

STEFANO PICOTTI: CURRICULUM

Name and surname	Stefano Picotti
Date and birthplace	09.09.1974, Tolmezzo (UD) – Italy
Citizenship	Italian
Address (home)	Via G. De Coletti, 1 34100 Trieste – Italy Tel.: +39 040 0645684 (home), +39 342 1063602 (cellphone)
Further address (office)	Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS) Borgo Grotta Gigante 42/C, 34010 Sgonico (Trieste) – Italy tel. +39 040 2140280
e-mail (work)	spicotti@ogs.trieste.it
e-mail (other)	stefano.picotti@virgilio.it
Driver's licence	Italian: car, bus

Education

- **Ph.D. in Polar Sciences:** University of Siena (20.12.07), “Applications of the seismic method to Antarctic ice-sheet related problems”.
- **4 years Degree in Physics:** University of Trieste (19.05.00), mark: 100/110. Experimental thesis in applied geophysics: “Subsurface imaging in thrust-belt oil area (Venezuelan chain) from time and depth data migration”.
- **High school:** Electronics and Telecommunications, (1993), mark: 56/60.

Academic and professional courses

- ENI E&P academic course on the investigation of energy and water resources. DISGAM department, University of Trieste (March – June 2007).

Work Experiences

- Since October 2000 at the “National Institute of Oceanography and Experimental Geophysics” (OGS – www.ogs.trieste.it), Trieste, Italy: researcher in the field of seismic data processing, tomography, rock physics and wave modelling.
- September – December 2000 at ALCATEL s.p.a. (Trieste – Italy): testing operator of opto-electronic devices for telecommunications.

Awards

- SCAR Fellowship 2009-11 on the research topic: *Ice properties and basal conditions inferred from seismic data acquired on two fast-flowing ice streams (West Antarctica)*. The final report is posted on <http://www.scar.org/awards/fellowships/fellowships0910.html>

Expeditions

- Participation to the 2010-2011 Antarctic campaign for a seismic survey on the Whillans Ice Stream (West Antarctica), in the frame of the Wissard USAP project and Wisslake PNRA project.

Projects

- Participation to the following international projects:
 - EU-LIFE-CAMI - Water-Bearing Characterization With Integrated Methodologies.
 - EU-CASTOR – Capture and geological STORAGE of CO₂.
 - EU-CO2GEONET – NETWORK Of Excellence On Geological Storage of CO₂.
 - PNRA-VOSTOK – Subglacial lake exploration in Est Antarctica.
 - PNRA-WISE – West antarctic ice sheet evolution in the Ross Sea.
 - EU- Co2ReMoVe – CO₂ Research Monitoring and Verification of CO₂ Geological storage
 - EU-ZEPT – Zero Emission at Porto Tolle (Italy).
 - EU-SITECHAR – Site Characterization for CO₂ Geological storage

- Coordination at OGS of the following national and international projects:
PNRA-WISSLAKE – Subglacial lake exploration in the Whillans Ice Stream region (West Antarctica).
EU- CO2CARE – CO₂ Site Closure Assessment Research.

Skills

- **Languages:** Italian (mother tongue), English (writing and reading: excellent; speaking: good).
- **Computer literacy**
Environments: Basic Unix, Linux and Windows.
Utilities: Corel, Photoshop, Office, Dreamweaver (for HTML programming), ecc..
Seismic commercial softwares: Focus and Promax (seismic processing), Geodepth (tomography and imaging), Tesseral (wave field modelling), Seismic Unix (miscellaneous).
Languages: Fortran and Matlab

Research Fields

- Seismic and geoelectric data acquisition.
- Seismic reflection and refraction data processing, tomography, AVO and imaging for crustal structures exploration and glaciology.
- Development of algorithms and code designing for seismic traveltime and attenuation tomography.
- Development of algorithms and code designing for EM traveltime tomography.
- Implementation of rock physics theories for rock properties computation: static and dynamic elastic properties, pore fluids, anisotropy, and attenuation.
- Seismic and EM characterization of hydrocarbon reservoirs and saline aquifers for studies related to CO₂ geological storage monitoring.
- Algorithms for quasi-static numerical seismic simulations in poroelastic and viscoelastic anisotropic (and fractured) media.
- Algorithms for numerical simulations of seismic wave propagation in poroelastic and viscoelastic anisotropic media.

