DOWNLOAD PDF BUCHNER, G. ITALIANO, A. VITA-FINZI, C. RECENT UPLIFT OF ISCHIA, SOUTHERN ITALY

Chapter 1 : Tectonic Environments of Ancient Cultures:

Radiocarbon dating of fossil bivalves and corals from Ischia shows that parts of the island have undergone some 70 m of uplift in the last yr. Historical evidence reportedly suggests that.

Tectonic footprints in the ancient Hellenic world Eric R. MINOANS The entire Aegean area hosted basically-Neolithic cultures until its neighbors to the east had long since initiated the Bronze Age, with Crete alone precociously showing an early and continuous evolution to civilization. The Minoan civilization held sway in Crete for almost a thousand years, about to B. Though influenced by Egypt and Mesopotamia, their culture was quite distinctive, based on maritime commerce and characterized by relaxed and flowing art, and on their own architecture and scripts. Indeed, the influence of the Minoans on later Hellenic civilizations is more remarkable to me than their derivative ancestry. Crete itself probably cradled its civilization due to its advantageous location relative to Africa, western Asia, and southern Europe for a seafaring people. In the next stage of this culture, the first Minoan palaces were constructed 2. The famous palace sites Knossos, Phaestos, and Malia are indeed rewarding, but traveling about eastern Crete one is constantly seeing signs to other Minoan sites, ranging from entire palaces to small hilltop temples, hundreds of them in all. The Minoan culture was clearly quite pervasive in Crete. Crete is just north of the boundary between the Hellenic and African tectonic plates fig. Seismicity is common today, especially near the south coast where Phaestos is, and in the basins 3 where all three big palaces lie. The southwestern coast of the island has been markedly uplifted over the past few millennia, and paleoseismic evidence for the Minoan period has been found at several sites 4. Evidence of the influence of tectonic activity on Minoan culture was pervasive too, starting with their construction method. Minoan structures are made of stone at least the preserved ones are , and stone structures are quite susceptible to seismic damage. The Minoans used timber cross-beams, however, to tie walls together. These are said to have provided the elasticity that permitted their survival. The sites of these tie-beams are today represented only by slots in the walls. Specific seismic events divide Minoan chronology into its subdivisions based on ceramics and architecture, commonly separated by destruction layers. On a hilltop near Knossos, strong evidence including gruesome skeletal remains suggests that a religious sacrifice was interrupted by an earthquake. About years later about B. Especially evocative are excavations at a villa at Pitsidia, just uphill from Kommos. Here the direction from which the destructive seismic waves approached can even be specified from the fall of specific walls on specific storerooms filled with pottery jars 4. This eruption captured Minoan life by burial of the settlement of Akrotiri; excavations there reveal a sophisticated settlement and stunning artwork. The inhabitants of Akrotiri might well have experienced earthquakes, tsunami, and smaller eruptions already, as these have occurred repeatedly in the historic period and are known in the pre B. But the Theran eruption did not end Minoan civiliization as was earlier thought. What may correspond chronologically with the end of all Bronzeâ€"age civilization on Crete is a tsunami deposit best known at Gouves, also on the north coast. It occurred between and B. Thus repeated tectonic activity, both seismic and volcanic, accompanied and indeed punctuated life in the Minoan world. In the absence of literature describing cultural responses to tectonic activity, however, we can only imagine its impact. The Mycenaean culture had many such points of similarity with the Minoans, but the Mycenaeans projected more power and wealth onto a Minoan cultural base 6. Mycenae itself is a mountain citadel that commands the broad Argos basin, and surrounded by coeval sites including former ports at Tyryns and Argos. Homer tells us that Agamemnon set out from here to lead the Greek hosts of the Trojan War. Travelling through southern Greece and especially in the northeastern Peloponnese Peninsula, I ran into Mycenaean ruins of all sorts and sizes seemingly everywhere, many more than guidebooks lead one to expect, and suggestive of a civilization that pervaded every aspect of human occupation in southern Greece. Remnants of Mycenaean bridges, for example, line up to reveal an extensive road system. Many more Mycenaean sites underlie ruins of the Classical Greek era. The tectonic environment of Mycenae and the Argos basin is largely extensional i. The evidence of age is based on streams dammed behind these fault scarps all around the hill on which Mycenae stands 7. Mycenaean civilization as a whole overlaps later Greek culture in area fig. The evidence is persuasive if gruesomely evocative, commonly involving skeletal remains of family groups under collapsed walls. The damaged palaces form a line on the map that trends all the way from Pylos at the southern end of Greece through Sparta, Mycenae, Tiryns, and Thebes all the way to Troy at the Dardanelles in Turkey fig. Apparently many of the Mycenaean sites made famous by Homer were being damaged by earthquakes, possibly soon after his Trojan War. As in Minoan Crete, earthquakes punctuate Mycenaean chronology. In fact it has been noted that, chronologically, all the changes in Mycenaean pottery styles correspond to major earthquakes fig. Almost all the evidences of earthquake damage are sandwiched between occupation layers, i. In the end, however, one of the terminal events of the Mycenaean era was the B. We see two odd things about the distribution of damaged Mycenaean palace sites. First, they line up as if along a fault. Second is how much effort the Mycenaeans invested in palaces and perhaps a war along this line fig. In fact as Mycenaean culture spread northward it stopped where this line passes out into the Aegean, rather than curving into interior Thessaly where typical agricultural Neolithic cultures had flourished in relative tectonic quiescence 8. The tectonic environment of the larger Mycenaean world 9 is an intersection of three tectonic plates, each headed in different directions, separated by two fault zones fig. To the south the African plate dives under the other two plates along the same subduction zone as that just