"Procedura selettiva di chiamata di 1 posto di Professore Associato, ai sensi dell'art. 18 comma 4 della Legge n.240/2010, per il settore concorsuale 04/A4 "Geofisica" e per il ssd GEO/11 "Geofisica Applicata" Scuola di Scienze e Tecnologie, nell'ambito del D.M. n.364/2019"	
Internal Code	Prot. N. 0079827 DEL 12/11/2021- [uor:SI000049 – Classi fVII/1]. Decr. Rett. N.543/2021
Università /Dipartimento	Università di Camerino / Scuola di Scienze e Tecnologie

CURRICULUM VITAE of Federico Cella

Italian National Scientific Qualifications awarded for Full and Associate Professor positions
("Abilitazioni Scientifiche Nazionali di I e II fascia")

ASN qualification as Associate Professor Positive recommandations = 5/5	From: 07/02/2014	To: 07/02/2023
ASN qualification as Full Professor Parameters of the candidate: Parameter 1=14 (Reference threshold=7) Indicatore 2=206 (Reference threshold= 107) Indicatore 3=6 (Reference threshold= 6) Positive recommandations = 4/5	From: 28/08/2018	To: 28/08/2024
ASN qualification as Associate Professor (2nd application) Parameters of the candidate: Parameter 1=9 (Reference threshold=7) Indicatore 2=300 (Reference threshold= 47) Indicatore 3=9 (Reference threshold= 4) Positive recommandations = 5/5	From: 14/01/2020	To: 14/01/2029

Academic Positions

Qualification/Title	Research Scientist / Research associate
University	Università della Calabria
Department	Dipartimento di Biologia, Ecologia e Scienze della Terra (DiBEST)
Academic Recruitment Field (*"Settore Concorsuale")*	04/A4 - GEOFISICA/GEOPHYSICS
Academic Discipline (formally named *"Settore Scientifico Disciplinare')*	GEO/11 - GEOFISICA APPLICATA/APPLIED GEOPHYSICS
ORCID link:	http://orcid.org/0000-0001-5165-1709

Working experience

Dates	31/05/1999 – Present
Name and address of the Employer	Università della Calabria, Corso Bucci 87036 Rende (CS)
Position held	Research Scientist (Ricercatore a tempo indeterminato) / Research Associate (Professore Aggregato) (Settore Disciplinare GEO/11 – Geofisica Applicata) at the Department of Biology, Ecology and Easth Sciences (DiBEST – Dipartimento di Biologia, Ecologia e Scienze della Terra). Confirmed in the position after the National evaluation (confermato in ruolo) .

Main activities/responsibilities	Scientific research, teaching, research projects management.

Dates	November 1996 – May 1997
Name and address of the Employer	Università degli Studi "Federico II" di Napoli
Position held	Research contractor (Settore Scientifico Disciplinare D04A - Physics of the Solid Earth) at Dipartimento di Geofisica e Vulcanologia (Presently – DiSTAR).
Main activities/responsibilities	Research activity

Dates	From 26-05-1994
Name and address of the Employer	Università degli Studi "Federico II" di Napoli
Position held	Research assistant (Settore Scientifico Disciplinare D04A - Physics of the Solid Earth) at Dipartimento di Geofisica e Vulcanologia (Presently – DiSTAR). Borsa post Dottorato 3° ciclo (Duration:2 years) - awarded by Università degli Studi "Federico II" di Napoli.
Main activities/responsibilities	Research activity

Dates	February 1993 - October 1994
Name and address of the Employer	Università degli Studi "Federico II" di Napoli
Position held	Research contractor (Settore Scientifico Disciplinare D04A - Physics of the Solid Earth) at Dipartimento di Geofisica e Vulcanologia (Presently – DiSTAR).
Main activities/responsibilities	Research activity

Dates	From 8-03-1990
Name and address of the Employer	Università degli Studi "Federico II" di Napoli
Position held	PhD student of Doctorate in Geophysics and Volcanology (*5° Ciclo* – Duration: 3 years) at *Dipartimento di Geofisica e Vulcanologia* (presently DiSTAR).
Main activities/responsibilities	Research activity

Education and Training

Dates	8-03-1990 - 14-09-1993
Institution which issued the degree	Università degli Studi "Federico II" di Napoli
Type of Degree awarded	**PhD (*Dottorato di Ricerca*)** in Geophysics and Volcanology (*5° Ciclo* – Duration: 3 years) at *Dipartimento di Geofisica e Vulcanologia* (presently DiSTAR). Thesis title: Studio gravimetrico del sistema litosfera-astenosfera in Africa Orientale (in Italian).

Dates	14-03-1989
Institution which issued the degree	Università degli Studi "Federico II" di Napoli
Type of Degree awarded	Master of Science's degree (Laurea Specialistica - quadriennale) in Geological Sciences.

RESEARCH ACTIVITY

The results of Federico Cella's research activity have been reported in scientific publications, extended summaries or oral and poster presentations at national and international conferences. The main research fields where he has been active are described with reference to the full list of publication enclosed at the end of the present document.

3D basin modeling by alternative methods

Recently, a new research topic was faced, that is the 3D gravity modeling of sedimentary bodies infilling in intermontane basins in areas with human settlements and high seismic activity strongly affecting ground-shaking phenomena at the surface. Since the knowledge of the thickness of the basin infills and of their density distribution is critical for the ground-motion amplification analysis, a recently proposed ITerative RESCaling (ITRESC) method was adopted for 3D gravity modelling of the Fucino Basin [1] and the Middle Aterno Valley [2] (Apennines, central Italy) , two fault-controlled basins where a strong seismic activity recently occurred. For the first time a full 3D model of the carbonate basement morphology was computed by the inversion of gravity data. Differently from usual gravity modelling approaches, the ITRESC technique does not assume a density contrast function, which is instead determined through a data-driven process, and integrates geological or geophysical constraints to define a global "gravity/depth-to-basement" rescaling law, valid in all the investigated area. The achieved models integrated a number of depth constraints of different nature while at the same time honoring the gravity anomalies. The results of these study provided a 3D model density of the sedimentary bodies, allowed a new outline of the faults network related to the development of these ares and are only partially consistent with the structural evolution hypothesized for these two basins by previous studies.

Boundary analysis and fast interpretation of potential fields by signal enhancement methods

The use of methodologies for the interpretation of potential fields capable of enhancing the signal or selectively highlighting some components ("signal enhancement methods") was the subject of several studies. These techniques generally allow an estimate of the horizontal position and, in some cases of the depth, of the discontinuities between adjacent sources and, therefore, are suitable procedures of fast interpretation and localization of structural limits ("boundary analysis"). A simple enhancement tecnique (horizontal gradient) was tested in several regions of Northern Italy [36] but a more reliable application consisted in the processing of the analytical signal of the aeromagnetic field in the Tyrrhenian region [28]. By analyzing the signal, several trends of maxima have been identified, allowing to define the limits of a series of crustal structures. Overall, this study contributed to providing a more up-to-date mapping of the complex distribution of already known structures but, above all, it highlighted many circular or subcircular features related to volcanic or igneous bodies whose presence was still unknown or doubtful. The tyrrhenian basin wasn't only studied by examining the Bouguer anomalies but also by analyzing the patterns of magnetic anomalies [21] to discuss the reliability of recent studies indicating the presence of striped, 'mid-ocean like', magnetic anomalies in this small basin, from which spreading velocities have been calculated. The resulting normally and reversely magnetized bodies does not fit with an ocean-like central expansion model. Instead, the distribution of magnetic sources may suggest that the crustal tearing induced by extension processes is not concentrated only beneath the seamounts, but may have in different times involved different areas of these sub-basins [16]. Techniques of signal enhancement were still applied to the magnetic field of the Ischia Island, together with self-potential data, to study the structural setting of the local volcanic district. The results suggest that the central relief is demagnetized because of high geothermal gradient presumably be due to hydro-chemical alteration processes and/or to the possible presence of partially melted spots [19].

