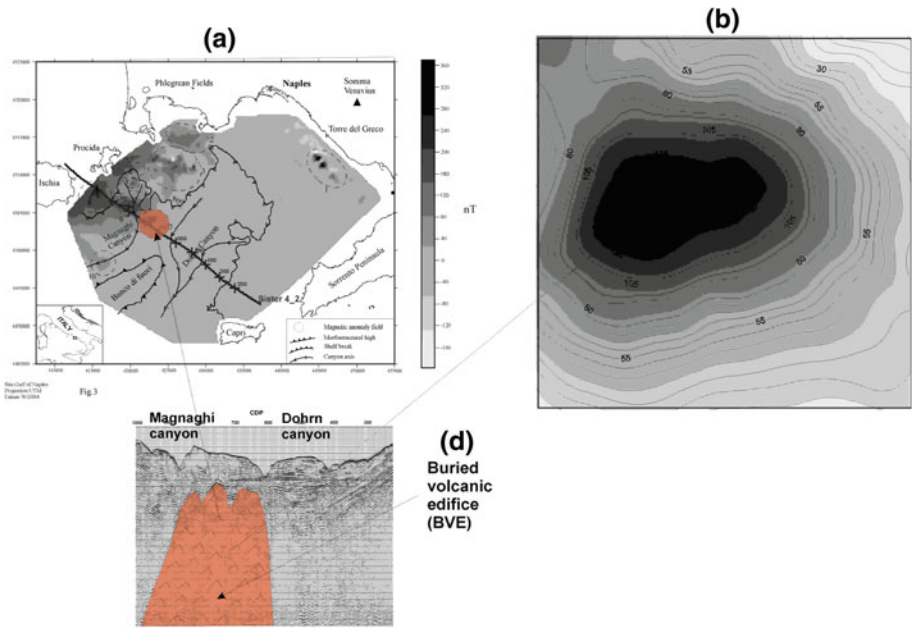

Fig. 13 **a** Anomaly map of the total magnetic field, main magnetic fields and morpho-structural features of the Naples Bay (slightly modified after Aiello et al. 2004); the location of the seismic profile Sister4_2 has also been reported. The red circle indicates the magnetic anomaly field corresponding to the buried volcanic edifice located between the Dohrn and Magnaghi canyons. **b** Detail of the magnetic anomaly map showing the anomaly field related to the BVE (buried volcanic edifice); **d** Detail of the seismic section Sister4_2 showing a large volcanic edifice, buried under recent sediments, identified through seismic interpretation on the continental slope between Magnaghi and Dohrn canyons

1. The "**Banco di Fuori**" is a morpho-structure high of the Meso-Cenozoic carbonatic substrate, bounding the southern sector of the Naples Bay. Its flanks and top are overlain by the Pleistocene deposits of the Late Quaternary depositional sequence (Figs. 10, 11 and 12). It is characterized by an acoustically transparent seismic facies, related to the Meso-Cenozoic carbonates.

Regional geological evidences and seismic interpretation have confirmed that the Banco di Fuori represents a major morpho-structure high, which separates the Dohrn canyon from the Magnaghi canyon. It is formed by a Mesozoic carbonate block that resulted from the regional uplift and tilting of the carbonatic substrate. Its carbonatic nature is suggested by the location along the Capri–Sorrento structural alignment and confirmed by the lack of significant field anomalies (Aiello et al. 2001, 2005).

The interpreted seismic data agree with previous structural interpretations (Milia and Torrente 1999). The Banco di Fuori high is bounded southward by a normal fault swarm, showing a change of trend from N56E to N33E that down throws the Meso-Cenozoic substrate many hundred of metres to the south–east and is characterized by variable cross-section geometries. The top of the substrate is down faulted to the south-east. The appraisal of the corresponding fault is ca. 1,300 and 1,000 m, while the eastern profile of ca. 600 m. The displacement changes of the Banco di Fuori normal fault are interpreted according to the model of Walsh and Watterson (1988), which document that the fault displacement changes along the strike. It is commonly greatest at the centre of the fault, decreasing to zero at the eastern fault tip in the central part of the Bay of Naples, where this structure is buried by younger sediments.

2. The **Dohrn canyon** is a main morpho-structure of the Naples Bay, separating the eastern sector, where the sedimentary seismic units crop out, from the western one, where the volcanic seismic units prevail. It is articulated into two branches, the eastern one and the western one, merging in a thalweg having a NE–SW (counter-Apenninic) direction, bounded southwards by the Capri Basin (Figs. 11 and 12). It erodes the Pleistocene relic marine units of the prograding wedges (A and C in the interpreted seismic sections) overlying the Meso-Cenozoic carbonates.