south of Crete. It passes from northern Turkey through the Istanbul area, the Sea of Marmara, the Dardanelles the ancient site of Troy , the northern Aegean, and thence into Greece, where its activity eventually becomes offset and dispersed fig. This margin is very active seismically but contains no active volcanoes. The plate boundary between Volos and the Hellenic trench is thought to be distributed over a considerable region of southern Greece, making a fairway of land about km wide seismically active. It seems remarkable, therefore, that the distribution of Mycenaean sites suggests such focus on that single tectonic trend, representing an extension of the East Anatolian fault and therefore the plate boundary fig. But why would the Mycenaeans have focused their architectural attentions on it, given the seismic problems it presented? Could there be something about this pathway that accelerated cultural development along it, relative to its more quiescent margins? So far, it seems clear that both the Mycenaean and Minoan cultures show intricate responses to their tectonic environments, both in map distribution and in cultural evolution. It even appears that the end of the Bronze Age has a tectonic signature 9. Complex urban cultures re-emerge on the Greek mainland rather slowly, and the earliest ones have tectonic signatures of their own: Sites of Mycenaean palaces destroyed by earthquakes in and B. The distribution of destroyed Mycenaean palaces 7 , with only a few exceptions, includes all the palaces of that civilization, suggesting not only ancient tectonic activity along this structural trend, but also the localization of palaces along it. Each curve represents a different pottery type dominant in its time period. What I can contribute is a description of their tectonic environment, and what part that played in their cultural development. This period B. Of course the factors that controlled the rise of ancient Greece certainly include the abundance of natural harbors, the result of a drowned shoreline produced by a combination of tectonic subsidence and the postglacial rise of sea-level, and its position projecting into the eastern Mediterranean. Valuable mineral resources especially of silver were nearby. The Aegean archipelago that today seems a hindrance to a cohesive culture, in antiquity fostered it; sea travel in antiquity was considerably faster than long-distance overland travel Poseidon willing! Thus distant islands could be imbued with Hellenic consciousness more easily than could inland Macedonia, for example. Both of these sites have intricate histories of tectonic activity see table 1. At Delphi, in fact, some investigators hold that the exact site where the Pythian priestess, mouthpiece of the oracle, delivered her ambiguous predictions is where hallucinogenic vapors emanated from intersecting active faults. Apparently the Greeks endured the hazards of active tectonism to take advantage of a useful aspect of it unwittingly one would think, but Plutarch came as close to a diagnosis as the science of his day permitted. Commercially, trade conducted at first via Phoenician mariners made a few Greek sites wealthy in the Geometric period. Three of greatest importance in the Geometric period are Corinth, Lefkandi, and Eretria, both of the latter on the nearshore island of Euboea Evia. It had an easily fortified position at Acrocorinth, and prolific springs there. Corinth became famous for its ceramic wares in the Geometric period, and already in this period it was throwing out colonies well outside present-day Greece. Corinth too was beset with earthquakes in antiquity as in modern times, described in some detail in note In addition to the usual destruction see table 1 , the earthquakes had the effect of destroying its port facilities either by submerging or uplifting them fig. All the Geometric sites are in regions of high seismic risk due to the activity along nearby tectonic boundaries fig. It is remarkable that these sites and many others that were damaged table 1 were generally rebuilt rather than relocated. Of course this also implies that the inhabitants of the site were determined to stay on, to rebuild or repair promptly, and this is the case at site after site. Hellenic cultures repeatedly chose zones of tectonic activity for initial sites, even though the faults involved were separate. Tectonism in classical Greek culture. According to Thucydides, the directions taken by the Peloponnesian War were diverted nine times by earthquakes Tsunami were also frequent hazardsâ€”to the extent that the Greek gods of earthquakes and of the sea were the same, Poseidon. At the point where its shock has been the most violent, the sea is driven back, and suddenly recoiling with redoubled force, causes the inundation. His predecessor Herodotus, however, thought that an earthquake in Delos was most pivotal. Earthquakes punctuate Greek dramas, particularly those of Euripides, who used earthquakes like a more modern playwright might use thunderstorms. And a succession of Greek philosophers and proto-scientists tried to explain both earthquakes and volcanoes, and these Greek explorations clearly influenced those of Lucretius in Rome hundreds of years later. Indeed their attempt to relate natural phenomena to each other is part of the origin of science Conversant with earthquakes they may have been, but not passive. A tour of ancient Greek sites with long histories shows quite an evolution of building methods. For example, where columns were made of stacked stone drum segments, these were susceptible to earthquake damage. Eventually various anti-seismic devices were used to tie them together. These devices themselves evolved from simple pins in their centers, to multiple I-shaped bronze locks with lead wrappers imparting both tensile strength and cushioning; fig. This evolution continued into the Hellenistic to BC and Roman eras The preservation of any stone structures containing segmented columns in seismically active areas is a testament to the effectiveness of these devices. The ancient Greek response to tectonism shows up in another way, one that seems remarkable, and counter-intuitive. This is the locus formed by its main early centers, from the Peloponnese through the Gulf of Corinth area, Attica and Boeotia, to Euboea.

Chapter 2 : Volcano instability on the Earth and other planets - ECU Libraries Catalog

Title: Recent uplift of Ischia, southern Italy: Authors: Buchner, G.; Italiano, A.; Vita-Finzi, C. Publication: Geological Society, London, Special Publications, vol.