A second survey was conducted in the Piana Campana (Southern Italy) paying attention to the detailed study of the main structures related to volcanic activity in the Phlegraean Fields [27]. Probable limits of the Phlegraean caldera have been located, highlighting an interesting correlation within the caldera area itself between the epicenters of the earthquakes of the last subsidence phase. The study found the existence of a spatial correlation between the formation areas of the most important eruptive buildings of the Piana Campana and the areas of intersection between structural features highlighted by signal trends. A more advanced boundary analysis technique concerned the field of gravimetric and magnetic anomalies in Southern Italy. It works by adding vertical derivatives of different degrees, whose horizontal derivative (Enhanced Horizontal Derivative, EHD), has maximum values indicating the horizontal limits of the anomaly sources with a high degree of

resolution. The calculation of the vertical derivatives of various orders was carried out with a procedure (ISVD) much more stable than those based on the traditional FFT. By calculating the EHD for different orders of derivatives, a Multiscale Derivative Analysis (MDA) was carried out without implying any separation between signal components (with consequent undesirable distortion effects) but simply the enhancement of certain contributions at different levels of resolutionl. The application of the method for the gravimetric and magnetic field of Southern Italy [35] was carried out in such a way as to selectively highlight its components on a regional, intermediate and local scale, and led to the development of maps of structural features often invisible to the outcrop and completely previously unknown. A review of this research field was available in [25].

3D source imaging by multiscale analysis (DEXP)

The use of fast interpretation techniques (MDA) suggested a complete multiscale approach for the interpretation of potential fields. MDA provides the information necessary for a delimitation of the lateral margins of the source bodies but it constitutes only the first phase of a more complex strategy. The second phase is based on a multiscale imaging interpretation technique (DEXP) but instead allows to estimate the depth, density contrast and morphological features of the source itself. The main property of this method is the great stability since it takes advantage of the regular behavior of the potential fields as a function of the altitude and because it can be applied to anomalies with low signal/noise ratio as well as to field derivatives of various orders. This allows (a) to reduce the effects of mutual interference, obtaining a reliable representation of the distribution of the sources at various depths and without preliminary filtering; (b) an interpretation of the field at different scales thanks to the variable level of detail and to the intrinsic effect of separation of the derivatives of different order. This approach was applied to several gravity anomaly fields in different areas of Southern Italy [5,6,7,15,20].

The study above mentioned took place as part of a research line in which was developed a technique for exploiting the Continuous Wavelet Transform 2D (CWT2D) for investigating potential field singularities with realistic fields. The 3D space-scale representation was generated and the Wavelet Transform Modulus Maxima (WTMM), related to the shape of the source, were showed at each scale. The method estimates the depth to the source properly selecting the range of scales where the sources behave as if they are approximately isolated. This took advantage from the property of the lines that, joining the WTMML maxima, intersect each other at the edges of the causative body. The method was successfully tested for estimating the depth of the Mesozoic carbonate basement in the Vesuvius area (Italy) starting from the local gravity anomalies [17].

3D inversion of potential fields.

A significant research area to which the activity of F. Cella was addressed is the interpretation of potential fields using 3D inversion methods. A this method was carried out on the gravimetric anomalies field of the Somma-Vesuvius volcanic district [22]. The interpretation was constrained by both well data and seismic reflection data. The morphology of the carbonate top was achieved and the presence of a low-density source immediately below the volcanic building was revealed. The full use of these inversion techniques suggested to investigate some methodological implications so far neglected. More precisely, the existence of an interesting correlation between the structural index (well known in the Euler deconvolution) and the depth weighting function, has been recognized. This function is introduced as a priori information in the theory of the inversion of potential fields (eg. In the tikchonov regularization) in order to prevent the inevitable loss of resolution in depth. It has been found that when the structural index is equal to the depth weighting function, the solutions provided by inverting the field are consistent with the real ones. These conclusions, supported by the results of numerous tests, lead to the establish a relation between the theory of the inversion of potential fields and the techniques related to Euler's deconvolution. A first practical demonstration of what emerged from this study in presence of a multi-source system was given by inverting the data of the total magnetic field in the area of the Monte

Vulture Volcano [14]. Each source is related to a distinct component of the field and to a specific weight function, calibrated on the structural index of the individual sources, investigated and previously estimated by DEXP.

The above mentioned approach, was further developed to define a potential-field-constrained inversion procedure [13]. The method was based on *a priori* information derived exclusively from the analysis of the gravity and magnetic data (e.g. DEXP) and targeted to set up effective constraints like the source depth-to-the-top, the structural index, the horizontal position of the source body edges and their dip.

Archeogeophysics

Considering the usefulness of boundary analysis techniques in the field of near-surface geophysics, particular attention has been focused on their potential in archaeo-geophysical prospecting. In a first site (Pian della Tirena, CZ, Southern Italy) detailed geophysical investigations were carried out by EM prospecting and magnetometry in a gradiometric configuration [10]. The recognition of trends and features associated with the presence of buried housing artifacts was made by Enhanced Horizontal Derivative (EHD). In summary, the resulting results show a series of several linear trends of the EHD signal showing a complex scheme with perpendicular orientations so to outline a regular geometry suggesting an urban network. The second area of investigation, located at the Bronze Age site of Torre Galli (VV, Southern Italy) was also the subject of a magnetic and EM survey [12]. The resulting data were interpreted using 3D imaging based on the multiscale DEXP technique, allowing the reconstruction of a series of three-dimensional sources interpreted as defensive ditches and road layouts (both confirmed by excavation tests) as well as probable remains of housing artifacts. The same approach adopted in the last case was repeated for two archeogeophysical prospecting campaigns conducted in north-eastern Syria, at the Tell Barri Italian Archaeological Mission [4]. Here, 3D imaging made it possible to trace the original urban network of a small town dated to the parthian age. In particular, a road layout was highlighted and then brought to light in an excavation test exactly at the point and depth presicted by the geophysical study. An overall review of all these experiences is reported in [34].

$2^{1/2}$D inversion of potential field anomalies.

Together with the lines of research described above, other investigations based on well tested methodologies were carried out. However, they provided interesting results within the framework of crustal geophysical exploration in the Central Mediterranean area. This is the case of the integrated study of reflection seismic and gravimetry conducted along a transept crossing the whole continental margin of Northern Sicily, from the coast line to the Tyrrhenian bathyal plain [26]. The interpretation of the gravity data by $2^{1/2}$D inversion, together with the analysis of unpublished seismic data, led to a detailed description of the most relevant structures of the offshore crustal thickness in Northern Sicily and allowed a reconstruction of the tectonic and sedimentary history, from Neogene to the present, in an area of transition between the African continental margin and the Tyrrhenian basin, characterized by a marked crustal and lithospheric thinning. The same approach was followed with the saim targets by still analyzing the tyrrhenian Basin but, in this case along a E-W crustal transect crossing the eastern continental shelf of the basin, from the Marsily volcanic sea mount to the Calabrian arc, across the Paola Basin [18]. In this case, the gravity modelling was crucial for refining the depths to the main seismic reflectors calculated on the base of the available velocity analysis. Another similar study was carried out along a profile passing through the Peloritani Mountains (Nord-eastern Sicily). The $2^{1/2}$D inversion was constrained not only by with deep seismic refraction data, but also by density laboratory measurements of samples xenoliths [24].

Other studies carried out in the early years by F. Cella also converge in this line of research, concerning the interpretation of gravimetric data for crustal modeling in areas involved in relaxing geodynamic regimes.

The regional anomalies in the Horn of Africa region (e.g. the negative broad gravity minimum centered on the Ethiopian rift and the positive one located in the Gulf of Aden), were interpreted through $2^{1/2}$D inversion and constrained with most of the available geophysical results [33]. The study provided an estimate of the lithospheric changes in thickness in the rift areas investigated and the density distribution in the underlying rising asthenosphere. In a second phase, the Somalia gravimetric anomaly field was interpreted to delineate the main intracrostal structures in the region. The study, conducted as part of the Somali Geotransect Project (ILP), involved the development of density models along several main geotransects [32]. The $2^{1/2}$D models have outlined the articulated geometry of the top of the crystalline base from the Archean or Paleozoic age. Still within the framework of research conducted in East Africa, a collaboration between the "Federico II" University of Naples and the University of Cairo produced a gravimetric study of the Egyptian region, aimed to characterize the large-scale geometry of the Moho [30]. The analysis identified large scale structural features separating different sectors of the plate. The detailed study of the relationships existing between these structural patterns, together with the local reductions in crustal thickness, suggested that the exensional phases occurred are not only associated with the formation of the Red Sea and the Gulfs of Suez and Aqaba, but they also involved intra-cratonic areas during the Paleozoic, leaving traces represented by bands of crustal thinning.

