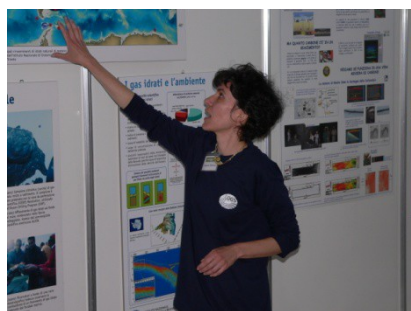


Curriculum Vitae – Umberta Tinivella



*Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Borgo Grotta Gigante 42C, 34010 Trieste, Italy
Tel: +39 040 2140219, Fax: +39 040 327521
Email: utinivella@inogs.it*

Brief profile

Since 1996 she is employed at OGS. In 1998 she received the Cagniard Award for the poster presented at the EAGE Conference. She performed simulation of acoustic wave propagation along the drill string considering the border condition (formation, mud, variable geometry, etc.). She studied the possibility to predict overpressure zones from analysis of seismic, log and laboratory data, by using elastic theories, which relate physical properties of rocks to pore pressure in the frame of EU project. In 2005, she received the Best Poster Presentation at the Near Surface Conference. Presently, she works on gas hydrate topic, considering standard and non-conventional processing of seismic data, such as pre-stack depth migration, Amplitude Versus Offset, seismic inversion, modeling and theoretical models to describe the physical properties of gas hydrate- and free gas-bearing sediments. She developed a procedure to estimate the concentrations of gas hydrate and free gas from seismic and well data. She is/was the leader of several Gas Hydrate Project supported by Italian government, Oil Company and EU. She is the author of many technical reports and papers on gas hydrate topic and she received several invitation to present her work. Moreover, she is active on dissemination of her research.

Keywords: gas hydrate, pore fluid, overpressure, modeling, advanced seismic processing, integrated geophysical approaches, theoretical modeling.

Researcher unique identifier: ORCID:[0000-0003-2013-6645](https://orcid.org/0000-0003-2013-6645), SCOPUS: 6602859093

• **EDUCATION**

- 2003-2006 PhD in Applied Geophysics – tutor prof. R. Nicolich
Department of Environmental and Civil Engineering, University of Trieste, Italy
- 1994-1995 Specialization in Solid State Physics and Numerical Physics in the frame of the «Troisième cycle en Physique»
Ecole Polytechnique Fédérale de Losanne (EPFL), Switzerland
- 1992 Laurea in Physics with laudem – tutor prof. A. Baldereschi
Physics Department, University of Trieste, Italy

• **CURRENT POSITION**

- 2016 – Vice-Director of Geophysics Dept. (OGS)
- 2009 – Senior Researcher and head of the Research Group GIANT (Geophysical Integrated Analysis and New Technologies), Geophysics dept., OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Italy

- **PREVIOUS POSITIONS**

- 1998 – 2008 Researcher (permanent position from 2003)
Geophysics Department, OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Italy
- 1994 – 1995 Assistant Research of the Physics Laboratory II
Ecole Polytechnique Federale de Losanne (EPFL), Switzerland

- **FELLOWSHIPS AND AWARDS**

- 2005 Best Poster Presentation Award at the Near Surface Conference, 11th European EAGE Meeting of Environmental and Engineering Geophysics.
- 1998 Cagniard Award for the best poster presented at the 60st European Association of Geoscientists and Engineers (EAGE) Conference.
- 1996-1998 Fellowship
Geophysics Department, OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Italy
- 1993 Fellowship
National Institute of Material Physics (INFM), Italy