Volcanic rocks en Volcanic risk en Volcanic eruptions en dc. The interaction between regional and local tectonics during resurgent doming: Transverse structures and volcanic activity along the Tyrrhenian margin of central Italy. Aeromagnetic map of Italy and surrounding seas. Petrogrl Acta 29, Il Pleistocene superiore marino di Ischia: Tectonic structures of the Latian-Campanian shelf Tyrrhenian Sea. Terra tremante ovvero una continuazione dei terremoti dalla creazione del mondo fino al tempo presente ecc. Topografia fisica della Campania. Voyages physiques et lythilogiques dans la Campanie. Dentu, Imprimeur- Libraire, Paris. New insights into Late Pleistocene explosive volcanic activity and caldera formation on Ischia southern Italy. The western undersea section of the Ischia volcanic complex Italy, Tyrrhenian Sea inferred by marine geophysical data. Geophysical Research Letters, 29 9 , Macchiaroli Editor , Napoli. Scavi nella necropoli di Pithecusa Magna Grecia 1, Recent work at Pithekoussai Ischia. Studi di geologia, zoologia e preistoria. Die Datierung der vorgeschichtlichen und geschichtlichen Ausbruche auf der Insel Ischia. Recent uplift of Ischia, southern Italy. In Mc Guire, W. Special Paper , Volcanic history of the island of Ischia south Italy. On the mechanics of caldera resurgence of Ischia island southern Italy. Gravity and magnetic survey of the Campanian volcanic area, S. Interpretation of gravity and magnetic anomalies near Naples, Italy, using computer techniques Bull. Allen and Unwin Pub. Volcanological evolution of the island of Ischia. In Di Girolamo, P. Napoli Special Paper , The Citara-Serrara formation Ischia island: Collapse and resurgent calderic movements in a volcano-tectonic area: Magmatic and Hydromagmatic volcanism. Guidebook of the field excursion to the Island of Ischia. Fumarolic and diffuse soil degassing west of Mount Epomeo, Ischia Italy. Vichiana, Loffredo Editor , Napoli Sr- and Nd- isotope and trace-element constraints on the chemical evolution of the magmatic system of Ischia Italy in the last 55 ka. Catalogo Parametrico dei Terremoti italiani. Geochemistry of recent volcanics of Ischia Island, Italy: Evidences of fractional crystallization and magma mixing.. Il terremoto di Casamicciola del 28 luglio Istituto poligrafico e zecca dello Stato Ed. Geochemistry of thermal waters in Ischia island Campania Italy. Geothermics 13 4 , Cyclical slope instability and volcanism related to volcano-tectonism in resurgent calderas: Evolution of transferrelated basin: Esplorazione sismica a riflessione dei Golfi di Napoli e Pozzuoli. Guide for the excursion to Ischia. Geologia Applicata e Idrogeologia. XXX I , Napoli, ottobre Monograph of the earthquakes of Ischia. I bacini neogenici costieri del margine tirrenico: Ischia, archeologia e storia. A gravity and magnetic study of the volcanic island of Ischia, Naples Italy. The uplift of the Mt. Epomeo block at the island of Ischia Gulf of Naples: Eos 69 44 , The restless, resurgent Campi Flegrei nested caldera Italy: Facing volcanic and related hazards in the Neapolitan area. A comprehensive study of the pumice formation and dispersal: Simple-shearing block resurgence in caldera depression. A model from Pantelleria and Ischia. Magnetic modelling of the Phlegrean volcanic district with extension to the Ponza Archipelago, Italy. Geothermal assesment of the island of Ischia southern Italy from isotopic and chemical composition of the delivered fluids. Studi e ricerche in corso nei Campi Flegrei allo scopo di utilizzare le energie del sottosuolo. Temperature nel sottosuolo della regione flegrea. Ricerche e studi sui fenomeni esalativi-idrotermali ed il problema delle forze endogene. Berlin-Stuttgart, Ischia, pp. The Ischia Magmatic Sysem in the last 10ka geochemical and geophisical evidence. Mingling in the magmatic system of Ischia Italy in the past 5ka. Piochi, M, Bruno, P. Relative roles of rifting tectonics and magma ascent processes: Iinferences from geophysical, structural, volcanological and geochemical data for the Neapolitan volcanic region southern Italy. Gcubed 6 7 , Q, doi: Chemistry versus time in the volcanic complex of Ischia Gulf of Naples, Italy: Time dimension in the geochemical approach and hazard estimation of a volcanic area: Magma mixing and chemical zoning in the recent magma chamber of Ischia Italy: Geologie der Insel Ischia. Erganzungsband, 6 Rittmann, A. Origine e differenziazione del magma ischitano. Memorie geologiche sulla

DOWNLOAD PDF BUCHNER, G. ITALIANO, A. VITA-FINZI, C. RECENT UPLIFT OF ISCHIA, SOUTHERN ITALY

Campania. Geological map of the Island of Ischia. Chemical and isotopic investigations of fumarolic gases from Ischia island southern Italy: The space problem of a caldera resurgence: Geologische Rundschau, 87, Late Quaternary monoclinal folding induced by caldera resurgence at Ischia, Italy. Forced Folds and Fractures, edited by J. London Special Publication, , A new type of volcano flank failure: The resurgent caldera sector collapse, Ischia, Italy. Geophysical Research Letters, 31, doi: Geologic map of the island of Ischia. Sr isotope geochemistry of megacrysts from continental rift and converging plate margin alkaline volcanism in south Italy. Stratigraphy and geology of the welded air-fall tuffs of Pantelleria, Italy. A working terminology of pyroclastic deposits.