The gravity modeling of the lithospheric thinning in rift regions needs the knowledge of the density distribution in the asthenospheric mantle rising, often estimated by a mere fitting with measured data with obvious consequences in terms of ambiguity of the solution. For this reason a research was carried out for introducing more rigorous petrophysical constraints [31]. Therefore the asthenospheric upwelling process was modelled considering adiabatic decompression, partial melting and magma upward migration as a function of three factors: potential temperature, lithospheric distension and lithospheric thickness in the pre-stretching phase. By assigning a-priori values to these parameters, the changes in temperature, melting fraction/composition and in modal norm of the residual rock were estimated after the extraction of the melt. The density gradient of the residual mantle rock was finally calculated to estimate the gravimetric effect (hundred of mGal) of the asthenospheric rise associated with different degrees of thermal anomaly and lithospheric distension. This approach found application in the case of the litho-asthenospheric system of the Central Mediterranean. The study consisted of the $2^{1/2}$D inversion of the long wavelenght gravity anomalies along a profile running from the Ionian Basin to the Balearic Basin. The study was constrained with the thermal state of the Tyrrhenian basin from heat flux measurements and with the thermal and density model of the subducting slab below the Tyrrhenian Sea. The research confirmed a passive development of the asthenospheric rise in correspondence of the Tyrrhenian and Balearic basins and a significant lithospheric thinning [23,29].

Seismic modelling in areas with slope instability

A secondary research line was also followed, consisting in the interpretation of velocity models achieved by 2D seismic inversion of seismic data surveyed along mountain slopes where crystalline rock units (granitoids) outcrop . These studies were targeted to a better characterization of the weathering processes along slopes, causing a decay of strength and stability of rock masses and, consequently, slope instability and landislides [8,9].

Other researches

Useful results for the scientific community were achieved designing a versatile code able to go beyond the limits of other public domain codes designed for performing terrain correction of gravity measurements [11]. It runs with input gravity data (absolute measurements or free air anomalies) at the land/sea surface and with one or more DTMs (indifferently gridded or scattered) at different levels of detail. The code allows a better approximation of the relief by means of a tessellation based network formed by triangular prisms avoiding long CPU times tanks to parallel computing functions and to the vectorization performed.

Other researches were devoted to data processing and mapping, consisting in previously unpublished gravity land measurements, targeted to improve the italian net of Bouguer anomaly field in areas with poor coverage [3].

Teaching Activity

Formal responsibility of Bachelor's (Laurea) and Master of Science's (Laurea Magistrale) degree courses

Academic Year	Course Name	MSc or BCs	CFU(hours)
2021/22	Applied Geophysics	BCs Geological Sciences	6 (52)
2020/21	Applied Geophysics Geophysical Prospecting and Seismology	BCs Geological Sciences MSc Geological Sciences	6 (56) 6 (52)
2019/20	Geophysical Prospecting and Seismology	MSc Geological Sciences	6 (52)
2018/19	Applied Geophysics Geophysical Prospecting and Seismology	BCs Geological Sciences MSc Geological Sciences	6 (56) 6 (56)
2017/18	Applied Geophysics Applied Geophysics	BCs Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56)
2016/2017	Geophysical Prospecting Applied Geophysics Applied Geophysics	MSc Geological Sciences BCs Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56) 6 (56)
2015/2016	Geophysical Prospecting Applied Geophysics Applied Geophysics	MSc Geological Sciences BCs Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56) 6 (56)
2014/2015	Geophysical Prospecting Applied Geophysics Applied Geophysics	MSc Geological Sciences BCs Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56) 6 (56)
2013/2014	Geophysical Prospecting Applied Geophysics	MSc Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of Cultural Heritage.	6 (56) 6 (56)
2012/2013	Geophysical Prospecting Applied Geophysics	MSc Geological Sciences MSc Sciences and Technologies for the Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56)
2011/2012	Geophysical Prospecting Applied Geophysics	MSc Geological Sciences MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56)
2010/2011	Geophysical Prospecting Applied Geophysics	MSc Geological Sciences MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	6 (56) 6 (56)
2009/2010	Geophysical Prospecting	MSc Geological Sciences	6 (56)
2008/2009	Geophysical Prospecting	MSc Geological Sciences	6 (56)

	Solid Earth Physics Applied Geophysics	MSc Natural RIsks Management MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	3 (18) 6 (56)
2007/2008	Geophysical Prospecting Solid Earth Physics Applied Geophysics	MSc Geological Sciences MSc Natural RIsks Management MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	6 (56) 3 (18) 6 (56)
2006/2007	Geophysical Prospecting Solid Earth Physics Applied Geophysics	MSc Geological Sciences MSc Natural RIsks Management MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	6 (56) 3 (18) 6 (56)
2005/2006	Geophysical Prospecting Solid Earth Physics Applied Geophysics	MSc Geological Sciences MSc Natural RIsks Management MSc Diagnostics, Conservation and Restoration of the Cultural Heritage.	6 (56) 3 (18) 6 (56)
2004/2005	Geophysical Prospecting Solid Earth Physics	MSc Geological Sciences MSc Natural RIsks Management	6 (56) 3 (18)
2003/2004	Geophysics Solid Earth Physics	MSc Geological Sciences MSc Natural RIsks Management	6 (56) 3 (18)
2002/2003	Environmental Geophysics Solid Earth Physics	MSc Geological Sciences MSc Natural RIsks Management	6 (56) 3 (18)

Formal responsibility in PhD courses

Membership of academic boards in the following doctorate programs:

Period	Doctorate Program	Cycle	Institution
2002 - 2009	Earth Sciences.	From: XVIII to: XXV	Università della CALABRIA
2010 - 2015	Scienze, Comunicazione e Tecnologie - DOT1005021.	From: XXVI to: XXX	Università della CALABRIA
2016 - 2021	Scienze e Ingegneria dell'ambiente, delle Costruzioni e dell'energia - DOT1305053.	From: XXXI to: XXXVII	Università della CALABRIA

Member of scientific commissions for assigning the PhD degree in the following doctorate programs:

Date	Doctorate Program	Cycle	Institution
14-01-2005	Analysis and modeling of environmental systems	XVI	Università degli Studi "Federico II" di Napoli
20-01-2006	Analysis and modeling of environmental systems	XVII	Università degli Studi "Federico II" di Napoli
15-06-2009	Earth Sciences - Geophysics	XXI	Università degli Studi "Federico II" di Napoli
28-01-2011	Analysis of the environmental systems. dei sistemi ambientali	XXIII	Università degli Studi "Federico II" di Napoli
26-02-2018	Sciences of the Earth, Environment and Resources.	XXX	Università degli Studi "Federico II" di Napoli
23/04/2021 16/07/2021	Sciences of the Earth, Environment and Resources.	XXXIII	Università degli Studi "Federico II" di Napoli

National and international reputation and professional activity for the scientific community

Awards for scientific activity

- Coauthor of the paper titled "Rifted margin formation in the South Tyrrhenian Sea: a high-resolution seismic profile across the North Sicily passive continental margin", published on Tectonics, 2000, vol. 19, p. 241-257. The paper was awarded with the "EGS Young Scientists' Publication Award 2000" of the European Geophysical Society.

- Awarded with the Loránd Eötvös Award 2010 for his paper "Toward a full multiscale approach to interpret potential fields", published in Geophysical Prospecting, 2010, vol. 57, pp. 543-557. The Award was presented by the President of the European Association of the Geophysicists and Engineers (EAGE), Mahmoud Abdulbaqi, by the Vice-President of EAGE, Davide Calcagni and by the Chairman of the Awards Committee, Don Milne, during the Opening Session of the 72nd EAGE Conference & Exhibition in the CCIB in Barcelona, Spain on Monday June 14, 2010. The paper was awarded with the following citation: "A multi-scale analysis can highlight the edges of buried bodies by the derivatives of their potential field and, based on these constraints, improve the estimation of their depth and shape. A major advantage of this method is its ability to decouple the components due to shallow or local bodies from the regional or deeper ones. The validation by synthetic data highlights the application of this new method to field data from Southern Italy".