New seismo-stratigraphic data have suggested the occurrence of Meso-Cenozoic carbonates under the canyon thalweg, in the bathyal plain westwards of the Capri island, as evidenced by the stratigraphic relationships of the carbonatic unit along the Banco di Fuori–Salerno Valley alignment (Fig. 12). The carbonatic unit below the Banco di Fuori–Dohrn canyon–Salerno Valley alignment has not been previously pointed out by seismo-stratigraphic papers on the Naples Bay, suggesting its distribution only in the eastern continental shelf of the Naples Bay, as offshore prolongation of the NW dipping Capri–Sorrento monoclinalic structure (Fusi 1996).

3. The **Capri structural high**, whose stratigraphic bulk is constituted by two relic prograding units (A and C seismic units). The structural high is bounded by the Dohrn canyon structure to the north-west and by the Salerno Valley to the south-east. Its regional structure is related to the Capri–Sorrento Peninsula structural alignment (D'Argenio et al. 1973; Perrone 1988). The southern flank of the structural high is controlled by the Capri–Sorrento master fault.
4. The **Magnaghi canyon** drained the volcanic and volcanoclastic input coming from the eruptive activity of the Ischia and Procida Islands during the Late Quaternary. It carves the sediments of the Mg unit, characterized by reflectors having a chaotic distribution. Based on regional seismo-stratigraphic evidences, a volcanic nature of the Mg unit, genetically related to the Procida volcanic complex, may be assumed (Figs. 9 and 14).
5. The **Magnaghi canyon basin** (Figs. 9 and 14) is a sedimentary basin located adjacently to the Magnaghi canyon and representing a depositional area, where Pleistocene–Holocene deposits drained by the canyon in its initial thalweg accumulated. It has been not previously mentioned by papers dealing on seismic stratigraphy of the area (Fusi et al. 1991; Milia and Torrente 1999).
6. The **buried volcanic edifice localized between the Dohrn and Magnaghi canyons (BVE)** represents another important morpho-structure of the Naples Bay detected through the seismic interpretation (Fig. 13). The volcanic edifice has been identified for the first time by Secomandi et al. (2003) based on magnetic anomaly maps of the Naples Bay and is confirmed by the seismic interpretation of the seismic profile Sister4_2. The volcanic structure, interstratified in the volcanic deposits of the Mg unit, shows a mounded-shaped external geometry and is buried below a volcanic sequence about 720 m thick (Fig. 13). It should be genetically related to the oldest phases of eruptive activity of Ischia and Procida volcanic complexes due to its stratigraphic location in the basal part of the Mg volcanic unit(Vezzoli 1988; De Astis et al. 2004).
7. The **Capri Basin** (Fig. 12) is a deep basin localized in the Tyrrhenian bathyal plain southwards of the Dohrn canyon. It is filled by Pleistocene–Holocene sediments thick about 0.7 s (twt), unconformably overlying the Meso-Cenozoic carbonates. The basin