- **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

- 2018 - 1 Thesis (Giulia Alessandrini) in collaboration with University of Bologna
- 2017 1 Thesis (Francesco Turco) in collaboration with University of Trieste
- 2016 - 1 Ph.D (Matilde Ferrante) in collaboration with University of Trieste
- 2015 - 1 Ph.D (Song Sha) and 1 master (Stefano Visintin) in collaboration with University of Padua
- 2014 – 2015 Postdoc at OGS about gas hydrate research in Arctic, OGS, Italy (H. Marin-Moreno)
- 2013 - Tutor of a stage (3 months) at OGS (S. Buenz)
- 2011 Diploma in Environmental Engineering, University of Trieste, Italy (M. Gili)
- 2006-2011 2 PhD in Environmental Science, University of Trieste, Italy (I. Vargas-Cordero, D. Accettella)
- 2007-2009 Fellowship at International Center of Theoretical Physics, Italy (I. Vargas-Cordero)
- 2005-2007 Fellowship to study gas hydrate in Antarctica, OGS, Italy (M.F. Loreto)
- 2004-2006 1 Marie Curie Fellowship (D. Praeg) and 1 European grant in the frame of EURODOM, OGS (C. Neagu)
- 1999 Master in Geophysics, University of Trieste (F. Donda)

- **TEACHING ACTIVITIES**

- 2015 (2 week) Course on Geophysical methods, University Andres Bello, Chile
- 2014 (1 week) Course on Elastic Properties of Rocks, University of Geosciences, China
- 2014 (1 week) Course on Gas hydrates in natural environment: from climate change to possible energy of the future, in the frame of KEP project, OGS, Italy
- 2013 (10 days) Organization and participation Training School: “Permafrost and gas hydrate related methane release in Arctic and impact on climate change”, Finland
- 2012 (2 weeks) Course on the use of Seismic Unix and software ISTRICI (my code created to analyze CIG), University of Geosciences, China
- 2011 (2 days) Lessons PhD course in Geosciences: “Elastic properties of the rocks: AVO and theoretical approaches” and “Gas hydrate: from climate change to possible future energy”, University of Trieste, Italy
- 2010 (2 weeks) Course on the use of GeoDepth (Paradigm Geophysical) at Barcelona Center for Subsurface Imaging (CSIC), Spain
- 2010 (1 day) Lesson: “An approach to characterize the gas hydrate reservoir by geophysical analysis”, PUCRS-PETROBRAS, Porto Alegre, Brasil
- 2009 (2 weeks) Course on the use of Seismic Unix and software ISTRICI (my code created to analyze CIG), National Geophysical Research Institute, India
- 2007 (1 week) Lessons about the method used to analyze the seismic data in order to estimate the gas

hydrate and free gas concentrations, Institute of Acoustics (Chinese Academy of Sciences, Beijing), Department of Geophysics and Information Technology (China University of Geosciences, Beijing), and University of Science and Technology (Qingdao, China)

- 2005 (3 days) Lessons in the frame of collaboration between Italy and Georgia: “3D seismic”, “Integrated analysis of geophysical methods” and “Petrophysical properties of the rocks”
- 2004 (1 week) Participation and organization School on “Processing of multichannel seismic data”, OGS, Italy

• ORGANISATION OF SCIENTIFIC MEETINGS

- 2014-2019 Member of Programme Committee of the 12th, 13th and 14th Offshore Mediterranean Conference & Exhibition (OMC 2015, 2017, 2019), Italy
- 2013 Section: “Seismic Imaging - Theory I”, EAGE, Grain Britain
Section: “Applied Geophysics for environmental management: methodological developments and practical experiences”, GEOITALIA, Italy
- 2012 Section: “Carbonate Petrophysics”, EAGE, Denmark
- 2012/2013 Section: “Shallow and deep seismic”, GNGTS, Italy
- 2010 Section: “Gas-hydrates, petroleum and coal - Resources and hazards”, EGU, Vienna, Austria
Member of Scientific Committee of Fiery Ice Workshop, New Zealand
- 2009 Workshop: “Energy From Methane Hydrates – Resource Potential and Technology Challenges, OMC, Italy
- 2008 Section: “Gas hydrates”, AOGS, Korea
- 2007 Workshop Italy-Korea to promote bilateral collaboration, Italy
- 2005/07/09 Sections: “Gas hydrate from environmental impact to a possible energy resource”, GEOITALIA, Italy
- 2005 Section “Seismic characterization of the local response with geophysical methods”, GNGTS, Italy

