

PERSONAL INFORMATION

Stanley Eugene Beaubien



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PERSONAL STATEMENT

A geochemist / hydrogeologist / geologist who has been involved in over 20 European Community funded research projects dealing with a wide range of environmental issues, with a focus on Carbon Capture and Storage (CCS).

WORK EXPERIENCE

June 1996 to Present

Research Geochemist

Dip. Scienze della Terra, Università di Roma La Sapienza, Ple. Aldo Moro 5, Roma, Italia;
<http://www.dst.uniroma1.it/>

- 24 years of experience in Carbon Capture and Storage research (monitoring, impacts)
- Developing, executing, and managing scientific research projects
- Organizing and conducting marine, lacustrine, soil gas, and groundwater sampling campaigns
- Performing laboratory chemical analyses
- Developing and executing laboratory experiments
- Data management, interpretation, and presentation
- Writing ad hoc computer code
- Writing research proposals, scientific reports and research articles

Business or sector University research

Sept. 1994 to Present

Translator

Freelance

- Translation of scientific articles from Italian to English
- Language revision of scientific articles written in English

Business or sector Translation

Sept. 1993 to Sept. 1994

Research Hydrogeologist / Geochemist

Waterloo Centre for Groundwater Research, University of Waterloo, 200 University Avenue West, Waterloo, Canada; <https://uwaterloo.ca/groundwater-research/>

- Designing and implementing field experiment for remediation of DNAPL in clay
- Organizing and conducting field sampling and mapping campaigns
- Performing laboratory chemical analyses
- Data management, interpretation, and presentation
- Writing scientific reports and research articles

Business or sector University research

June 1988 to August 1990

Exploration Geologist

Noranda Exploration Ltd.; Rhino Resources Ltd; and Northwest Territories Government, Canada

- Geological mapping for gold and base metal exploration
- Drill core logging, writing of map and drill reports

Business or sector Mineral exploration

EDUCATION AND TRAINING

October 2010 to January 2015

PhD – Thesis Title: The mapping and quantification of CO₂ leakage and its potential impact on groundwater quality. (SSD GEO/08)

Dipartimento Scienze Ambientale, Università Ca' Foscari Venezia, Italy

- Research related to monitoring Carbon Capture and Storage (CCS) sites
- Research related to potential impact of a CO₂ leak from a CCS site

Sept. 1990 to Sept. 1993

MSc – Thesis Title: Chromium in Lake Ontario: Geochemical Cycling and the Role of Redox Speciation in Controlling Dissolved Phase Concentrations.

Department of Earth Sciences, University of Waterloo, Waterloo, Canada

- Research related to anthropogenic inorganic contamination of the Great Lakes
- Development of analytical technique for chromium speciation
- Course study of physical and chemical hydrogeology, environmental geochemistry

Sept. 1983 to April 1988

BSc – Thesis Title: Contact Metamorphism in the Host Rocks Surrounding the Falcon Lake Igneous Complex.

Department of Geological Sciences, University of Manitoba, Winnipeg, Canada

- Research into contact metamorphism
- Course study of basic geology (structural, geochemistry, petrology, mineralogy, sedimentology, etc.)

PERSONAL SKILLS

Mother tongue(s) English

Other language(s)

Italian

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
C1	C2	C1	C1	B2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user
Common European Framework of Reference for Languages

Communication skills

- excellent written communication skills gained through my experience as translator / reviser of articles
- excellent oral communication skills gained through experience presenting at conferences / teaching

Digital competence

- highly proficient use of Office suite (Word, Excel, PowerPoint, Access), graphical software (CorelDraw, Adobe), and geological software (Golden Software suite)
- competent use of GIS software (QGIS, ESRI) and writing computer programs (Visual Basic)

Organisational / managerial skills

- responsible for organisation of extensive offshore and onshore field campaigns
- extensive managerial skills based on experience and responsibilities in over 20 EC research projects
- have contributed to, or led, the writing and submission of numerous funding proposals
- responsible for data management, data interpretation, and report writing on numerous projects

Field sampling experience

I have more than 35 years of experience in sampling surface water, groundwater, soil gas and rocks for chemical, physical, and biological analyses, including gases and dissolved gases:

- have participated in 5 large sampling campaigns on oceanographic research vessels (Black Sea, Adriatic Sea, Tyrrhenian Sea, The Great Lakes) and more than 15 offshore studies from small boats
- have participated in more than 100 onshore sampling campaigns in Italy and Canada