Membership of editorial boards of scientific papers

Journal	Subject area (SCOPUS)	Publisher	Ranking (SCOPUS)	Duration	Role
Near Surface Geophysics	Earth and Planetary Sciences: Geophysics	EAGE	CiteScore 2021: 3.2 SJR 2020: 0.639 SNIP 2020: 1.069 Percentile 2020:59th	2010 - present	Associate Editor
Journal of Applied Geophysics	Earth and Planetary Sciences: Geophysics	Elsevier	CiteScore 2020: 3.9 SJR: 2020: 0.627 SNIP:2020: 1.199 Percentile 2020:68th	2017 - present	Associate Editor

Membership of Scientific Associations

Duration	2020 - Present
Association	EAGE-SEG Italian Section
Membership Status	Board Officer

Duration	2008 – Present
Association	EAGE (European Association of Geophysicist and Engineers)
Membership Status	Normal Membership
Membership Number	M2008-0080

Scientific responsibility (Principal Investigator) of competitive research projects, awarded through a peer-review process.

Duration	2011-2013
Project type	PRIN (Project of relevant national interest) 2009
Funding Institution	MIUR (Italian Ministry of Education, University and Research)
Reference	4-07-2011 n. 404/ric. Prot. 2009MF87BM_002.
Project title	High resolution geophysical investigations for the modeling of buried archaeological structures: Practical applications near the Greek and native settlements of the Tyrrhenian Calabria (Italy).

Scientific Leader of the Research Unit	Federico Cella
Project funds	37.871 €

Duration	2006-2007
Project type	PRIN (Project of relevant national interest) 2005
Funding Institution	MIUR (Italian Ministry of Education, University and Research)
Reference	D.M. n. 291-22.12.2005. Prot. 2005108872_004
Project title	Geophysical survey at the archaeological site of Piano della Tirena (CZ, Southern Italy).
Scientific Leader of the Research Unit	Federico Cella
Project funds	15.880 €

Scientific membership of research projects.

Duration	15/03/2000 - 12/04/2002
Project type	Cofin Project
Funding Institution	MURST (Ministero dell'Università e della Ricerca Scientifica e Tecnologica)
Project title	"Ricostruzione stratigrafico-tettonica crostale centro-mediterranea e sua inversione evolutiva mediante inediti dati CROP di rilevante informazione innovativa" (Sub-project: "Indagini gravimetriche e magnetiche per lo studio della struttura crostale dell'Italia Centrale e delle regioni contigue del Mediterraneo Centrale").
Scientific Leader	Icilio Finetti (Main project) Maurizio Fedi (Sub-Project)

Duration	08/05/1998 - 10/02/2001
Project type	National Project
Funding Institution	MURST (Ministero dell'Università e della Ricerca Scientifica e Tecnologica)
Project title	Modellizzazione della composizione petrografica e geochimica della crosta continentale in alcune aree tipo italiane" (Sub-project: "Studi geofisici delle strutture crostali in alcune aree tipo italiane");.
Scientific Leader	Francesco Sassi (Main project); Antonio Rapolla (Sub-Project)

Duration	01/05/1998 - 01/05/2000
Project type	Cofin Project
Funding Institution	MURST (Ministero dell'Università e della Ricerca Scientifica e Tecnologica)
Project title	Tettono-dinamica evolutiva del sistema orogenico sud-appennino - Arco Calabro-Sicilia - alla luce dei nuovi dati CROP" (Sub-project: "Indagini gravimetriche e magnetiche per lo studio del sistema crostale e subcrostale dell'Italia Centromeridionale e delle regioni contigue del Mediterraneo Centrale").
Scientific Leader	Icilio Finetti (Main project) Maurizio Fedi (Sub-Project)

Duration	1997-1999
Project type	Research project
Funding Institution	CNR (National Research Committee)
Project title	Rilevamento geofisico delle aree del Somma-Vesuvio e dei Campi Flegrei.
Scientific Leader of the U.R.	Antonio Rapolla

Duration	01-04-1990 al 01-04-1992

Project type	CNR - Strategic project
Funding Institution	CNR (National Research Committee)
Reference	CNR 90.1104 - CNR 92-00818 - CNR 92-04759
Project title	Meccanismi di formazione di un oceano: il sistema Mar Rosso - Golfo di Aden e lo scudo Afro-Arabico" (Sub-project: "I margini continentali somali e l'evoluzione del Golfo di Aden e dell'Oceano Indiano Nord-Occidentale").
Scientific Leader of the U.R.	Antonio Rapolla

Membership of scientific expeditions.

Duration	01/07/2013 –01/07/2013
Destination	Nocera Terinese (CZ), Southern Italy
Funding Institution	MIUR (PRIN 2009) / University of Calabria.
Project title	High resolution geophysical survey at the *archaeological site of Piano della Tirena.*
Mission Leader	Federico Cella

Duration	16/07/2012 – 21/07/2012
Destination	Drapia (VV), Southern Italy
Funding Institution	MIUR (PRIN 2009) / University of Calabria.
Project title	High resolution geophysical survey at the *archaeological site of Torre Galli.*
Mission Leader	Federico Cella

Duration	06/09/2010 – 17/09/2010
Destination	Tell Barri (Al-Hasakah Governorate), northeastern Syria.
Funding Institution	Department of Historical disciplines “E. Lepore”, University “Federico II” of Naples.
Project title	High resolution geophysical survey at the *Italian Archaeological Mission of Tell Barri.*
Mission Leader	Giovanni Florio

Duration	07/04/2008 - 18/04/2008
Destination	Tell Barri (Al-Hasakah Governorate), northeastern Syria.
Funding Institution	Department of Historical disciplines “E. Lepore”, University “Federico II” of Naples.
Project title	High resolution geophysical survey at the *Italian Archaeological Mission of Tell Barri.*
Mission Leader	Giovanni Florio

Duration	05/07/2006 – 21/07/2006
Destination	Nocera Terinese (CZ), Southern Italy
Funding Institution	MIUR (PRIN 2005) / University of Calabria.
Project title	High resolution geophysical survey at the *archaeological site of Piano della Tirena.*
Mission Leader	Federico Cella

Participation in conferences

2020	G. Gaudiosi, V. Paoletti, R. Nappi, P. Luiso, F. Cella, G. Florio, M. Fedi (2020). Multiparametric data analysis for identifying active fault geometries in the Abruzzo and Molise regions (Central-Southern Apennines, Italy). European Geosciences Union General Assembly 2020 - Vienna, Austria, 1-31 May 2020.
2019	F. Cella (2019). Quantitative interpretation of geophysical data in archaeological applications: Beyond anomaly-bump hunting. 105° Congresso Nazionale della Società Italiana di Fisica L’Aquila, 23 - 27 settembre 2019. *(Invited speaker).*