• INSTITUTIONAL RESPONSIBILITIES

- 2016 - Vice-Director of Geophysic Dept. (OGS)
- 2012 - Member of Executive Committee of Italian EAGE-SEG Section
Member of Scientific Committee of PhD courses, University of Padua, Italy
Member of Committee on Equal Opportunities, OGS, Italy
- 2005 – 2012 Member of Administrative committee, OGS, Italy

• COMMISSIONS OF TRUST

- 2018 - Member of Editorial Board of Journal of Geofluids
- 2018 - Lead Guest Editor of special publication: “Gas Hydrate. Environmental and Climate Impacts”, Geosciences
- 2014 - Member of Editorial Board of Journal of Geography, Environment and Earth Science International and International Journal of Geophysics and GeoChemistry
- 2013 - Member of Editorial Board of The Scientific World Journal
Scientific Evaluator, Ministry of Education, University and Research, Italy
Lead Guest Editor of special publication: “Geophysical Methods for Environmental Studies”, International Journal of Geophysics”
- 2012 - Member of Editorial Board of Journal of Geological Research and American Chemical Science Journal
- 2011 Lead Guest Editor of special publication: “Gas Hydrate on Continental Margins”, Journal of Geological Research
- 2008 - 2014 Member of Editorial Board of The Open Paleontology Journal

• MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2015 – 2019 Management Committee of the EU-COST project and leader of the WG3 “Environmental challenges”): MIGRATE - Marine gas hydrate - an indigenous resource of natural gas for Europe

- 2013 - 2017 Participation to EU-COST project: Impact of Fluid circulation in old oceanic Lithosphere on the seismicity of transform-type plate boundaries: new solutions for early seismic monitoring of major European Seismogenic zones (FLOWS)
- 2008 – 2013 Management Committee of the EU-COST project: PERGAMON - Permafrost and gas hydrate related methane release in Arctic and impact on climate change: European cooperation for long-term monitoring

• MAJOR COLLABORATIONS

Prof. I. Vargas-Cordero (Andres Bello University, Chile), formalized with a Memorandum of Understanding to promote bilateral collaboration on geophysical studies (2016-2020)

Dr. K. Sain (NGRI, India), formalized with a Memorandum of Understanding to promote bilateral collaboration on gas hydrate studies (2010-2014)

Prof. X. Liu (Geoscience University, China), formalized with a Memorandum of Understanding to promote bilateral collaboration on GH studies and a project (2009-2013)

Dr. J.K. Hong (KOPRI, Korea); formalized with a Memorandum of Understanding to collaborate in Antarctica (2007-2011)

In the following, I select the main publications on the gas hydrate topic, which I consider innovative, such as my methods to estimate gas hydrate, free gas concentrations and pore pressure from geophysical data, AVO analysis applied to gas hydrate system, the recent studies about the BSR depth versus overpressure and the effect of overpressure on coupled waves across BSR.