Geochemical analyses

I have 35 years of experience in gas, water, and dissolved gas analysis in the laboratory and the field:

- Laboratory instruments used include: Gas Chromatograph (GC), Cavity Ring-Down Spectrometry (CRDS), Spectrophotometer, Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), Ion Chromatography (IC), and Graphite Furnace Atomic Absorption Spectrometry (GFAAS).
- Field instruments used include: multiparameter probes for analysis of pH, dissolved oxygen, and electrical conductivity, etc. in water; RAD7 instruments for radon analysis in soil gas; infrared and electrochemical sensors for CO₂, CH₄, O₂, and H₂, etc. in soil gas; and CO₂ and CH₄ fluxmeters.

Development of CCS-related monitoring tools

I have led research and development into three innovative tools for CCS site monitoring:

- The GasPro is an autonomous probe designed to continuously monitor the concentration of CO₂ or CH₄ in a variety of environments, including the soil, groundwater and surface water. Surface water deployment has included fixed benthic monitoring and use on a mobile ROV. The GasPro consists of an NDIR sensor behind a gas permeable membrane.
- The CO₂-Mapper is a mobile unit for finding and mapping the distribution of CO₂ leaking from the ground surface. It consists of a flow-through system that pumps air from the ground-air contact, analyses it, and associates precise coordinates using a differential GPS.
- The Well-Star is a multi-point sensor system designed for low-cost, continual analysis of atmospheric air quality in the vicinity of a CO₂ injection well to monitor for possible leaks.

Teaching experience

- Lecturer in the Sapienza International Masters on "CO₂ Geological Storage", giving lessons on storage sites, geochemical processes and modelling, and geochemical monitoring.
- Guest lecturer in various courses, teaching such topics as CCS, soil gas geochemistry, gas analyses, climate change, and hydrogeology.

ADDITIONAL INFORMATION

Memberships

- American Geophysical Union (AGU) since 2005

EC-funded Projects

I have participated in the 21 EU-funded projects listed below: 12 were focussed on Carbon Capture and Storage (CCS) and 6 had a strong offshore, marine component.

- CO₂ Routes Across Europe – COREu (Project number - 101136217; 2024-2028)
- Radon rEal time monitoring System and Proactive Indoor Remediation - LIFE-RESPIRE (LIFE16 ENV / IT / 000553).
- ENabling Onshore CO₂ Storage in Europe – ENOS. (Project number – 653718; 2016-2020).
- Research and Civil Society Dialogue towards a low-carbon society - R&Dialogue. (Contract no. 288980; 2012-2015).
- Sub-seabed CO₂ Storage: Impact on Marine Ecosystems (ECO₂). Call FP7-ENERGY-2010-1. (Project number: 265847; 2011-2015).
- Pan-European coordination action on CO₂ Geological Storage (CGS Europe) Call FP7-ENERGY-2010-1. (Project number: 256725. Start date: 2010-2013).
- Characterisation of European CO₂ storage (SiteChar). (Contract no. 256705; 2011-2013).
- Research into Impact and Safety in CO₂ storage (RISCS) – (Contract N° 240837; 2010-2013).
- CO₂ Re.Mo.Ve – EU Integrated Project on Research into Monitoring and Verification Technology of CO₂ Geological Storage – SES6- (Contract Number 518350 2006-2011).
- Assessment of the feasibility of the CO₂ storage in the Russian permafrost. (Contract no. INTAS 2006-1000025-9220; 2007-2009).
- MOVECBM - Monitoring and verification of CO₂ storage and ECBM in Poland (Contract Number 038967; 2006-2008).
- Intailrisk Assessment of Environmental Risk of Radioactively Contaminated Industrial Tailings (contr. N. INCO-CT-2004-509214; 2004-2007).
- CO₂GeoNet, Network of Excellence for CO₂ Geological Storage (Contract no. 502816; 2004-2009).
- Contribution of high density gas seeps in the Black Sea to methane emission in the atmosphere. CRIMEA. (Contract no. EVK-2-CT-2002-00162; 2003-2006).
- The Weyburn CO₂ Monitoring Project – "Weyburn" Project n° NNE5-2000-00096 (sub-contractor).
- Assessment and Prognosis of Environmental Changes in Lake Issyk-Kul (Kyrgyzstan) (APELIK). (Contract n° ICA2-CT-2000-10003; 2000-2004).