2019	Cicala, L., Pacciarelli M., Federico Cella F., Fedi M., Tardugno M.L.. PIAN DELLA TIRENA, TORRE GALLI. Convegno: “Archeologia e geofisica: Le ricerche della Federico II in Italia meridionale”. Napoli, 11 Giugno 2019. *(Invited speaker).*
2018	Cella F. - Gravity modeling finds a large magma body in the deep crust below the Gulf of Naples, Italy. Sino-Italian International Cooperation and Exchange & Advancements in Gravity and Magnetic Technology Seminar Programme, 2018. Octagon Conference Hall - East Campus, China University of Geosciences, Wuhan, China, 11-03-2018. *(Invited speaker).*
2018	Cella F. : "Gravity modeling finds a large magma body in the deep crust below the Gulf of Naples, Italy" (speech). Technical Meeting (2018). China University of Geosciences (Beijing), China, 08-03-2018. *(Invited speaker).*
2018	Luiso P, Paoletti V, Gaudiosi G, Nappi R, Cella F, Fedi M (2016). A multi-method aproach to identify outcropping and buried active faults: case studies.. In: GRUPPO NAZIONALE DI GEOFISICA DELLA TERRA SOLIDA - 35° CONVEGNO NAZIONALE - RIASSUNTI ESTESI DELLE COMUNICAZIONI.. p. 144, ISBN: 978-88-940442-7-0. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/175175
2016	Luiso P, Paoletti V, Gaudiosi G, Nappi R, Cella F, Fedi M (2016). Identification of active faults in Abruzzo area (central Italy) through the analysis of geological, seismological and gravimetric data.. In: (a cura di): , Geophysical Research Abstracts . vol. 18, Vienna, 17-22/04/2016.
2016	Cella F, D’Antonio M, Fedi M, Florio G, Morra V, Paoletti V (2016). Modelling delle variazioni verticali di densità neLLa crosta deL distretto vuLcanico napoLetano vincoLato da dati geofisici e petrografici.. In: GRUPPO NAZIONALE DI GEOFISICA DELLA TERRA SOLIDA - 35° CONVEGNO NAZIONALE *(Speaker)* . RIASSUNTI ESTESI DELLE COMUNICAZIONI.. p. 247, Centro Stampa della Regione Emilia-Romagna, ISBN: 978-88-940442-7-0, LECCE, 22-24 novembre 2016.Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/18852
2011	Cella F (2011). A MATLAB toolbox for computation of complete Bouguer anomalies from free air anomalies *(Speaker).* In: (a cura di): D. Sleyko and A. Riggio, 30° Convegno Nazionale GNGTS - Riassunti estesi delle comunicazioni. p. 484-486, ISBN: 978-88-902101-5-0, Trieste, November 15-17, 2011 .
2010	FLORIO G, CELLA F, PIEROBON R, CASTALDO R, CASTIELLO G. AND FEDI M (2010). Geophysical survey at Tell Barri (Syria). In: EGU General Assembly 2010 - Geophysical Research Abstracts . Vienna, 02 – 07 May 2010, vol. 12 - EGU2010-9898.Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/185420.
2010	CELLA F, L. FERRANTI, G. FLORIO AND L. MASCHIO (2010). New insights on some structural geometries in Southern Apennines by multiscale analysis of potential fields. In: Extended Abstract EGM 2010 International Workshop. Capri, Italy., April 11-14, 2010, p. 1-5, TRIESTE:OGS.
2009	G. FLORIO, M. FEDI, CELLA F (2009). AN ANALYSIS OF THE MAGNETIC ANOMALIES IN THE VAVILOV AND MARSILI BASINS. In: Riassunti Estesi delle Comunicazioni - 28° Convegno Nazionale GNGTS (Extended Abstracts). Trieste, 16-18 Novembre 2009, p. 643-644, TRIESTE:OGS, ISBN: 88-902101-4-1. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/161954.
2008	FEDI M, CELLA F (2008). Inversion of potential field data using the structural index as weighting function rate decay. In: 70th EAGE Conference & Exhibition - Extended Abstract H043 (Session: Electromagnetic Methods/Potential Fields). Rome, Italy, 9 - 12 June, 2008, p. 1-5. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/160300.
2008	CELLA F (2008). The structural index as weighting function rate decay in the inversion of potential field data *(Speaker).* In: Riassunti Estesi delle Comunicazioni - 27° Convegno Nazionale GNGTS. Trieste (Italia), 6-8 Ottobre, 2008, p. 420-422, TRIESTE:Sleiko D., ISBN: 88-902101-3-3. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/171770.
2007	CELLA F, FLORIO G, GAROFALO B, LA MANNA M, TIANO P (2007). Advanced techniques for processing of magnetic and EM data in the archaeological site of Piano della Terina (Catanzaro – Southern Italy) *(Speaker).*. In: Estratti del VI Forum Italiano di Scienze della Terra (FIST). Rimini, 12-14 settembre 2007. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/173572
2007	FEDI M, FLORIO G, CELLA F (2007). Toward a full multiscale approach to interpret potential fields. In: EGM2007 - Extended Abstract. Capri (NA, Italy), April 15-18, 2007. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/187978
2005	FLORIO G, FEDI M, CELLA F (2005). Implications of the use of 2D/3D transformations on the interpretation of potential field anomalies. In: Riassunti estesi delle Comunicazioni del "24° Convegno Nazionale GNGTS". Roma, 15-17 Novembre, 2005, vol. Sessione 14, p. 506-508, TRIESTE:Sleiko D., ISBN: 88-902101-9-2. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/183730
2005	CELLA F, FEDI M, FLORIO G, RAPOLLA A (2005). Structural study of Southern Apennines by the Multiscale derivative Analysis of gravity and magnetic fields *(Speaker).* In: Riassunti estesi delle Comunicazioni del "24° Convegno Nazionale GNGTS". Roma, 15-17 Novembre, 2005 vol. Sessione 13, p. 477-480, TRIESTE:Sleiko D., ISBN: 88-902101-9-2. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/179490

2004	FLORIO G, FEDI M, CELLA F (2004). On the use of two- vs. three- dimensional transformation and interpretation of potential field anomalies. In: Near Surface 2004 Extended Abstracts Book. Utrecht, the Netherland, 6-9 September, 2004, vol. P011, p. 1-4, ISBN: 90-73781-37-X. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/169942
2003	BRUNO P.P, CELLA F, PISACANE R, RAPOLLA A (2003). INDIVIDUAZIONE DI LINEAMENTI STRUTTURALI E SISMOGENETICI A PARTIRE DA DATI GEOFISICI E GEOLOGICI NELL' APPENNINO MOLISANO-SANNITA E CAMPANO-LUCANO. *(Speaker).* In: Riassunti estesi delle Comunicazioni del "22° Convegno Nazionale GNGTS". Roma, 18-20 novembre, 2003. p. 1-2, ISBN: 88-900385-7-8. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/175758
2003	CELLA F, FEDI M, QUARTA T, VILLANI A (2003). Location of 3D gravity sources using continuous wavelet transform. In: 1st Workshop on International Gravity Field Research. Graz, Austria., May 8-9, 2003, p. 171-172, VIENNA:B. Meurers and R. Pail. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/187046.
2003	CELLA, Federico, FEDI M, FLORIO G, GRIMALDI M, PAOLETTI V, RAPOLLA A. (2003). Shallow structure of Somma-Vesuvius from 3D gravity data inversion. In: Proceedings of the 1st Workshop on International Gravity Field Research, Graz 2003. p. 169-170, VIENNA: B. Meurers and R. Pail, Graz, Austria, May 8-9, 2003. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/167005.
2003	CELLA F, FEDI M, QUARTA T, VILLANI A (2003). Stima delle caratterizzazioni geometriche delle sorgenti di anomalie gravimetriche mediante la trasformata continua di Wavelet 2D. In: Riassunti estesi delle Comunicazioni del "22° Convegno Nazionale GNGTS". Roma, 18-20 novembre, 2003, vol. 14.05, p. 1-8, TRIESTE: Sleiko D., ISBN: 88-900385-7-8. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/179332.
2002	CELLA F, DE LORENZO S, FEDI M, LODDO M, MONGELLI F, RAPOLLA A, ZITO G.M (2002). Temperatura e densità dello slab tirrenico e nuova interpretazione del campo gravimetrico del bacino del Tirreno *(Speaker).* In: Riassunti estesi delle Comunicazioni del "21° Convegno Nazionale GNGTS". p. 66-68, TRIESTE:OGS-GNGTS. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/160187
2001	CELLA F, FEDI M, FLORIO G, RAPOLLA A (2001). Crustal modelling of the Somma-Vesuvius volcanic area (Campania, Italy) by 3d inversion of gravity data. In: EGS. Nizza (Francia), Aprile 2001. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/167007
2000	CELLA F, FEDI M, FLORIO G, RAPOLLA A (2000). Boundary analysis del campo 3D di anomalie gravimetriche *(Speaker).* In: Atti del 19° Convegno Annuale GNGTS. Roma (Italia), Novembre, 2000, vol. 07.01. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/181280
1996	CELLA F, FLORIO G, FEDI M, RAPOLLA A (1996). The interpretation of Geopotential Fields in Volcanic Areas: Examples in the Campanian Volcanic Areas (Southern Italy). In: Atti del convegno "The Safe City": Italian-Japanese Symposium on Earthquakes, Eruptions and Civil Defence". Napoli, Messina (Italy), Febbraio, 1996, p. 61-69, NAPOLI:Rapolla A. . Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/182126
1995	CELLA F, CARRARA E, FEDI M, FIUME M, FLORIO G, GRIMALDI M, RAPOLLA A, ROBERTI N (1995). Indagini geofisiche nella Conca di Laceno (AV) *(Speaker).* In: 12a Conferenza Annuale del GNGTS. Roma, Novembre, 1994, vol. XII, p. 867-872. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/166311
1995	DORRE A, CELLA F, GRIMALDI M, HADI Y, HASSAN H, RAPOLLA A (1995). Regional components of the gravity field of Egypt and contiguous regions *(Speaker).* In: Atti della 12a Conferenza Annuale del GNGTS. Roma (Italia), Novembre, 19, p. 1113-1120. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/167008
1995	DORRE A, GRIMALDI M, RAPOLLA A, CELLA F (1995). Studio del campo gravimetrico dell'Egitto: la discontinuità della Moho *(Speaker).* In: Atti della 13a Conferenza Annuale del GNGTS. Roma (Italia), 28-29 Novembre, 1994, vol. II, p. 151-153. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/160198
1994	CELLA F, RAPOLLA A, DORRE A (1994). Gravity study of the crustal structures of Somalia along ILP Geotransects *(Speaker).* In: Atti della 12a Conferenza annuale GNGTS. Roma (Italia), Novembre, 1993, p. 1121-1124. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/166312
1993	CELLA F, RAPOLLA A, DORRE A (1993). Gravity signature of Ethiopian Rift (East Africa) *(Speaker).* In: Atti della 11a Conferenza Annuale GNGTS. Roma (Italia), 9-11 Dicembre, 1992, p. 673-676. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/160243
1992	CELLA F, RAPOLLA A, DORRE A (1992). Studio gravimetrico dell'Africa Orientale: Risultati preliminari *(Speaker).* In: Atti della 10a Conferenza Nazionale GNGTS. Roma (Italia), 6-8 Novembre, 1991, p. 635-638. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/180985