Chapter 3 : ECU Libraries Catalog

Buchner G, Italiano A, Vita-Finzi C () Recent uplift of Ischia, Southern Italy. In: Jones WJ, Jones AP, Neuberg J (eds) Volcano instability on the earth and other.

Stefano Carlino Nat Hazards The study of the earthquake shows that the intensities, which decreased rapidly with distance, were affected by source directivity, according to the causative fault geometry and tectonic structures, while local amplification of damage was observed where soft soils outcrop. The diverse gradients of attenuation, observed in different directions, were ascribed to the various geological features of the shallow crust of the island. In order to evaluate the role of geology in the damage level, we computed different attenuation models for stiff and soft soils outcropping on the island. A systematic local amplification of about 1 MCS degree associated to the presence of reworked tuffs was obtained. This study also shows the influence of geological conditions on the evaluation of macroseismic data and supplies useful elements to derive a predictive map of potential site effects. The majority of volcanic earthquakes do not generally exceed magnitude 2 or 3. Low seismic energy released in S. This may be associated to various factors such as the anomalous thermal state of the crust, the high fracturing of the medium, the reduction in potential seismogenetic volume and the action of concentrated local stress Abe ; Yokoyama ; Cubellis and Marturano ; Zobin ; McNutt ; Azzaro et al. At the same time, significant volcanic earthquakes of moderate magnitude may occur and produce serious damage. In the twentieth century, about 30 earthquakes, which occurred in different volcanic areas with magnitudes exceeding 4. In the Etna region, earthquakes producing severe damage or even destruction epicentral intensity up to X EMS are associated with magnitudes less than 4. Relatively high-magnitude earthquakes have also been recorded at Mt. Therefore, seismic hazard for settlements close to volcanic areas may be a reality Zobin The occurrence of high intensities against low magnitudes is generally related to the shallow hypocentral depth of volcanic earthquakes and to the poor mechanical properties of the rocks. The latter are known to have great influence on intensities distribution, which often shows a complex field. The study of historical seismicity of Ischia Fig. In particular, the catastrophic event of represents the only example of an earthquake in the Mediterranean volcanic areas, which produced more than fatalities as a result of the total destruction of the village of Casamicciola and damage to many buildings on the island. Furthermore, a sub-vertical fault length about 2 km, barycentre depth at about 1. The former solution allowed for the extent of the highest intensities X MCS ; the latter ably interprets the development of the macroseismic field in the western sector of the island IX MCS Fig. Historical data also show the occurrence of numerous earthquakes before the event Table 1 , which caused serious damage, hundreds of casualties, and often landslides and surface breaks Mercalli ; Johnston-Lavis ; Palmieri and Ogliarolo ; Cubellis ; Buchner ; Luongo et al. After the earthquake, seismic silence was observed on the island. A few events felt by the population occurred at the beginning of the last century Parascandola , and very occasional micro-earthquakes have been recorded in the last 20 years in the northern part of the island. Since , four micro-earthquakes with a magnitude of about 1. The aim of this article is to assess the attenuation trend for different zones on the island and estimate amplification effects due to the outcropping of different soils. Our study uses the detailed damage data MCS intensity of the earthquake from Cubellis and Luongo and Cubellis et al. The quantity and quality of the available data are suitable to achieve the aims of the article. The oldest outcrops date back about ka, while the most recent eruption occurred in â€" Vezzoli ; Civetta et al. The central sector of the island is made up by the structure of Mt. About 30, years ago, the resurgence inside the caldera produced the Mt. The resurgence, interpreted as due to the increase in pressure of a shallow laccolith, rising up to 1 km Luongo et al. Epomeo block; uplift about m probably occurred in fits and starts, as also inferred from the formation and age of marine terraces. In the northern sector of Mt. Epomeo, seismic energy was released during historical time until see Table 1 Cubellis ; Luongo et al. Since that time, seismic silence has been observed. As a result, the seismogenetic volume is thought to be generated in the northern sector at a lower geothermal gradient, while in the southern sector, a high geothermal gradient promotes slow-slip phenomena and absence of earthquakes. These data show that the event was accompanied by strong attenuation of seismic energy, mainly due to the small seismic source in the shallow crustal layer. Furthermore, the complex distribution of intensity values can be related to focal mechanism, attenuation of the medium and site effects due to small-scale geological heterogeneity. The dotted line represents the causative fault of the earthquake, the white point in the middle is the macroseismic epicentre occur Fig. Formulas with larger number of free parameters could better reproduce the fluctuation of dataset without describing the real physics of the problem e. This formula is generally suitable for macroseismic data assuming the rupture area as a point source. For past historical crustal depth earthquakes, for which intensity obser- vations are available, we generally have an estimate of the earthquake magnitude and location e. For large earthquakes, in which the causative fault is supported by surface faulting or clear evidence of a narrow and long epicentral region, it is possible to evaluate the attenuation of intensity using the closest distance from the fault. Furthermore, in Italian volcanic areas, the shallower depth of the source influences the intensityâ€"distance relation, also for smaller magnitude earthquakes Branno et al. For the earthquake, a magnitude of range 4. For distances greater than 1 km, both the distributions show a high dispersion of intensity, whose values spread from VI to X of the fault L of about 2 km were proposed by Cubellis and Luongo In order to evaluate the influence of the source dimension on the intensity versus distance distributions, we located the causative fault in the northern sector of the island for fault location see Fig. The new distribution, obtained considering the shortest distance to the surface projection of the fault rupture Joyner and Boore , Bommer et al. This result reveals that both the reference systems point source and fault length projection are roughly equivalent. By setting the hypocentral depth h at 1. Interestingly, the intensityâ€"distance dependence shows different gradients in different directions, particularly towards the eastern and southern sector; indeed, the c values are 6. Site location is shown at the top right of each figure and 9. These values testify to a very strong decay of seismic shaking especially towards the east where the observed intensities show an anomalous 5-degree decrease in a range of about 2. This result can be interpreted as the effect of the different physical properties of the deeper layers in respect to the shallower ones. This hypothesis is supported by the structural framework of the area Judenherc and Zollo ; Carlino et al. In fact, inside the island, the seismic ray crosses the 2-km-thick brittle, high-fractured and less-dense layer. At a greater distance, the ray goes deeper into the denser basement structures, producing a more efficient propagation of seismic waves. This can be explained in terms of good propagation of the medium along a westerly direction or to westward rupture propagation. The lack of correlation of intensity versus distance for all data from the island R2 B 0. In order to highlight the possible direc- tional effects of the source, the distribution of intensities was calculated as a function of angle of elevation, the latter being defined as the anticlockwise angle that each locality forms from the strike of the causative fault. Circle size is proportional to the intensity from VI small circles to XI large circles. Fault strike is roughly Eâ€"W. Northward, the decay of intensities can be evaluated only for distances smaller than 1 km due to the presence of the sea. In light of the above considerations, a more detailed analysis of intensity versus distance along different directions allows us to emphasize the local effects due to the outcropping of different soils. Moreover, based on macroseismic data, several studies have proposed seismic zoning of some cities, comparing data of historical and recent earthquakes with surface geology and active tectonic structures. These studies show that severe damage generally occurs on soft substrata Esposito et al. However, earthquakes of about intensity that are one degree higher is normally expected for soft soil sites than for rocky ones e. At Ischia, the intensities of the earthquake can be associated to areas with different superficial geology. The outcropping soils were therefore grouped into three main classes: During data processing, it was noted that the behaviour of lavas and welded tuffs, as regards their effects on the variation of c, is very similar. Hence, both soils are to be Nat Hazards As shown by Fig. Since the intensityâ€"distance decay shows different gradients according to the direction, and hard and soft soils are not uniformly located on the island, the above result can be improved if we consider the decay of intensity along NW, SE and E directions, where comparison is allowed between very close soft and stiff soil sites Figs. The regression lines obtained, with a good correlation coefficient, provide the theoretical rate of intensity versus distance for stiff and soft soils, showing a difference of intensity of one MCS degree. Also, the DI value increases slightly with distance. This is likely due to the source effects which, close to the epicentre, cover the effects of soil amplification. In fact, the severe damage which occurred in the near field produced uniform high intensities X and XI degree , making it difficult to recognise local geological effects. In contrast, as the distance from the epicentre increases, the effects of amplification become more evident, producing the observed slight increases in DI. This difference becomes significant at distances greater than 2 km from the epicentre, where the effect of the source decreases, allowing detection of amplification due to soft soils. In order to verify the influence of the soil filtering computation on the attenuation law, the stiff and soft Blake curves, obtained from the equations in Fig. As we expected, comparison Fig. These directions across both soft circle and stiff triangles soils allow us to compare the difference in intensities among sites very close together, located at the same distance from the epicentre Fig. A geological sketch top left of the area is shown see Fig. For instance, the shapes of isoseisms due to soil effects may be otherwise considered dependent on source parameters. Furthermore, as recently Nat Hazards For the earthquake, this result could involve the lowering of the upper bound of the previous evaluated magnitude range. Our results show that macroseismic intensity increases from stiff to soft soils. Furthermore, intensity, as a statistical description of effects in an area e. For this reason, intensities are rarely used for site effect estimations. Here, we used macroseismic data to correlate the damage caused by the Casamicciola earthquake with geological conditions and source properties. In the case, some conclusions may be drawn: The outcropping of soft soils produces an average local amplification of effects of about 1 MCS degree, independently from the azimuth. This result has been widely recognized for sites located very close to one another. Soft soils occur widely on the island and thus, they represent a factor of seismic risk increase; â€” the observed intensity values versus distance from the epicentre also underline the high heterogeneity of the shallow geological conditions. Very strong attenuation is observed in the eastern sector of the island where the high temperatures deplete the rigidity of the shallow structures; instead, in the southern sector, the strong attenuation may be due to the high level of fracturing at the edge of the Mt. Epomeo block, combined with the high temperature of shallow crustal rocks which act as a seismic barrier. Otherwise, the effect of good propagation along the western direction can be correlated to the westward rupture spread. Finally, this study shows that the effects due to superficial geology can be detected from macroseismic data and used to derive a predictive map of potential site effects. Further, the lack of site effect evaluation can lead to overestimating the macroseismic magnitude of historical events due to the occurrence of anomalously high intensities.

Chapter 4 : SRL - Historical Seismologist

The western undersea section of the Ischia volcanic complex (Italy, Tyrrhenian sea) inferred by marine geophysical data and C. Vita-Finzi, Recent uplift of Ischia, Southern. Italy, in Volcano.