Publications in National and International Journals

1. Picotti, S., 2005, *A seismic modelling study for Antarctic subglacial lake exploration*, Bollettino di Geofisica Teorica ed Applicata, 46 (2-3), 217-229.
2. Carcione, J. M., and Picotti, S., 2006, *P-wave seismic attenuation by slow-wave diffusion: Effects of inhomogeneous rock properties*, Geophysics, 71(3), O1-O8. DOI: 10.1190/1.2194512
3. Carcione, J. M., Picotti, S., Gei, D., and Rossi, G., 2006, *Physics and seismic modeling for monitoring CO₂ storage*, Pure and Applied Geophysics, 163(1), 175-207. DOI: 10.1007/s00024-005-0002-1
4. Picotti, S., and Carcione, J. M., 2006, *Estimating seismic attenuation (Q) in the presence of random noise*, Journal of Seismic Exploration, 15(2), 165-181.
5. Picotti, S., Carcione, J. M., Rubino, J. G., and Santos, J. E., 2007, *P-wave seismic attenuation by slow-wave diffusion: Numerical experiments in partially saturated rocks*, Geophysics, 72 (4), N11-N21. DOI: 10.1190/1.2740666.
6. Rubino, J. G., Santos, J. E., Picotti, S., Carcione, J. M., 2007, *Simulation of upscaling effects due to wave-induced fluid flow in Biot media using the finite-element method*, Journal of Applied Geophysics, 62(3), 193-203. DOI:10.1016/j.jappgeo.2006.11.003
7. Rossi, G., Gei, D., Picotti, S., and Carcione, J. M., 2008, *CO₂ storage at the Aztbach-Schwanenstadt gas field: a seismic monitoring feasibility study*, First Break, 26, 45-51.
8. Giustiniani, M., Accaino, F., Picotti, S., and Tinivella, U., 2008, *Characterisation of shallow aquifers by non-conventional analyses of high-resolution seismic data*, Geophysical Prospecting, 56(5), 655-666. DOI: 10.1111/j.1365-2478.2008.00705.x
9. Rossi, G., Picotti, S., Gei, D., e Carcione, J.M., 2009. *Monitorare nel tempo la CO₂ in un sito di stoccaggio geologico: possibilità e limiti*, "Time-lapse CO₂ geological storage monitoring: possibilities and limits", Geoitalia, 27, 9-13. DOI: 10.1474/Geoitalia-27-06.
10. Giustiniani, M., Accaino, F., Picotti, S., and Tinivella, U., 2009, *3D seismic tomography and imaging for shallow aquifers characterization*, Journal of Applied Geophysics, 68(3), 394–403. DOI:10.1016/j.jappgeo.2009.03.005