1. Villar-Munoz, L., Bento, J.P., Klaeschen, D., **Tinivella**, U., Vargas-Cordero I., Behrmann, J.H. A first estimation of gas hydrates offshore Patagonia (Chile) (2018). *Marine and Petroleum Geology* 96: 232-239
2. Giustiniani, M., **Tinivella**, U., Sauli, C, Della Vedova B. Distribution of the gas hydrate stability zone in the Ross Sea, Antarctica (2018). *Andean Geology* 45 (1): 78-86.2018 doi: 10.5027/andgeoV45n1-2989
3. **Tinivella**, U., Giustiniani, M., Vargas-Cordero, I. Wave Equation Datuming Applied to Seismic Data in Shallow Water Environment and Post-Critical Water Bottom Reflection (2017). *Energies* 10, 1414; doi:10.3390/en10091414
4. Vargas-Cordero, I, Tinivella, U., Villar-Munoz, L., Gas Hydrate and Free Gas Concentrations in Two Sites inside the Chilean Margin (Itata and Valdivia Offshores) (2017). *Energies*, 10, 2154; doi:10.3390/en10122154
5. U. **Tinivella** and M. Giustiniani (2016). Gas hydrate stability zone in shallow Arctic Ocean in presence of sub-sea permafrost. *Rend. Lincei*, 27, 163-171
6. Vargas-Cordero, U. **Tinivella**, L. Villar-Muñoz and M. Giustiniani (2016). Gas hydrate and free gas estimation from seismic analysis offshore Chiloé island (Chile). *Andean Geology*, 43, 263-274
7. U. **Tinivella** and M. Giustiniani (2013), Numerical simulation of coupled waves in borehole drilling BSR. *Marine and Petroleum Geology*, 44, 34-40. <http://dx.doi.org/10.1016/j.marpetgeo.2013.03.015>
8. U. **Tinivella** and M. Giustiniani (2012). Variations in BSR depth due to gas hydrate stability versus pore pressure. *Global and Planetary Change*, 100, 119-128. doi: 10.1016/j.gloplacha.2012.10.012
9. J.M. Carcione, D. Gei, G. Rossi and U. **Tinivella** (2010). Wave theory, simulation and determination of gas-hydrate content in sediments. Chapter 25 in *Geophysical characterization of Gas hydrate*. Edited by M. Reidel, E.C. Willoughby and S. Chopra.
10. U. **Tinivella**, F. Accaino and B. Della Vedova (2008). Gas hydrates and active mud volcanism on the South Shetland continental margin, Antarctic Peninsula *GeoMarine Letters*, 28, 97-106, DOI 10.1007/s00367-007-0093-z
11. U. **Tinivella** (2002). The seismic response to overpressure versus gas hydrate and free gas concentration. *J. Seismic Exploration*, 11, 283-305
12. F. Coren, V. Volpi and U. **Tinivella** (2001). Gas hydrate physical properties imaging by multi-attribute analysis Blake Ridge BSR case history. *Marine Geology*, 178, 197-210

13. **U. Tinivella** and J.M. Carcione (2001). Estimation of gas hydrate concentration and free gas saturation from log and seismic data. *The Leading Edge, Special Section: Rock Physics*, 200-203
14. **U. Tinivella** and F. Accaino (2000). Compressional velocity structure and Poisson's ratio in marine sediments with gas hydrate and free gas by inversion of reflected and refracted seismic data (South Shetland Islands, Antarctica). *Marine Geology*, 164, 13-27
15. J.M. Carcione and **U. Tinivella** (2000). Bottom simulating reflectors: seismic velocities and AVO effects. *Geophysics*, 65, 54-67
16. **U. Tinivella** (1999). A method for estimating gas hydrate and free gas concentrations in marine sediments. *Bollettino di Geofisica Teorica ed Applicata*, 40, 19-30

In the following, I select the main publications related to my mentoring (underlined), related to gas hydrate studies in Antarctica and South Chile.