- Natural Analogues to the Storage of CO₂ in the Geological Environment (NASCENT). (Contr. No. ENK5-CT-2000-00303; 2000-2003).
- Natural analogue of the thermo-hydrochemical and thermo-hydromechanical response of clay barriers (Contr. n° F14W CT 95014; 1996-1999).
- Project of research into gas generation and migration in radioactive waste repository systems (PROGRESS) (Contr. n° F14W- CT96- 0024; 1996-1999).
- Geochemical method seismic zonation - seismic hazard: a multi-disciplinary approach using fluid- geochemistry (Contr. n° ENV 4-CT96-0291; 1996-1998).
- Analysis of the geo-environmental conditions as morphological evolution factors of the sand-clay series of the Tiber Valley and Dunarobba forest preservation (Contr. n° FI 2W/0121; 1992-1994).

Peer Review

I have reviewed articles for the following journals:

- Int. J. Greenhouse Gas Control, Science of the Total Environment, Environmental Science & Technology, Geoderma, Greenhouse Gas Science and Technology, Oil & Gas Science and Technology, Terra Nova, Applied Geochemistry, Chemical Geology, Pure and Applied Geophysics, Geochemical Journal, Scientific Reports, J. of Hydrology, Environmental Monitoring and Assessment, Journal of Marine and Petroleum Geology.

Bibliometric indicators (Scopus, accessed 28/7/2024)

Scopus Author Identifier: [6508347473](#)

- Documents: [67](#)
- Total number of citations: [2368](#)
- H-index: [23](#)

Editor

- Jenkins, C., Wright, I., **Beaubien, S.E.** and Kita, J. (Editors), 2021. Special Issue on Monitoring, Measurement and Verification for Offshore CCS: Outcomes of the STEMM-CCS project. International Journal of Greenhouse Gases.
- Lombardi, S., Altunina, L.K. and **Beaubien, S.E.** (Editors), 2006. Advances in the geological storage of carbon dioxide. NATO Science Series. IV. Earth and Environmental Sciences 65. Springer, 362 pp. 10.1007/1-4020-4471-2.

Journal Publications

- Ridolfi, R.M., Azzaro, S., **Beaubien, S.E.**, Da Pra, A., Pontiggia, M., and Bigi, S., 2024, Development of a site-screening method for hydrogen storage purposes and its application to an industrial dataset of Italian hydrocarbon reservoirs: International Journal of Hydrogen Energy, v. 85, p. 841 - 853, <https://doi.org/10.1016/j.ijhydene.2024.08.291>.
- Di Bella, L., Pierdomenico, M., Conte, A.M., Cornacchia, I., Ruspandini, T., Spatola, D., **Beaubien, S.E.**, Bigi, S., Conti, A., Gaglianone, G., Ingrassia, M., Chiocci, F.L., and Casalbore, D., 2024, The influence of shallow-water methane emissions on foraminiferal assemblages: The case of Scoglio d'Affrica (Northern Tyrrhenian Sea, Mediterranean Sea): Marine and Petroleum Geology, v. 170, p. 107130, <https://doi.org/10.1016/j.marpetgeo.2024.107130>.
- **Beaubien, S.E.**, Schirripa Spagnolo, G., Ridolfi, R.M., Aldega, L., Antoncecchi, I., Bigi, S., Billi, A., and Carminati, E., 2023, Structural control of gas migration pathways in the hydrocarbon-rich Val d'Agri basin (Southern Apennines, Italy): Marine and Petroleum Geology, v. 154, p. 106339, <https://doi.org/10.1016/j.marpetgeo.2023.106339>.
- Proietti, G., Conti, A., **Beaubien, S.E.**, and Bigi, S., 2023, Screening, classification, capacity estimation and reservoir modelling of potential CO₂ geological storage sites in the NW Adriatic Sea, Italy: International Journal of Greenhouse Gas Control, v. 126, p. 103882, <https://www.sciencedirect.com/science/article/pii/S175058362300052X>
- **Beaubien, S.E.**, Ciotoli, G., Finioia, M.G., Lombardi, S., and Bigi, S., 2022, Monte Carlo simulations to assess the uncertainty of locating and quantifying CO₂ leakage flux from deep geological or anthropogenic sources: Stochastic Environmental Research and Risk Assessment, v. 36, p. 609-627, <https://doi.org/10.1007/s00477-021-02123-9>.
- Giustini, F., Ruggiero, L., Sciarra, A., **Beaubien, S.E.**, Graziani, S., Galli, G., Pizzino, L., Tartarello, M.C., Lucchetti, C., Sirianni, P., Tuccimei, P., Voltaggio, M., Bigi, S., and Ciotoli, G., 2022, Radon Hazard in Central Italy: Comparison among Areas with Different Geogenic Radon Potential: International Journal of Environmental Research and Public Health, v. 19, p. 666, <https://www.mdpi.com/1660-4601/19/2/666>
- Graziani, S., **Beaubien, S.E.**, Ciotoli, G., and Bigi, S., 2022, Development and testing of a rapid, sensitive, high-resolution tool to improve mapping of CO₂ leakage at the ground surface: Applied