11. Picotti, S., Giustiniani, M., Accaino, F., and Tinivella, U., 2009, *Depth modelling and imaging of the 4D seismic survey of Basso Livenza*, Bollettino di Geofisica Teorica ed Applicata, 50(1), 71-82.
12. Giustiniani, M., Accaino, F., Del Negro, E., Picotti, S., and Tinivella, U., 2009, *Characterisation of shallow aquifers by 2D high-resolution seismic data analysis*, Bollettino di Geof. Teorica ed Applicata, 50(1), 29-38.
13. Tinivella, U., Giustiniani, M., Accaino, F., and Picotti, S., 2009, *Petro-physical characterisation of shallow aquifers by using AVO and theoretical approaches*, Bollettino di Geofisica Teorica ed Applicata, 50(1), 71-82.
14. Böhm, G., Oçakoğlu, N., Picotti, S., De Santis, L., 2009, *Western Ice Sheet evolution: new insights from a seismic tomographic 3D depth model in the Eastern Ross Sea (Antarctica)*, Marine Geology, 266(1-4), 109-128. DOI:10.1016/j.margeo.2009.07.016
15. Picotti, S., Carcione, J. M., Rubino, J. G., Santos, J. E., and Cavallini, F., 2010, *A viscoelastic representation of wave attenuation in porous media*, Computer & Geosciences 36(1), 44-53. DOI: 10.1016/j.cageo.2009.07.003
16. Picotti, S., Carcione, J. M., Santos, J. E., and Gei, D., 2010, *Q-anisotropy in finely-layered media*, Geophysical Research Letters, 37(6), L06302. DOI:10.1029/2009GL042046.
17. Santos, J. E., Carcione, J. M. and Picotti, S., 2011, *Viscoelastic-stiffness tensor of anisotropic media from oscillatory numerical experiments*, Computer Methods in Applied Mechanics and Engineering, 200(9-12), 896-904. DOI:10.1016/j.cma.2010.11.008.
18. Carcione, J. M., Santos, J. E. and Picotti, S., 2011, *Anisotropic poroelasticity and wave-induced fluid flow. Harmonic finite-element simulations*, Geophysical Journal International, 186(3), pp. 1245-1254. DOI: 10.1111/j.1365-246X.2011.05101.x (<http://www.co2care.org/SciPublicationsData.aspx?IdPublication=31&IdType=327>)
19. Carcione, J. M., and Picotti, S., 2012, *Reflection and transmission coefficients of a fracture in transversely isotropic media*, Studia Geophysica et Geodetica, 56(2), 307-322. DOI: 10.1007/s11200-011-9034-4.
20. Carcione, J. M., Gei, D., Picotti, S. and Michelini, A., 2012, *Cross-hole electromagnetic and seismic modeling for CO₂ detection and monitoring in a saline aquifer*, Journal of Petroleum Science and Engineering. DOI: 10.1016/j.petrol.2012.03.018. (<http://www.co2care.org/SciPublicationsData.aspx?IdPublication=28&IdType=327>) .
21. Picotti, S., Carcione, J. M., Santos, J. E., 2012, *Oscillatory numerical experiments in finely layered anisotropic viscoelastic media*, Computers & Geosciences 43, 83-89. DOI:10.1016/j.cageo.2012.02.026
22. Picotti, S., Carcione, J. M., Gei, D., Rossi, G. and Santos, J. E., 2012, *Seismic modeling to monitor CO₂ geological storage - The Atzbach-Schwanenstadt gas field*, JGR Solid Earth 117(6), B06103, DOI:10.1029/2011JB008540.
23. Carcione, J. M., Santos, J. E., and Picotti, S., 2012, *Fracture-induced anisotropic attenuation*, Rock Mechanics and Rock Engineering, 45(5), 929-942, DOI: 10.1007/s00603-012-0237-y.
24. Carcione, J. M., Picotti, S., Cavallini, F., and Santos, J. E., 2012, *Numerical test of Schoenberg-Muir averaging theory*, Geophysics, 77(2), C27-35. DOI: 10.1190/geo2011-0228.1
25. Horgan, H. J., Anandakrishnan, S., Jacobel, R. W., Christianson, K., Alley, R. B., Heeszel, D. S., Picotti, S. and Jacob I. W., 2012, *Subglacial Lake Whillans - Seismic observations of a shallow active reservoir beneath a West Antarctic ice stream*, Earth and Planetary Science Letters 331-332, 201-209. DOI:10.1016/j.epsl.2012.02.023
26. Santos, J. E., Picotti, S. and Carcione, J. M. 2012, *Evaluation of the stiffness tensor of a fractured medium with harmonic experiments*, Computer Methods in Applied Mechanics and Engineering, 247-248, 130-145. DOI: 10.1016/j.cma.2012.08.004
27. Carcione, J. M., Picotti, S. and Santos, J. E., 2012, *Numerical experiments of fracture-induced velocity and attenuation anisotropy*, Geophysical Journal International, 191, 1179-1191. DOI: 10.1111/j.1365-246X.2012.05697.x
28. Picotti S., 2012, *Ice properties and basal conditions inferred from seismic data acquired on two fast-flowing ice streams (West Antarctica)*. SCAR Fellowship report (http://www.scar.org/awards/fellowships/fellowship0910/Picotti_Fellow_Report_0910.pdf).
29. Carcione, J. M., De la Vega, M., Gei, D., Osella, A., Picotti, S., Tassone, A., and Pascolieri, M., 2012, *Seismic characterization of the Quaternary sediments at Llanquihue-Lake Area, Argentina*. Accepted by Journal of Seismic Exploration.
30. Picotti S., Vuan A., Carcione J. M., Horgan, H. J., Anandakrishnan, S., 2012, *The crystalline fabric of Whillans Ice Stream (West Antarctica) inferred from multicomponent seismic data*, submitted to JGR Earth Surface.
31. Carcione, J. M., Gurevich, B., Santos, J. E. and Picotti, S., 2012, *Angular and frequency dependent wave velocity and attenuation in fractured porous media*, accepted by Pure and Applied Geophysics.
32. Picotti, S., Grünhut, V., Osella, A., Gei, D., Carcione, J. M., 2012, *Sensitivity analysis from single-well ERT simulations to image CO₂ migrations along wellbores*, submitted to The Leading Edge.
33. Gauzellino P., Carcione, J. M., Santos, J. E. and Picotti, S., 2012, *A rheological equation for anisotropic and anelastic media. Synthetic seismograms at the Sleipner CO₂ injection site*. To be submitted.