List of the 12 publications selected for submission.

The publications have been selected to provide an overview of F. Federico Cella scientific production. The selection has been done not having as a unique criterion the ranking of the journal. Here the list in chronological order (from the most recent) is reported

1. M. Fedi, F. Cella, M. D'Antonio, G. Florio, V. Paoletti, V. Morra (2018). Gravity modeling finds a large magma body in the deep crust below the Gulf of Naples, Italy.. SCIENTIFIC REPORTS, vol. 8, ISSN: 2045-2322, doi: 10.1038/s41598-018-26346-z. (20 cit.).
2. P. Luiso, V. Paoletti, R. Nappi, M. La Manna, F. Cella, G. Gaudiosi, M. Fedi, M. Iorio (2018). A multidisciplinary approach to characterize the geometry of active faults: the example of Mt. Massico, Southern Italy.. GEOPHYSICAL JOURNAL INTERNATIONAL, vol. 213, p. 1673-1681, ISSN: 1365-246X, doi: 10.1093/gji/ggy080.
3. CELLA, Federico (2015). GTeC—A versatile MATLAB tool for a detailed computation of the terrain correction and Bouguer gravity anomalies. COMPUTERS & GEOSCIENCES, vol. 84, p. 72-85, ISSN: 0098-3004, doi: http://dx.doi.org/10.1016/j.cageo.2015.07.015. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/150881. (11 cit.)
4. CELLA, Federico, Fedi M. (2015). High-Resolution Geophysical 3D Imaging for Archaeology by Magnetic and EM data: The Case of the Iron Age Settlement of Torre Galli, Southern Italy.. SURVEYS IN GEOPHYSICS, vol. 36, p. 831-850, ISSN: 0169-3298, doi: 10.1007/s10712-015-9341-3. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/135301. (8 cit.)
5. CELLA, Federico, PAOLETTI V, FLORIO G, FEDI M. (2015). Characterizing Elements of Urban Planning in Magna Graecia Using Geophysical Techniques: the Case of Tirena (Southern Italy). ARCHAEOLOGICAL PROSPECTION, vol. 22, p. 207-219.
6. CELLA, Federico, FEDI M. (2012). Inversion of potential field data using the structural index as weighting function rate decay. GEOPHYSICAL PROSPECTING, vol. 60, p. 313-336, ISSN: 0016-8025, doi: 10.1111_j.1365-2478.2011.00974. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/147684. (74 cit.)
7. Pepe, F., Sulli, A., Bertotti, G., Cella, F., 2010. Architecture and Neogene to Recent evolution of the western Calabrian continental margin: An upper plate perspective to the Ionian subduction system, central Mediterranean. Tectonics, 29(3),TC3007 (32 cit).
8. FEDI M, CELLA, Federico, QUARTA T, VILLANI A. V. (2010). 2D Continuous Wavelet Transform of potential fields due to extended source distributions. APPLIED AND COMPUTATIONAL HARMONIC ANALYSIS, vol. 28, p. 320-337, ISSN: 1063-5203, doi: 10.1016/j.acha.2010.03.002. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/155109. (37 cit.).
9. CELLA, Federico, FEDI M, FLORIO G. (2009). Toward a full multiscale approach to interpret potential fields. GEOPHYSICAL PROSPECTING, vol. 57, p. 543-557, ISSN: 0016-8025, doi: 10.1111/j.1365-2478.2009.00808.x. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/158439. (65 cit.).
10. CELLA, Federico, S. DE LORENZO, M. FEDI, M. LODDO, F. MONGELLI, A. RAPOLLA, G. ZITO (2006). Temperature and density of the Tyrrhenian lithosphere and slab and new interpretation of gravity field in the Tyrrhenian Basin. TECTONOPHYSICS, vol. 412, p. 27-47, ISSN: 0040-1951, doi: 10.1016/j.tecto.2005.08.025. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/144829. (16 cit.).
11. PEPE F, BERTOTTI G, CELLA, Federico, MARSELLA E. (2000). Rifted margin formation in the South Tyrrhenian Sea: a high-resolution seismic profile across the North Sicily passive continental margin. TECTONICS, vol. 19, p. 241-257, ISSN: 0278-7407, doi: 10.1029/1999TC90006. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/125943. (81 cit.).
12. CELLA, Federico, RAPOLLA A. (1997). Density change in upwelling mantle. PHYSICS OF THE EARTH AND PLANETARY INTERIORS, vol. 103, p. 63-84, ISSN: 0031-9201, doi: 10.1016/S0031-9201(97)00021-6. Proveniente dall'Archivio Istituzionale di UNICAL con codice 20.500.11770/125942. (12 cit.).

Description of the 12 publications selected for submission.

1. **M. Fedi, F. Cella, M. D'Antonio, G. Florio, V. Paoletti, V. Morra (2018). Gravity modeling finds a large magma body in the deep crust below the Gulf of Naples, Italy.. SCIENTIFIC REPORTS, vol. 8, ISSN: 2045-2322.**
Source type: Journal
ISSN 20452322
DOI: 10.1038/s41598-018-26346-z
Publisher: Nature Publishing Group
Impact factor (2018): 4.011
SClmago Journal Rank (2015): Q1
Citations: SCOPUS: 20, WEB OF SCIENCE: 20, GOOGLE SCHOLAR: 25.

The paper analyzed the wide gravity low in the Campania Active Volcanic Area , interpreting it as a large and deep source distribution of partially molten, low-density material from about 8 to 30 km depth. Given the extreme heterogeneity of the causative source modelled, as well as the complexity of the processes that originated it, the result was achieved by modeling the gravity data consistently with several seismic, volcanological and petro-physical constraints, accounting for the coexistence, within the lower/intermediate crust, of large amounts of melts and cumulates besides country rocks . This implied the need to calculate a layered distribution of densities and, thus, a variation with depth of percentages of silicate liquids, cumulates and country rocks. This model results compatible with a fractal density distribution (melt pockets within solid rocks), calculated basing on the scaling exponent estimated from the gravity data. The final interpretation of such a detected low-density body is that of a developing batholith.

F. Cella conceptualized and carried out the whole density forward modeling from gravity data by petro-physical constraining. For computing the densities of silicate melts and their cumulates he updated standard algorithms for including accurate chemical (liquids) and modal (cumulates) compositions inferred from a vast literature. This allowed accounting for variations of physical properties related to the presence of fuids (H2O and CO2) and minerals previously not included. Finally, he contributed to write and review the manuscript.