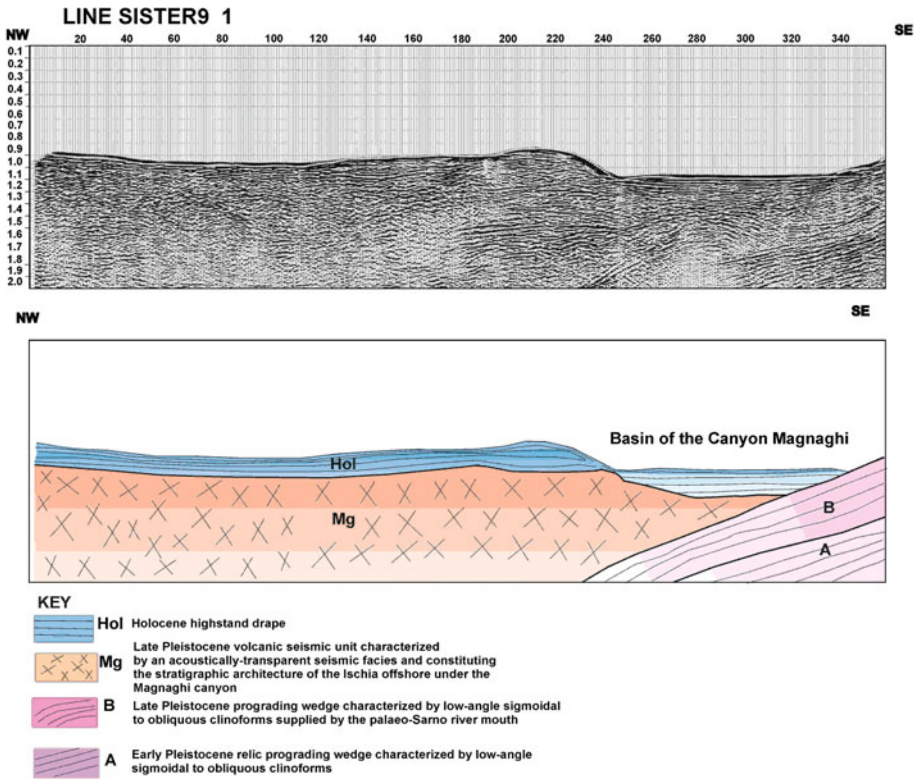

Fig. 14 Detail of the seismic profile Sister9_1 showing the basin recognized in correspondence to the Magnaghi canyon. *Hol* Holocene highstand drape. *Mg* Late Pleistocene volcanic seismic unit characterized by an acoustically transparent seismic facies and constituting the stratigraphic architecture of the Ischia offshore under the Magnaghi canyon. *B* Late Pleistocene prograding wedge characterized by low-angle sigmoidal to obliquous clinoforms supplied by the paleo-Sarno river mouth. *A* Early Pleistocene relic prograding wedge characterized by low-angle sigmoidal to obliquous clinoforms

filling is characterized by parallel and laterally continuous seismic reflectors, overlying an acoustically transparent seismic facies, interpreted as the Meso-Cenozoic carbonates.

A few study deals with the seismic stratigraphy of the Capri Basin, which is relatively unknown, excluding the paper of Milia and Torrente (1999), identifying seven depositional sequences in the basin filling. Two lowstand units have been related to main tectonic pulses. Mass flow deposits that flowed into the basin directly from the contiguous narrow shelf and steep slope have also been recognized.

8. The **Salerno Valley** (Fig. 12) is a half-graben basin filled by three main seismic units corresponding to Quaternary marine and continental sediments. These units grade laterally into the chaotic deposits related to the "Flysch del Cilento" *Auct.* (Bonardi et al. 1988). The deepest seismic unit has been interpreted as Meso-Cenozoic carbonates due to the poor penetration of seismic signal. The tectonic setting of the valley is controlled by the Capri regional fault, downthrowing the Meso-Cenozoic carbonates from the Capri structural high under the basin itself.

9. The **Volturno Basin**, hosting the northern sector of the Campania Plain and the surrounding offshore, shows a sedimentary filling consisting of four marine and deltaic seismic sequences, alternating with volcanoclastic levels and overlying deep seismic units, related with Miocene flysch deposits (sands and shales) and Meso-Cenozoic carbonates (Fig. 10).

The seismo-stratigraphic data have evidenced that the Volturno Basin represents a half-graben, characterized by blocks down thrown along normal faults, involving the top of the Miocene acoustic basement. Similarly to other sedimentary basins offshore of Campania, the volcanic terms are particularly developed with proper terms (i.e. a volcanic body genetically related to the Villa Literno volcanic complex). The basin filling is composed of thick coastal and deltaic sediments interstratified with pyroclastic and lavic complexes, often conditioning their depositional geometries.

A sketch table resuming the main seismic units recognized in the Ischia–Capri–Volturno sector of the Naples Bay (Table 1), their seismic facies and geologic interpretation has been constructed to improve the discussion of the obtained results. The order of the units reported in the table roughly reflects their stratigraphic position and consequently, their qualitative age (Table 1).

The interpretation of the seismic profiles has allowed to evidence the main seismic units of the Naples Bay and related tectonic lineaments. The boundaries between different morpho-structures of the Campania continental margin (i.e. Naples Bay–Volturno Basin) and the relationship existing with the deeper seismic units have been defined. The geoseismic interpretation of the profiles has been carried out according to the classic criteria of seismic stratigraphy (Mitchum et al. 1977), starting from the seismic profile Sister4_2, the cross-points of the profile Sister7_2 and the other two profiles.