Geochemistry, v. 145, p. 105424,
<https://www.sciencedirect.com/science/article/pii/S0883292722002281>

- Jenkins, C., Wright, I., **Beaubien, S.E.**, and Kita, J., 2021, Special Issue on Monitoring, Measurement and Verification for Offshore CCS: Outcomes of the STEMM-CCS project: International Journal of Greenhouse Gas Control, <https://www.sciencedirect.com/special-issue/105MKT91P08>.
- Barkwith, A.K.A.P., **Beaubien, S.E.**, Barlow, T., Kirk, K., Lister, T.R., Tartarello, M.C., and Taylor, H., 2020, Using near-surface atmospheric measurements as a proxy for quantifying field-scale soil gas flux: Geoscience Instrumentation, Methods and Data Systems, <https://doi.org/10.5194/gi-2020-8>.
- Casalbore, D., Ingrassia, M., Pierdomenico, M., **Beaubien, S.E.**, Martorelli, E., Bigi, S., Ivaldi, R., DeMarte, M., and Chiocci, F.L., 2020, Morpho-acoustic characterization of a shallow-water mud volcano offshore Scoglio d'Affrica (Northern Tyrrhenian Sea) responsible for a violent gas outburst in 2017: Marine Geology, v. 428, p. 106277, <http://www.sciencedirect.com/science/article/pii/S0025322720301651>
- Ingrassia, M., **Beaubien, S.E.**, Bosman, A., Chiocci, F.L., Conte, A.M., Di Bella, L., V., F., Graziani, S., Italiano, F., Macelloni, L., Martorelli, E., and Sposato, A., 2020, Il sistema idrotermale sottomarino a largo dell'Isola di Zannone (Arcipelago Pontino occidentale, Mar Tirreno): Mem. Descr. Carta Geol. d'It., v. 105, p. 51-54.
- Vachon, D., Langenegger, T., Donis, D., **Beaubien, S.E.**, and McGinnis, D.F., 2020, Methane emission offsets carbon dioxide uptake in a small productive lake: Limnology and Oceanography Letters, v. 5, p. 384-392, <https://aslopubs.onlinelibrary.wiley.com/doi/abs/10.1002/lol2.10161>
- Ju, Y., **Beaubien, S.E.**, Lee, S.-S., Kaown, D., Hahm, D., Lee, S., Park, I.-W., Park, K., Yun, S.-T., and Lee, K.-K., 2019, Application of natural and artificial tracers to constrain CO₂ leakage and degassing in the K-COSEM site, South Korea: International Journal of Greenhouse Gas Control, v. 86, p. 211-225, <http://www.sciencedirect.com/science/article/pii/S1750583618308077>
- Bigi, S., Tartarello, M.C., Ruggiero, L., Graziani, S., **Beaubien, S.E.**, and Lombardi, S., 2017, On-going and Future Research at the Sulcis Site in Sardinia, Italy - Characterization and Experimentation at a Possible Future CCS Pilot: Energy Procedia, v. 114, p. 2742-2747, <http://www.sciencedirect.com/science/article/pii/S1876610217317319>
- Ciotoli, G., Voltaggio, M., Tuccimei, P., Soligo, M., Pasculli, A., **Beaubien, S.E.**, and Bigi, S., 2017, Geographically weighted regression and geostatistical techniques to construct the Geogenic Radon Potential map of the Lazio region: a methodological proposal for the European Atlas of Natural Radiation: Journal of Environmental Radioactivity, v. 166, p. 355-375, <http://www.sciencedirect.com/science/article/pii/S0265931X16301540>.
- Jones, D.G., **Beaubien, S.E.**, Lister, T.R., Graziani, S., Finoia, M.G., Barkwith, A.K.A.P., Ruggiero, L., Ciotoli, G., Bigi, S., and Lombardi, S., 2017, Continuous Monitoring of Natural CO₂ Emissions Near Rome - Lessons for Low-level CO₂ Leakage Detection: Energy Procedia, v. 114, p. 3824-3831, <http://www.sciencedirect.com/science/article/pii/S1876610217317083>
- Tartarello, M.C., Plaisant, A., Bigi, S., **Beaubien, S.E.**, Graziani, S., Lombardi, S., Ruggiero, L., De Angelis, D., Sacco, P., and Maggio, E., 2017, Preliminary results of geological characterization and geochemical monitoring of Sulcis Basin (Sardinia), as a potential CCS site: Energy Procedia, v. 125, p. 549-555, <http://www.sciencedirect.com/science/article/pii/S1876610217336913>
- Martorelli, E., Italiano, F., Ingrassia, M., Macelloni, L., Bosman, A., Conte, A.M., **Beaubien, S.E.**, Graziani, S., Sposato, A., and Chiocci, F.L.C., 2016, Evidence of a shallow water submarine hydrothermal field off Zannone Island from morphological and geochemical characterization: Implications for Tyrrhenian Sea Quaternary volcanism: Journal of Geophysical Research: Solid Earth, v. 121, p. 8396-8414, <http://dx.doi.org/10.1002/2016JB013103>
- **Beaubien, S.E.**, Ruggiero, L., Annunziatellis, A., Bigi, S., Ciotoli, G., Deiana, P., Graziani, S., Lombardi, S., and Tartarello, M.C., 2015, The Importance of Baseline Surveys of Near-Surface Gas Geochemistry for CCS Monitoring, as Shown from Onshore Case Studies in Northern and Southern Europe: Oil Gas Sci. Technol. - Rev. IFP Energies nouvelles, v. 70, p. 615-633, <http://dx.doi.org/10.2516/ogst/2014009>
- Jones, D.G., **Beaubien, S.E.**, Blackford, J.C., Foekema, E.M., Lions, J., De Vittor, C., West, J.M., Widdicombe, S., Hauton, C., and Queirós, A.M., 2015, Developments since 2005 in understanding potential environmental impacts of CO₂ leakage from geological storage: International Journal of Greenhouse Gas Control, v. 40, p. 350-377, <http://www.sciencedirect.com/science/article/pii/S175058361500225X>
- Voltattorni, N., Lombardi, S., and **Beaubien, S.E.**, 2015, Gas migration from two mine districts: The