1. *A 3D seismic survey for groundwater protection*, (Rossi, G., Dal Moro, G., Picotti, S., Vesnaver, A. & Vuan, A., 2001), 71st Annual Internat. Mtg., SEG, Expanded Abstracts, San Antonio, Texas, 1333-1336.
2. *Geophysical integrated approach to the study of an aquifer in a Karstic area*, (Rossi, G., Baradello, L., Bolcato, S., Bratus, A., Nieto, D., Picotti S., Nigel, W., 2002), 72nd Annual Internat. Mtg., Soc. Expl. Geophys. (SEG), Expanded Abstracts, Salt Lake City, Utah, 1480-1483.
3. *A 3D seismic survey applied to the study of an acquifer*, (Picotti, S., Rossi, G., Böhm, G.), 9th Meeting of Environmental and Engineering Geophysics (EEGS, Praga, 31/08-04/09/03), Proceedings, O-053.
4. *A seismic survey design for subglacial lake exploration*, (Picotti, S., Geletti, R. and Gei, D.), XXVIII SCAR Open Science Conference (Bremen, Germany, 25-31 July 2004), Abstract Volume, 416.
5. *Characterisation of shallow aquifers by non-conventional analysis of high resolution seismic data (CAMI project)*, (Picotti, S., Giustiniani, M., Accaino, F. and Tinivella, U.), 25th National Conference on the Geophysics of Solid Earth (GNGTS, Rome, 28-30 November 2006), Abstract Volume, 511-514.
6. *Physics, seismic numerical modeling and tomographic inversion for monitoring CO₂ geological storage*, (Gei, D., Picotti, S., Rossi, G., and Carcione, J. M.), EGU General Assembly (Vienna, 15-20 April 2007), Abstracts Volume 9, 07442.
7. *Seismic investigation and 3D tomography in the Ross Sea (Antarctica) for western ice sheet evolution studies*, (Böhm, G., Ocakoglu, N., and Picotti, S.), 69th EAGE Conference (London, UK, 11 - 14 June 2007), Extended Abstract C045.
8. *A Seismic Characterization of Antarctic Glacial Sediments in the Ross Sea*, (Picotti, S. and Rossi, G.), 70th EAGE Conference (Rome, Italy, 9 - 12 June 2008), Extended Abstract H008.
9. *A seismic characterization of Concordia lake (East Antarctica)*, (Picotti, S., Geletti, R., and Carcione, J. M.), XXX SCAR Open Science Conference (S. Petersburg, Russia, 8-11 July 2008), Abstract S3.1/O18.
10. *A physics and seismic numerical methodology for monitoring CO₂ geological storage*, (Picotti, S., Santos, J. E., Carcione, J. M., Gei, D., and Ravazzoli, C.), SEG 2009 Summer Research Workshop on CO₂ Sequestration Geophysics, Extended Abstract (Banff, Canada, 23-27 August 2009).
11. *A finite element method to model attenuation and dispersion effects in highly heterogeneous fluid-saturated porous media* (Santos, J. E., Ravazzoli, C., Picotti, S., Gei, D., and Carcione, J. M.), Proceedings of the 9th International Conference on Theoretical and Computational Acoustics, pp. 235-246 (ICTCA 2009, Dresden, Germany, 7-11 September, 2009).
12. *Seismic evidence of a gas-hydrate system in the western Ross sea (Antartica) by tomography, AVO analysis and pre-stack depth migration*, (Picotti, S., Geletti, R. Gei, D., Mocnik, A., and Carcione, J., M., 2010), International Geological Congress on the Southern Hemisphere-GEOSUR. Mar del Plata - Argentina conference 22 - 23 November 2010.
13. *Determination of the stiffness tensor of transversely isotropic viscoelastic media using numerical oscillatory experiments*, (Santos, J. E., Picotti, S., and Carcione, J. M.), Proceedings of the 80th SEG Annual Meeting (Denver, October 18 2010).
14. *Analysis of mesoscopic loss effects in anisotropic poroelastic media using harmonic finite element simulations*, (Santos, J. E., Carcione, J. M. and Picotti, S.), Proceedings of the 81th SEG Annual Meeting.
15. *Determination of the stiffness tensor of a fractured medium using finite-element simulations*, (Santos, J. E., Carcione, J. M. and Picotti, S.), SEG 2012 Annual Meeting.
16. *Glacier basal conditions inferred from seismic data*, (Picotti, S., Accaino, F., and Pettenati, F.), Proceedings of the 27th HKT Workshop (Kathmandu, Nepal, 27-30 November, 2012).

Commercial software

Contributions to the development of the CAT 3D tomographic software (www.3dtomography.com). Main features:

- joint travel-time and attenuation inversion of reflected, refracted, direct and diving arrivals;
- interval velocity and quality (Q) factor model reconstruction;
- petrophysical (porosity and gas saturation) model reconstruction;
- irregular adaptive grids;
- arbitrary geometry horizon reconstruction;
- well constraints;
- reliability maps.

Updated November 2012

Picotti Stefano