This paper has allowed to reconstruct the distribution of the different described seismic units and to define the transition from the sedimentary seismic units to the volcanic ones, already a matter of interest of several papers on the Naples Bay (Fusi et al. 1991; Aiello et al. 2001). A brief comparison with the distribution of the volcanic seismic units in the Naples Bay reported in the stratigraphic paper of Fusi et al. (1991) has been carried out. In particular, a volcanic edifice has been recognized on the continental slope of the Naples Bay, N–S trending and oval in shape. It crops out at the sea bottom in the western branch of the Dohrn canyon (Fusi et al. 1991). This edifice should be genetically related to the buried volcanic edifice (BVE; Fig. 13) here described on the continental slope between the Dohrn and Magnaghi canyon, also if the BVE, due to its stratigraphic location, seems to be older. A small volcano, having a well-individuated conduit, is located about 10 km south of the island of Procida (Fusi et al. 1991) in the same area of distribution of the Mg seismic unit. However, the Mg volcanic unit, supported by our seismic data offshore of Procida, being tabular in external shape, differs from this mounded-shaped, isolated edifice. It should perhaps represent a volcanic and/or volcanoclastic deposit genetically related to the Procida volcanic complex, whose eruptive activity lasted in age from 55 to 18 ky B.P. (Rosi and Sbrana 1987; De Astis et al. 2004).

Several volcanic edifices have been identified in the Ischia offshore (Fusi et al. 1991). In particular, a volcanic edifice with a visible conduit has been individuated 25 km SE of the island of Ischia; a small volcano with a diameter of 1.5 km and a visible conduit is located 15 km south of Punta S. Pancrazio; another volcanic edifice, having a maximum diameter of 5 km is located about 30 km south the island. As in the Procida offshore, the Isch volcanic unit, revealed by our data in the Ischia structural high is a wide tabular, acoustically transparent, volcanic rock body, different from isolated volcanic edifices suggested

Table 1 Sketch table of the main seismic units in the Ischia–Capri–Volturno sectors

Seismic unit	Seismic facies	Geologic interpretation
F1/F2	Chaotic seismic reflectors	Submarine slides composed of alternating volcanoclastites and pumice levels in the Naples Bay outer shelf
Hol	Parallel and continuous seismic reflectors	Holocene marine sediments
Pls	Seismic reflectors with high amplitude, from inclined and discontinuous to parallel	Late Pleistocene coastal and marine deposits
Mg	Weak internal reflectivity	Volcanic deposits genetically related to the Procida volcanic complex (Magnaghi canyon)
Isch	Low internal reflectivity (acoustically transparent)	Volcanic deposits genetically related to the Ischia volcanic complex (Ischia structural high)
C	Continuous and strongly inclined seismic reflectors	Late Pleistocene relic prograding wedge supplied by the Sarno–Sebeto river mouth (north-eastern Naples Bay)
D3	Weak seismic reflectors with low lateral continuity	Late Pleistocene coastal and marine sediments (Volturno Basin)
A	Continous and sub-parallel seismic reflectors	Early–Middle Pleistocene relic prograding wedge supplied by the Sorrento Peninsula during its phases of tectonic uplift; depocentral area between Capri and Bocca Piccola (maximum thickness of the seismic unit)
D2	Continuous seismic reflectors having low amplitude	Pleistocene deltaic and marine sediments (Volturno Basin)
D1	Parallel seismic reflectors	Early Pleistocene sediments (shales of coastal environment) alternating with volcanic materials (Volturno Basin)
FF	Discontinuous seismic reflectors/low penetration of the seismic signal	Miocene siliciclastic deposits ("Flysch di Frosinone" *Auct.*); Volturno Basin
FC	Weak and discontinuous seismic reflectors	Miocene siliciclastic deposits ("Flysch del Cilento" *Auct.*); Salerno Valley
MC	Acoustically transparent; low penetration of the seismic signal	Meso-Cenozoic carbonatic unit in the south-eastern Naples Bay (Banco di Fuori–Dohrn canyon–Capri high–Capri Basin–Salerno Valley)

by Fusi et al. (1991). Also if precise dating of the Isch unit is not possible based only on seismo-stratigraphic data, we may accept that it ranges in age from 150 to 10 ky B.P., which is the interval of activity of the Ischia volcanic complex (Poli et al. 1987).

Several deep seismic unit, here called S, V, FF and MC have been defined in the Naples Bay based on multichannel seismic interpretation. These units have been mapped reporting in plan view the boundaries of their distribution and showing the main tectonic relationships along the morpho-structural lineaments.

A qualitative sketch map reporting the main deep seismic units identified on multichannel seismic data set of the Naples Bay is reported in Fig. 15. In this scheme, the thin Holocene drape covering most of the part of the sea bottom in the Naples Bay has not been considered.