Pubblicazioni su riviste internazionali: Effects of subductions and trends in seismically induced Earth rotational variations, J. The Umbria-Marche, Italy, earthquake sequence: Letters, 25, 15, Spada Stress diffusion following large strike-slip earthquakes: Research, 80, , Deformation of the ka marine terrace in Italy: Solar cycle 22 control on daily geomagnetic variation at Terra Nova Bay Antarctica , Annali di Geofisica, 41, , Initial Report", Terra Antarctica, 5 1 , Stress field, deformations and displacements around a flat cavity in an elastic medium, Boll. A time domain finite-difference technique for oblique incidence of antiplane waves in heterogeneous dissipative media, Annali di Geofisica, XLI, 4, Balkema, Rotterdam, Brookfield, , Three years of high precision gravity measurements at the gravimetric station of Brasimone - Italy, Annali di Geofisica, XLI, 2, Local effects of Mountains on Weather in the central Italy: The April Irpinia seismic sequence: Static stress change and strain field variation from large earthquakes and microseismicity, Proceedings of "Earthquake Fault Plane Solutions" Meeting, Taormina, Messina, Febbraio , G. Paleoseismicity of the Corinth earthquake fault: Non-Gaussian distribution function of AE-index fluctuations. Evidence for time intermittency, Geophysical Research Letters, 25, De Martini e K. Regional uplift and local tectonic deformation recorded by the Quaternary marine terraces on the Ionian coast of northern Calabria southern Italy , Tectonophysics, , The role of pre-existing thrust faults and topography on the styles of extension in the Gran Sasso range Central Italy , Tectonophysics, , De Franceschi, G. Regional ionospheric mapping and modelling over Antarctica, Annali di Geofisica, 41, , Piezomagnetic effects induced by artificial sources at Mt. Site response study in Abruzzo Central Italy: Underground array versus surface stations, Journal of Seismology, A geologic contribution to the evaluation of the seismic potential of the Kahrizak fault Tehran, Iran , Tectonophysics, , , Worldwide character of the geomagnetic jerk, Geophysical Research Letters, 25, Sign singularity in the secular acceleration of the geomagnetic field, Physical Review Letters, 81, Variance estimate in frequency-domain deconvolution for teleseismic receiver function computation, Geophys. Moment tensor analysis of the central Italy earthquake sequence of September-October , Geophys. Transport of radioactive and toxic matter by gas microbubbles in the ground, J. Radon in geogas microbubbles: Mechanism of formation of Pc3 geomagnetic pulsations at latitudes of dayside cusp, Geomagnetism and Aeronomy, 38, Polarization of low frequency pulsations driven by solar wind pressure variations: A test site for the magnetic detection of buried steel drums, VI Workshop di Geoelettromagnetismo, S. SKS-wave splitting and upper mantle structure: Paleomagnetism and geochronology of early Middle Pleistocene depositional sequences in Rome: Compressional velocity structure and anisotropy in the uppermost mantle beneath Italy and surrounding regions, J. Letters, 25 15 , Tectonomagnetic field observations in central Italy: The study of crustal stress using borehole breakouts. Two-way coupling between Vesuvius and southern Apennine earthquakes Italy by elastic stress transfer, J. Solar, ionospheric and geomagnetic indices, Annali di Geofisica, 41, , De Santis e G. P-wave propagation heterogeneity and earthquake location in the Mediterranean region, Geophys. Study of source geometry for tsunamigenic events in the Euro Mediterranean area, in: Mosert de Gonzalez, B. Magnetic fabric of clay sediments from the external northern Apennines Italy , Physics of the Earth and Planetary Interiors, , Paleogeographical reconstructions compatible with Earth dilatation, Annali di Geofisica, 41, , Recurrence of large magnitude earthquakes in the Santa Cruz Mountains, California: An improved probability function to predict the F1 layer occurence and L condition, Radio Science, 33, 6, November-December, Spatial distribution of horizontal seismic strain in the Apennines from historical earthquakes, Annali di Geofisica, XLI, 2, Global postseismic gravity changes of a viscoelastic Earth, J. Obliquity variations due to climate friction on Mars: Darwin versus layered models, J. Di Bucci e S. Neogene-Quaternary evolution of the central