2. **P. Luiso, V. Paoletti, R. Nappi, M. La Manna, F. Cella, G. Gaudiosi, M. Fedi, M. Iorio (2018). A multidisciplinary approach to characterize the geometry of active faults: the example of Mt. Massico, Southern Italy.. GEOPHYSICAL JOURNAL INTERNATIONAL, vol. 213, p. 1673-1681.**
Source type: Journal
ISSN: 1365-246X
DOI: 10.1093/gji/ggy080
Publisher: Oxford University Press
Impact factor (2018): 2.777
SClmago Journal Rank (2015): Q1
Citations: SCOPUS: 13; WEB OF SCIENCE: 12; GOOGLE SCHOLAR: 16.

The paper presents the results of a multidisciplinary and multiscale study of the gravity anomaly field in the area of Mt. Massico (Southern Italy), a carbonate horst located along the Campanian-Latial margin of the Tyrrhenian basin. The analysis is aimed to model the system of main NE– SW faults that were presumably capable since Plio-Pleistocene and are still active, even though with scarce and low-energy seismicity. The pattern of the fault planes was inferred through a combined interpretation of 2-D hypocentral sections, a multiscale analysis of gravity field and geochemical data. The geometry of these faults was therefore outlined, allowing to infer their large depth extent. Such an analysis proved the effectiveness of a this multidisciplinary approach in areas with buried and/or silent faults of potential high hazard.

F. Cella dealt with collecting, analysis and processing gravity data by means of multiscale techniques (EHD, DEXP). He participated to the interpretation of the final results and contributed to write and review the manuscript.

3. CELLA, Federico (2015). GTeC—A versatile MATLAB tool for a detailed computation of the terrain correction and Bouguer gravity anomalies. COMPUTERS & GEOSCIENCES, vol. 84, p. 72-85.
Source type: Journal
ISSN: 0098-3004
DOI: http://dx.doi.org/10.1016/j.cageo.2015.07.015
Publisher: Elsevier
Impact factor (2015): 2.474
SClmago Journal Rank (2015): Q1
Citations: SCOPUS: 11; WEB OF SCIENCE: 10; GOOGLE SCHOLAR: 14.

The papers presents a versatile MATLAB code (GTeC) able to go beyond the limits of other public domain codes designed for performing terrain correction of gravity measurements. It runs with input gravity data (absolute measurements or free air anomalies) at the land/sea surface and with one or more DTMs (indifferently gridded or scattered) at different levels of detail. For areas closer to the point station it allows a better approximation of the relief by means of a tessellation based network formed by triangular prisms. GTeC calculates free air anomalies, curvature corrections, plate correction, terrain effect, providing also a complete graphic output. GTeC speeds up CPU times taking advantage from the parallel computing functions and from the vectorization code performed by MATLAB. The results of a synthetic case, of a real case at the regional scale and of a microgravity survey carried out at a short scale, are here presented.

4. **CELLA, Federico, Fedi M. (2015). High-Resolution Geophysical 3D Imaging for Archaeology by Magnetic and EM data: The Case of the Iron Age Settlement of Torre Galli, Southern Italy. SURVEYS IN GEOPHYSICS, vol. 36, p. 831-850.**
Source type: Journal
ISSN: 0169-3298
DOI: 10.1007/s10712-015-9341-3
Publisher: Springer Nature.
Impact factor (2015): 3.622
SClmago Journal Rank (2015): Q1
Citations: SCOPUS: 8; WEB OF SCIENCE: 9; GOOGLE SCHOLAR: 12.

The paper illustrates the results of a high-resolution imaging process based on Magnetic and EM data surveyed at Torre Galli (Vibo Valentia, Calabria, Italy), one of the most significant sites of the early Iron Age in Italy. Multi-scale derivative analysis of magnetic data allowed to outline several buried structures and to characterize them in terms of size, shape, and depth by means of the imaging technique. The selected results addressed targeted excavations revealing structures showing exactly the predicted features and confirming the archaeological hypothesis concerning the settlement organization partitioned in terms of functional differentiation. The survey was financed by MIUR with funds PRIN (Project of relevant national interest) 2009 (U.R. Leader: Federico Cella).

F. Cella supervised the whole survey as Project Leader (PRIN 2009) and was the responsible of the data collecting, analysis, processing and validation. He dealt with the interpretation and multiscale imaging by means of EHD and DEXP 3D techniques, finally providing the maps used for addressing archaeological excavations. He was also responsible of the manuscript writing and reviewing as corresponding author.

5. **CELLA, Federico, PAOLETTI V, FLORIO G, FEDI M. (2015). Characterizing Elements of Urban Planning in Magna Graecia Using Geophysical Techniques: the Case of Tirena (Southern Italy).. ARCHAEOLOGICAL PROSPECTION, vol. 22, p. 207-219, ISSN: 1099-0763, doi: 10.1002/arp.1507.**
Source type: Journal
ISSN: 1099-0763
DOI: 10.1002/arp.1507
Publisher: WILEY-BLACKWELL
Impact factor (2015): 1.327
SClmago Journal Rank (2015): Q1 (Q3 by Clarivate)
Citations: SCOPUS: 4; WEB OF SCIENCE: 4; GOOGLE SCHOLAR: 10.

The paper presents the results of a geophysical study at the site of Pian della Tirena (CZ, Southern Italy). The site studied gained archaeological interest following the hypothesis of the presence of two adjacent, but distinct, settlements. The first one of Hellenic/Hellenistic age (the Temesa of Brettian age), the second (called Tempsa) of Roman age. Even though the site was recently excavated, extensive investigation was not possible due to the broadness of the area and the scarceness of traces at the surface, making it difficult to plan a targeted survey. Two detailed geophysical (magnetic and electromagnetic) surveys were carried out to provide the archaeologists with precise information about the type and position of the buried structures, and increase the efficiency of the investigation. The three-dimensional analysis and interpretation detected several anomaly trends, most of which show a rather regular shape and orientation. This allowed to infer the possible existence of a well-developed urban network. The final results guided the archaeological investigation and wer fully confirmed by excavation tests.

F. Cella supervised the whole survey as Project Leader (PRIN 2005) and was the responsible of the magnetic/EM data collecting, analysis, processing and validation. He dealt with the multiscale boundary analysis and interpretation and by DEXP imaging, finally providing the maps used for addressing archaeological excavations. He was also responsible of the manuscript writing and reviewing as corresponding author.

6. **CELLA, Federico, FEDI M. (2012). Inversion of potential field data using the structural index as weighting function rate decay. GEOPHYSICAL PROSPECTING, vol. 60, p. 313-336.**
Source type: Journal
ISSN: 0016-8025
DOI: 10.1111_j.1365-2478.2011.00974
Publisher: Wiley-Blackwell
Impact factor (2012): 1.36
SClmago Journal Rank (2012): Q2
Citations: SCOPUS: 74; WEB OF SCIENCE: 63; GOOGLE SCHOLAR: 90.

The paper suggests an alternative procedure to estimate the source densiy/susceptibility distribution from potential field measurements exploiting inversion methods by means of a flexible depth-weighting function in the Tikhonov formulation. Such an approach improves the formulation proposed by previous authors, introducing a significant change in the definition of the depth-weighting function. This parameters is no longer associated to the field decay of a single block (which can be representative of just a part of the source) but to the field decay of the whole source, thus implying that the data inversion is independent on the cell shape but, on the contrary on the shape of the whole source. The study of a complex synthetic and real (Vulture volcanic complex, Southern Italy) cases also proves that the depth-weighting decay should not be kept constant for multi-source models but should instead depend on the structural index of the different sources Such a parameter can be predicted without a-priori assumptions by means of multiscale techniques (e.g. DEXP).

Dr. Cella contributed to the conceptualization and developing of the methodology, testing the results and validating the approach by dealing with the whole case history. He was responsible of the manuscript writing and reviewing as corresponding author.

7. **Pepe, F., Sulli, A., Bertotti, G., Cella, F. (2010). Architecture and Neogene to Recent evolution of the western Calabrian continental margin: An upper plate perspective to the Ionian subduction system, central Mediterranean. Tectonics, 29(3),TC3007.**
Source type: Journal
ISSN: 0278-7407
DOI: 10.1029/2009TC002599
Publisher: Wiley-Blackwell
Impact factor (2010): 3.147
SClmago Journal Rank (2010): Q1
Citations: SCOPUS: 32; WEB OF SCIENCE: 32; GOOGLE SCHOLAR: 39.