The first seismic unit (S Fig. 15) includes the A and B seismic units recognized in the data. It is defined by a seismic facies with continuous reflectors, with amplitude from weak

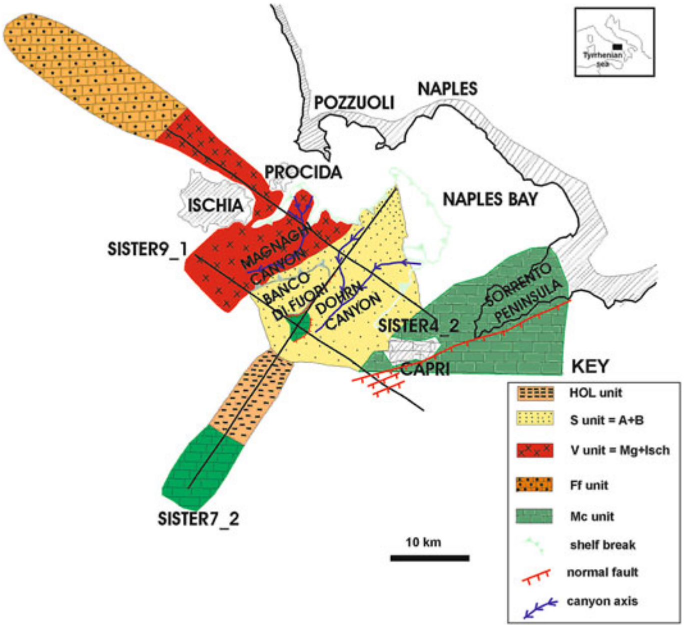

Fig. 15 Sketch map showing the distribution of the deep seismic units recognized in the study profiles in the Naples Bay (see the text for further details). Main morpho-structural lineaments have also been reported

to strong and steeply dipping. This unit unconformably overlies the Meso-Cenozoic carbonates of the MC unit and comprises the two Pleistocene prograding wedges constituting the main stratigraphic architecture of the Naples Bay (S unit = A + B in Fig. 15). The unit has been mapped in the central Naples Bay outer shelf and upper slope.

The MC seismic unit corresponds to the deep Meso-Cenozoic carbonatic unit of the Naples Bay (Fig. 15). It is characterized by an acoustic facies with poor or lacking penetration of the seismic signal. In the sketch map of Fig. 15 the unit has been represented in the eastern Naples Bay continental shelf and in the north-western Salerno Bay, respectively, north and south of the Sorrento Peninsula structural high, where Meso-Cenozoic carbonates extensively crop out. Moreover, the MC unit has been mapped in correspondence to the Banco di Fuori structural high and in correspondence of the Capri Basin.

The Ff seismic unit characterizes the offshore north to the Ischia island in its deepest area (Fig. 15). In this unit, the seismic facies is characterized by alternating discontinuous reflectors and poor penetration of the seismic signal. This unit includes Miocene flysch siliciclastic deposits and underlying Meso-Cenozoic carbonates.

The V seismic unit comprises all the different volcanic units (Mg and Isch) defined in the seismic profiles which characterize the north-western sector of the same bay (Fig. 15). The Mg seismic unit, identified below the Magnaghi canyon, is characterized in correspondence to the seismic profile SISTER4_2 by a less acoustically transparent seismic signal and by the occurrence of a large buried volcanic edifice, correspondent to a wide positive magnetic anomaly (Secomandi et al. 2003).

Along the Sister7_2 seismic profile and, more precisely, between the Capri Basin and the S unit a sedimentary body with chaotic seismic signal has been related to Holocene marine sediments (Hol unit in Fig. 15) located along the Dohrn canyon thalweg.

Turning from the Naples Bay to the Salerno Valley, focused through the study of the seismic profile Sister9_1, it seems to be marked by a normal fault, downthrowing the MC seismic unit and characterized by strong diffraction hyperbola. Due to the positioning and to the seismic characteristics of the structure, it is likely that this fault represents the southwestwards prolongation of the Capri master fault. A further prolongation of the same fault in the south-western sector of the surveyed area may be inferred. Other two main faults have been identified: the Dohrn fault, which puts in contact the MC unit with the Pleistocene sediments of the relic prograding wedges in correspondence to the Banco di Fuori–Capri island regional structure and the master fault of the Capri Basin, controlling the transition to the deep basin and downthrowing the MC unit.

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