1. H. Marin-Moreno, M. Giustiniani, **U. Tinivella** and E. Pinero (2016). The challenges of quantifying the carbon stored in Arctic marine gas hydrate. *Mar. Pet. Geol.* 71, 76-82
2. H. Marin-Moreno, M. Giustiniani and **U. Tinivella** (2015). The Potential Response of the Hydrate Reservoir in the South Shetland Margin, Antarctic Peninsula, to Ocean Warming over the 21st Century. *Polar Research*, 34, 27443
3. M.F. Loreto and **U. Tinivella** (2012). Gas hydrate versus geological features: the South Shetland case study. *Marine and Petroleum Geology*. 36, 164-171
4. M.F. Loreto, **U. Tinivella**, F. Accaino, and M. Giustiniani (2011). Gas Hydrate Reservoir Characterization by Geophysical Data Analysis (Offshore Antarctic Peninsula). *Energies*, 4(1), 39-56; doi:10.3390/en4010039
5. Vargas Cordero, **U. Tinivella**, F. Accaino, M.F. Loreto, and F. Fanucci (2010). Thermal state and concentration of gas hydrate and free gas of Coyhaique, Chilean Margin (44°30' S). *Marine and Petroleum Geology.*, 27, 1148-1156
6. **U. Tinivella**, M.F. Loreto, and F. Accaino (2009). Regional versus detailed velocity analysis to quantify hydrate and free gas in marine sediments: the South Shetland Margin case study. From: *Sediment-Hosted Gas Hydrates: New Insights on Natural and Synthetic Systems*. Vol. 319, 103–119
7. Vargas Cordero, **U. Tinivella**, F. Accaino, M.F. Loreto, F. Fanucci, and C. Reichert (2009). Analyses of bottom simulating reflections offshore Arauco and Coyhaique (Chile). *Geo-Mar Lett.*, DOI 10.1007/s00367-009-0171-5
8. R.C. Neagu, **U. Tinivella**, U., Volpi, V., Rebesco, M. and Camerlenghi (2008). Estimating the biogenic silica concentration and its effects on slope stability in marine sediments using seismic and log data from the sediment drift 7-Antarctica. *Int. J. E. Sci.*, Doi 10.1007/s00531-008-0315-2
9. M.F. Loreto, **U. Tinivella**, and C.R. Ranero (2007). Evidence for fluid circulation, overpressure and tectonic style along the Southern Chilean margin. *Tectonophysics*, 429, 183–200

Selected papers in collaboration with my PhD tutor (underlined), mainly related to geothermal field studies, deep crustal seismic data analysis, innovative seismic processing (such as AVO and WED) and papers related to PhD studies, demonstrating my skill attitude in another research field.

1. M. Giustiniani, **U. Tinivella** and R. Nicolich (2015). Reflection seismic sections across the Geothermal Province of Tuscany from reprocessing CROP profiles. *Geothermics*, 53: 498–507
2. R. Catalano, V. Valenti, C. Albanese, F. Accaino, A. Sulli, **U. Tinivella**, M. Gasparo Morticelli, C. Zanolla, and M. Giustiniani (2013), Sicily's fold/thrust belt and slab roll-back: the SI.RI.PRO. seismic crustal transect *Journal of the Geological Society*, May 2013, v. 170:451-464, doi:10.1144/jgs2012-099
3. E. Barison, G. Brancatelli, R. Nicolich, F. Accaino, M. Giustiniani, **U. Tinivella** (2011). Wave equation datuming applied to marine OBS data and to land high resolution seismic profiling. *Journal of Applied Geophysics*. doi:10.1016/j.jappgeo.2011.01.009
4. F. Accaino, R. Catalano, L. Di Marzo, M. Giustiniani, **U. Tinivella**, R. Nicolich, A. Sulli, V. Valenti and P. Manetti (2011). A crustal seismic profile across Sicily. *Tectonophysics*, doi:10.1016/j.tecto.2010.07.011
5. B. Della Vedova, Vecellio, C; Bellani, S; and **Tinivella, U.** (2007). Thermal modelling of the Larderello geothermal field (Tuscany, Italy). *Int. J. E. Sci.*, DOI 10.1007/s00531-007-0249-0
6. F. Accaino, **U. Tinivella**, G. Rossi, and R. Nicolich (2005). Geofluid evidences from analysis of seismic data from Southern Tuscany (Italy). *JVGR*, 148, 46– 59

7. **U. Tinivella**, F. Accaino, G. Rossi, and R. Nicolich (2005). Petrophysical analysis of CROP 18 crustal seismic data. BSGI, 3, 205-211
8. F. Accaino, **U. Tinivella**, G. Rossi and R. Nicolich (2005). Imaging of CROP 18 deep seismic crustal data. BSGI, 3, 195-204