The paper provided a detailed reconstruction of the architecture of the margin and develop a new scheme for its Miocene to present evolution by integrating high-resolution and crustal seismic images constrained by gravity modeling. The paper documented a crustal thinning leading to thicknesses decreasing from ∼25 km beneath the western Calabria coast to ∼12 km beneath the Marsili continent-ocean transition with local sedimentary thickening in the Paola Basin. The hypothesis of a regional shortening from since Micene to Pliocene accommodated by several west vergent trusts, was also supported. The structural model was constrained by the density distribution mapped by gravity data interpretation. The problem of a preventive residuation of gravity anomalies to separate crustal components, was solved by directly modelling also the main causative mantle sources by taking advances from previous studies (see papers 9 and 11). The gravity modelling was crucial for refining the depths to the main seismic reflectors calculated on the base of the available velocity analysis.

F. Cella was responsible of the whole gravity investigation (including data collection, analysis, processing and interpretation) and contributed to write and review the manuscript.

8. **FEDI M, CELLA, Federico, QUARTA T, VILLANI A. V. (2010). 2D Continuous Wavelet Transform of potential fields due to extended source distributions. APPLIED AND COMPUTATIONAL HARMONIC ANALYSIS, vol. 28, p. 320-337.**
Source type: Journal
ISSN: 1063-5203
DOI: 10.1016/j.acha.2010.03.002
Publisher: Elsevier / Academic Press Inc.
Impact factor (2010): 3.211
SClmago Journal Rank (2020): Q1
Citations: SCOPUS: 37; WEB OF SCIENCE: 27; GOOGLE SCHOLAR: 46.

The paper exploits the Continuous Wavelet Transform 2D (CWT2D) for investigating potential field singularities with realistic fields. The 3D space-scale representation was generated and the Wavelet Transform Modulus Maxima (WTMM), related to the shape of the source, were showed at each scale. A sort of source boundary analysis were so defined gaining resolution and defining source features through the CWT. The method estimates the depth to the source properly selecting the range of scales where the sources behave as if they are approximately isolated. This was made by taking advantage from the property that the lines joining the WTMML maxima intersect each other at the edges of the causative body. The method was successfully tested for estimating the depth of the Mesozoic carbonate basement in the Vesuvius area (Italy) starting from the local gravity anomalies.

F. Cella dealt with the phases of investigation, data analysis, curation and validation. He contributed to implement and test the software giving, finally, the main contribution to the writing and reviewing as corresponding author.

9. **CELLA, Federico, FEDI M, FLORIO G. (2009). Toward a full multiscale approach to interpret potential fields. GEOPHYSICAL PROSPECTING, vol. 57, p. 543-557.**
Source type: Journal
ISSN: 0016-8025
DOI: 10.1111/j.1365-2478.2009.00808.x
Publisher: WILEY-BLACKWELL PUBLISHING, INC
Impact factor (2009): 1.772
SClmago Journal Rank (2009): Q1
Citations: SCOPUS: 66; WEB OF SCIENCE: 54; GOOGLE SCHOLAR: 77.

The paper presents an original way for interpreting the potential fields by a multiscale analysis based on the assumption that the main field contributions are caused by sources with different depths and extents. The multiscale analysis takes advantage from the combined use of stable transformations: the first one (multiscale derivative analysis), estimates the source boundaries by utilizing a generalized concept of horizontal derivative, thus producing a set of boundary maps at different scales; the second one (depth from extreme points) allows a source imaging with a great stability. This results from mixing, in a single operator, the behavior of the upward continuation transformation of the field with the enhancement high-pass properties of *n*-order derivative transformations. The reciprocal interference of more field components may be properly set at several scales of the analysis and the depth to the sources may be estimated together with the homogeneity degrees of the field. Finally, two successful case histories (Southern Apennines) were described. The paper was awarded with the Loránd Eötvös Award 2010 by the European Association of the Geophysicists and Engineers (EAGE).

F. Cella dealt with the phases of investigation, data analysis, curation and validation and was also responsible of the software implementation and testing. Finally, he gave the main contribution to the writing and reviewing as corresponding author.

10. **CELLA, Federico, S. DE LORENZO, M. FEDI, M. LODDO, F. MONGELLI, A. RAPOLLA, G. ZITO (2006). Temperature and density of the Tyrrhenian lithosphere and slab and new interpretation of gravity field in the Tyrrhenian Basin. TECTONOPHYSICS, vol. 412, p. 27-47.**
Source type: Journal
ISSN: 0040-1951
DOI: 10.1016/j.tecto.2005.08.025
Publisher: Elsevier
Impact factor (2006): 1.675
SClmago Journal Rank (2006): Q1
Citations: SCOPUS: 16; WEB OF SCIENCE: 15; GOOGLE SCHOLAR: 16.

The paper presented a regional model of the litho-asthenospheric structure of the whole Tyrrhenian Basin along a regional transect. A $2^{1/2}$ interpretation of gravity data was carried out by including as constraints the results achieved by the computation of the isotherms in the crust–mantle system beneath the Tyrrhenian Basin and of the density distribution within the partially melted upwelling asthenosphere.The final model matched both gravity, thermal and petrographic data, providing a better definition of the thermal regime of the passive mantle rise beneath the Tyrrhenian basin and a reconstruction of the lithospheric slab beneath the Calabrian Arc.

F. Cella was responsible of conceptualization and developing of both methodology and software used for modelling the density distribution within the uprising mantle. He dealt with the analysis, processing and

modelling of gravity data, finally giving a primary contribution to the writing and reviewing as corresponding author.

11. **PEPE F, BERTOTTI G, CELLA, Federico, MARSELLA E. (2000). Rifted margin formation in the South Tyrrhenian Sea: a high-resolution seismic profile across the North Sicily passive continental margin. TECTONICS, vol. 19, p. 241-257.**
Source type: Journal
ISSN: 0278-7407
DOI: 10.1029/1999TC90006
Publisher: Impact factor (2000): 3.975
SClmago Journal Rank (2000): Q1
Citations: SCOPUS: 81; WEB OF SCIENCE: 71; GOOGLE SCHOLAR: 97.

The paper presented the results of the seismic/gravity interpretation along a new 150 km seismic line across the continental margin of Northern Sicily and the Thyrrenian Basin. The study recognized two extensive phases: the earlier aged from the late Tortonian to Messinian and a second in the late Pliocene. It confirmed that the extension/thinning did not migrate at a lithospheric scale whereas at a smaller scale it migrated toward the foot-wall of the listric fault controlling the basin opening up to an total elongation of almost 100 km.

F. Cella validated the interpretation of the seismic section by means of gravity modelling at both the regional (litho-asthenospheric) and local (crustal) scale. He contributed to write and review the manuscript.

12. **CELLA, Federico, RAPOLLA A. (1997). Density change in upwelling mantle. PHYSICS OF THE EARTH AND PLANETARY INTERIORS, vol. 103, p. 63-84.**
Source type: Journal
ISSN: 0031-9201
DOI: 10.1016/S0031-9201(97)00021-6
Publisher: Elsevier
Impact factor (1997): 1.699
SClmago Journal Rank (1999): Q2
Citations: SCOPUS: 12; WEB OF SCIENCE: 8; GOOGLE SCHOLAR: 16.

The paper deals with the problem of the interpretative ambiguity recurring when gravity data are analyzed for modeling crustal structures involved by extensional tectonics (rifting). The aim was to calculate a reliable density vertical distribution within the asthenospheric mantle upwelling beneath the thinned lithosphere. To do this several parameters were considered as the degree of thermal anomaly in the asthenosphere, the amount of lithospheric stretching, the thickness of the lithosphere before stretching, and the variation of melt fraction generated by adiabatic decompression. The method was successfully tested to model the lithospheric structure of the Tyrrhenian Basin.

F. Cella was responsible of conceptualization and developing of both methodology and software, together with the data data curation and the validation of the results. Finally, he contributed to write and review the manuscript as corresponding author.

Indicators related to overall scientific production

Publication metrics on the main publication databases:

Database source	H index	Without self-citations	Citations	Without self-citations

GOOGLE SCHOLAR	16	-	964	-
SCOPUS	14	13	747	542
WEB OF SCIENCE	14	-	672	623

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