Apennine orogenic system Italy: The first real-time worldwide ionospheric predictions network: An advance in support of spaceborn experimentation, on line model validation, and space weather, Geophys. Letters, 25, 4, Macroseismic evidences and site effects for the Lunigiana Italy earthquake, Journal of Seismology, 2, Di Giovambattista e M. Revision of the Palestrina earthquake following the recovery of an unpublished document, Annali di Geofisica, XLI, 4, Geomagnetic fields variations at low and high latitude during the January , magnetic cloud, Geophysical Research Letters, 25,14, Implications for the Antarctic glacial history, Geol. Advances in regional ionospheric mapping over Europe, Annali di Geofisica, 41, , Pubblicazioni su riviste nazionali: Quei brividi lungo lo stivale, Sapere, febbraio , Dossier: Geodynamic evolution of the northern Apennines from recent seismological studies, Mem. Di Maro e M. Tomographic images of the upper mantle high-velocity anomaly beneath the Northern Apennines, Mem. Paleomagnetic constraints to the tectonic evolution of the northern Italian peninsula, Mem. Macroseismic data in terms of EMS scale, http: Fotogrammetria digitale per il controllo delle deformazioni in aree vulcaniche, Convegno Annuale del Gruppo Nazionale di Vulcanologia, Catania, marzo , Poster. Evoluzione geodinamica della regione italiana: La sequenza umbro-marchigiana del settembre-ottobre Alcuni effetti di sito indotti dalla sequenza sismica umbro-marchigiana del Integrazione tra un rilievo fotogrammetrico aereo e batimetria Swath: Evidence for high vertical accelerations during the Umbria-Marche central Italy earthquakes - I: The Norwalk Fault System: Union, 79, 25, Lithospheric subduction versus continental collision in the Apenninic system Italy: Three-dimensional velocity structure of the southern Tyrrhenian subduction zone from nonlinear teleseismic travel time tomography, Abstracts Volume, Shalheveth Freier First International Workshop on "Advanced Methods in Seismic analysis: Dynamic versus static stress changes: Fault interaction and earthquake triggering caused by fluid flow: Monitoraggio sismico della centrale idroelettrica Dlouhe Strane, Relazione interna per il progetto della Repubblica Ceca Legge 26 febbraio , n. Statistical assessment of seismicity patterns in Central Italy: Are they precursors of subsequent events? Processi Elettrodinamici nello Spazio Circumterrestre: The BroadVes seismic experiment: Active tectonic structures in the Padana Plain: Decomposizione spettrale del campo geomagnetico regionale in armoniche sferiche su calotta sferica, VII Workshop di Geolettromagnetismo, Abano Terme, Settembre A site effect study during the Umbria-Marche earthquakes - I: Sea water gas-geochemical surveys in southern Tyrrhenian Sea. Paleorainfall estimation for the last two glacial cycles from the Chinese loess plateau: Stress changes in the subducted plate caused by large, shallow, thrust earthquakes: Monitoring crustal deformations by the integration of the Algerian sites in the tyrgeonet campaigns, IXth International Symposium on "Recent Crustal Movements", Cairo, November Belt bending as a consequence of lateral bending of subducting lithospheric slab:

Chapter 5 : Pubblicazioni ING anno

Buchner G, Italiano A, Vita-Finzi C () Recent uplift of Ischia, southern Italy. In: Mc Guire WJ, Jones AP, Neuberg J (eds) Volcano instability on the earth and other planets. Geological Society of London, Special Publication , pp Google Scholar.

The analysis of tsunami catalogues and of data published on the NOAA web site pointed out that in the Mediterranean basin, from B. Within this framework, a GIS-aided procedure that takes advantage of spatial analysis to apply the Papathoma Tsunami Vulnerability Assessment model of urban environments is presented, with the main purpose of assessing the vulnerability of wide areas at spatial resolution of the census district. The vulnerability status of the urban environment was depicted on a map. This map represents a good tool to plan the actions aimed at reducing risk and promoting resilience of the territory. Introduction The tsunami was considered as a secondary hazard included with earthquake [1 , 2] or volcanic eruption archives [3 , 4]. The first tsunami catalogue of the Eastern Mediterranean Sea was published by Antonopoulos et al. The analysis of available data [6 , 7 , 8] revealed that from B. These natural events become dangerous when the tsunamis hit a densely inhabited area, where they can pose hazards and turn into disasters. Risk is defined by UNISDR [9] as the combination of the probability of occurrence of an event and its negative consequences. Hazard is the likely frequency of occurrence of a dangerous event in a fixed future time, Exposure measures people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses, Vulnerability is the proportion of lives or goods likely to be lost, and accounts for the features of a system or asset that make it susceptible to the damaging effects of a hazard. This definition identifies vulnerability as a characteristic of the element of interest community, system or asset which does not depend on its exposure [9]. Ultimately, the notation points out that the risk can be reduced both by lowering exposure and acting on vulnerability. Traditionally, the vulnerability of a territorial system affected by tsunami events was assumed to be invariable within the flood zone. Recent papers, thanks to the analysis of damages caused by tsunamis in many areas around the world, evidenced that tsunami vulnerability changes within the flood zone in response to several parameters mainly reflecting the features of urban environment [22 , 23 , 24 , 25 , 26 , 27]. Starting from this idea, to evaluate the territorial vulnerability, Papathoama et al. They built a database recording information on building features, sociological, economic, environmental and physical data and assigned to each a weight to quantify its contribution to the vulnerability assessment. Two indices, the building vulnerability and human vulnerability, defined as weighted average of data recorded into the database were assessed to show into maps the spatial and temporal variability of tsunami vulnerability over the inundated area [22 , 24 , 28]. This multi-criteria approach limits the subjective ranking and displays the contribution of the single attribute to the overall buildings vulnerability. The implemented workflow takes advantage of the experiences gained in the areas recently affected by tsunamis and of freely available datasets as the ISTAT Italian National Institute for Statistics [30] data and the Google Earth satellite images. The main outcome of the present research is the urban vulnerability map; it represents a good tool to limit the physical damage of tsunami propagation and to improve social preparedness, essential to favor the development of a resilient community. The method was tested on Napoli megacity because it is exposed to many natural events seismic, volcanic, landslide that could trigger tsunamis. Method for Tsunami Vulnerability Assessment at Urban Scale In the present paper, the PTVA-3 model previously applied to the single buildings of several areas [29 , 31 , 32 , 33 , 34] was partially modified to work at the regional scale, assessing the urban vulnerability of wide areas by using remote sensing and National Institute for Statistics data. The procedure was implemented in a GIS environment to take full advantage of the spatial analysis algorithms for analyzing and integrating data with different spatial resolutions. Figure 1 shows the input data and the sequence of steps required for calculation of Relative Vulnerability Index RVI ; the ISTAT [30] geodataset and the satellite images represent the main source of data needed to implement the proposed procedure. The censual district ISTAT , [30] was assumed as the smallest geographical feature spatial resolution while the associated dataset number of buildings, typologies of buildings, number of floors, age of building provided part of the parameters required for the vulnerability assessment. The distance from the shoreline, shape and orientation of buildings, building rows and the presence of seawalls were identified thanks to the analysis of Google Earth satellite images of Figure 1. The method adopted to calculate the inundation height is described in the hazard assessment section. The RVI was defined as the sum of two factors: The WV factor was calculated by comparing the mean building elevation with the mean inundation height. The mean building elevation at census district scale Bh was calculated for the four building categories defined by the ISTAT [30] buildings with one floor, two floors, three floors, four and more than four floors and assuming a mean floor height hi of 3 m, as follows:

Chapter 6 : History of Ischia Harbour (Southern Italy | Stefano Carlino - blog.quintoapp.com

4 F. Zaniboni, G. Pagnoni, S. Tinti, M. Della Seta, P. Fredi, E. Marotta, G. Orsi, The potential failure of Monte Nuovo at Ischia Island (Southern Italy): numerical assessment of a likely induced tsunami and its effects on a densely inhabited area, Bulletin of Volcanology, , 75, 11CrossRef.

They are related to the mainly strombolian and effusive volcanic activity of several eruptive centres located along the west coast Timpone Carrubbo, Monte Mazzacaruso, Timpone Pataso, Timpone Ospedale, Valle di Pero, Pietrovito, Chiesa Vecchia and, subordinately, in the central-eastern sector of Lipari Monterosa, Timpone Croci. Radiometric ages of Chirica stratovolcanoes, located in the central sector of Lipari. Lavas of the M. The 4th period includes pumiceous hydromagmatic pyroclastics associated to the emplacement of three orders of volcanic domes HKCA rhyolite in composition in the southern sector of the island. The second and the third ones were emplaced in the 37â€”23 and 22â€”20 ka time spans, respectively Tranne et al. These range in age from Raised shorelines Marine deposits and forms representing remnants of fossil, sloping terraced surfaces have been recognized mainly along the west coast of Lipari, between Punta del Legno Nero and Punta le Grotticelle, and locally along the east coast, at Monterosa and Porto Pignataro Fig. The most visible features occur on the steep coastal cliffs and are represented by marine platforms capped by littoral conglomerates, inner terrace margins Figs. Littoral beach sands and marine reworked conglomerates occur at Fig. Geological sketch map of Lipari Tranne et al. Carrubbo eruptive centre and is covered by slope detrital deposits de. These morphological, sedimentological and paleontological indicators of ancient shorelines Fig. According to the evaluation of cross-cutting relationships and to the distribution of main morphological features such as inner margins and marine notches, which allow an acceptable level of accuracy , these indicators have been attributed to three ancient raised shorelines Lucchi et al. A continuous and complete three-fold staircase did not form or has not been preserved in any sector of the island. South of Bruca, the shoreline is locally displaced by normal faults. The II order shoreline occurs in some isolated terraced surfaces along the whole studied area, frequently cross-cutting the I order shoreline features Fig. Two limited outcrops of marine conglomerates lying on a marine platform have been observed at Monterosa, whereas marine reworked volcanoclastics occur near Porto Pignataro, along the east coast of Lipari Fig. Reconstructed stratigraphical relationships between marine deposits related to the three ancient shorelines and volcanic products Fig. Only in the sector of Punta del Legno Nero Fig. These lavas are affected by erosional phases relevant only to both II and III order shorelines, as demonstrated by the occurrence of pebbles of this peculiar lithotype in the littoral conglomerates outcropping between Bruca and Punta le Grotticelle Fig. Marine deposits related to the three ancient shorelines are widely capped by the characteristic pyroclastic succession of the 4th period of volcanic activity of Lipari Fig. According to the above stratigraphical and chronological constraints, the formation of the marine deposits related to the I order shoreline has to be contained in the time span between ca. Areal distribution of the shorelines is shown in a sketch map of the west coast of Lipari. Both terraced surfaces cut massive lavas related to the 1st period of volcanic activity A and are capped by the pyroclastics of the 4th period B. According to the Late Quaternary global eustatic curve proposed by Chappell and Shackleton , which is concordant, in the period of interest, with a recent revision of Chappell et al. In particular, assuming that the age of the ancient shorelines corresponds to the age of eustatic highstands i. According to their interval of formation, the II and III order shorelines correlate with the younger eustatic peaks of the marine oxygen isotope stage 5 Fig. In particular, taking into account the cross-cutting relationships the III order shoreline cross-cuts the II order shoreline, hence is more recent , the II and III order shorelines are attributed to the eustatic peaks corresponding to substages 5c dated at ka and 5a dated at 81 ka , respectively. Marine conglomerates at Monterosa, along the east coast of Lipari Fig. These stratigraphical constraints have been used to describe the geological evolution of Lipari as a result of two mainly constructive stages pre-Tyrrhenian and postTyrrhenian due to strong volcanic activity, separated by one stage Tyrrhenian characterized by prevalent marine and subaerial erosional episodes. The pre-Tyrrhenian stage ranges in age from ca. The Tyrrhenian stage, ranging from to 81 ka, is characterized by prevalent conditions of sea-level highstand Fig.