I also selected relevant papers about other topics, mainly related to advanced seismic processing (such as AVO), seismic modeling (such as numerical simulation), theoretical models (such as overpressure modeling) and innovative seismic methods (such as semi-automatic picking):

1. Tinivella, U., Giustiniani, M., Nicolich R. Wave equation datuming applied to S-wave reflection seismic data (2018) J. Applied Geophysics 152: 167-172
2. Giustiniani, M., **Tinivella**, U., Nicolich, R. (2018) Crustal structure of Central Sicily Tectonophysics, 722, pp. 299-313.
3. Y. Liu, **U. Tinivella** and X. Liu (2014). An inversion method for seafloor elastic parameters. Geophysics, 80: N11–N21, doi: 10.1190/GEO2014-0028.1
4. M. Giustiniani, **U. Tinivella**, and F. Accaino (2010). P and S reflection and P refraction: An integration for characterising shallow subsurface. Journal of Applied Geophysics, 71, 149-156
5. M. Giustiniani, F. Accaino, S. Picotti and **U. Tinivella** (2009). 3D seismic data for shallow aquifers characterisation. Journal of Applied Geophysics, 68: 394–403, doi:10.1016/j.jappgeo.2009
6. F. Accaino, A. Bratus, S. Conti, D. Fontana and **U. Tinivella** (2007). Fluid seepage in mud volcanoes of the northern Apennines: An integrated geophysical and geological study. J. Appl. Geoph.; 63, 90 – 101.
7. G. Bohm, F. Accaino, G. Rossi and **U. Tinivella** (2006). Tomographic joint inversion of first arrivals in a real case from Saudi Arabia. Geophysical Prospecting, 54, 721–730
8. F. Poletto, M. Malusa, F. Miranda, and **U. Tinivella** (2004). Seismic-while-drilling by using dual sensors in drill strings. Geophysics, 69, 1261-1271
9. **U. Tinivella** and F. Poletto (2003). Propagation of extensional and torsional waves in a real drill string. Journal of Seismic Exploration, 12, 151-168
10. **U. Tinivella** (2003). Numerical simulation of coupled waves in borehole. J. Computational Acoustics, 11, 1-14
11. J.M. Carcione and **U. Tinivella** (2001). The seismic response to overpressure: a modelling study based on laboratory, well and seismic data. Geophysical Prospecting, 49, 523-539
12. **U. Tinivella** (1998). Semi-automatic picking in real seismic data. First Break, 16, 47-51

I was also involved to disseminate my research about gas hydrate, for example through italian book (Energia immensa e sfida ambientale. Gli idrati del metano. Ed. Universita' la Sapienza, 192 pp, 2007) and participating to italian scientific news in 2008 and 2013.

I developed a code to estimate gas hydrate and free gas concentrations, considering the effect of pore pressure in free gas zone, named DRAGO. Moreover, I produced ISTRICI (Structural Inversion by CIG Analysis) software to obtain interval velocity by Common Image Gather (CIG) analysis adopting Seismic Unix (open source package) and home codes. DRAGO and ISTRICI software are illustrated in the web site: <https://sites.google.com/site/tinicoes/>. Both codes required me developing a strong background about seismic data analysis and theoretical models. In addition, I developed a code for simulating torsional and extensional waves in a real drill string and coupled waves in borehole, and a code to perform Amplitude Versus Offset inversion, based on theoretical AVO curves.

About 76 publications in the databases SCI-EXPANDED, SSCI, A&HCI and about 100 papers in international journals, with increasing productivity during my carrier, testify the impact of my research in the scientific community and in particular in gas hydrate community. Currently, my H index is 17, if only databases SCI-EXPANDED, SSCI, A&HCI are considered. Note that the field of applied geophysics is characterized by a relatively low number of citations, with top journals having relatively low impact factors.