- Tolfa (Lazio, Central Italy) and the Neves-Corvo (Baixo Alentejo, Portugal) case studies: *Journal of Geochemical Exploration*, v. 152, p. 37-53, <http://www.sciencedirect.com/science/article/pii/S0375674215000205>.
- West, J.M., Jones, D.G., Annunziatellis, A., Barlow, T.S., **Beaubien, S.E.**, Bond, A., Breward, N., Coombs, P., de Angelis, D., Gardner, A., Gemeni, V., Graziani, S., Green, K.A., Gregory, S., Gwosdz, S., Hannis, S., Kirk, K., Koukoulas, N., Kruger, M., Libertini, S., Lister, T.R., Lombardi, S., Metcalfe, R., Pearce, J.M., Smith, K.L., Steven, M.D., Thatcher, K., and Ziogou, F., 2015, Comparison of the impacts of elevated CO₂ soil gas concentrations on selected European terrestrial environments: *International Journal of Greenhouse Gas Control*, v. 42, p. 357-371, <http://www.sciencedirect.com/science/article/pii/S1750583615300281>
 - **Beaubien, S.E.**, De Vittor, C., McGinnis, D.F., Bigi, S., Comici, C., Ingrosso, G., Lombardi, S., and Ruggiero, L., 2014, Preliminary Experiments and Modelling of the Fate of CO₂ Bubbles in the Water Column Near Panarea Island (Italy): *Energy Procedia*, v. 59, p. 397-403, <http://www.sciencedirect.com/science/article/pii/S1876610214017615>
 - **Beaubien, S.E.**, Graziani, S., Annunziatellis, A., Bigi, S., Ruggiero, L., Tartarello, M.C., and Lombardi, S., 2014, Spatial-temporal water column monitoring using multiple, low-cost GasPro-pCO₂ sensors: implications for monitoring, modelling, and potential impact: *Energy Procedia*, v. 63, p. 3840-3847, <http://www.sciencedirect.com/science/article/pii/S1876610214022280>
 - Bigi, S., **Beaubien, S.E.**, Ciotoli, G., D'Ambrogi, C., Doglioni, C., Ferrante, V., Lombardi, S., Milli, S., Orlando, L., Ruggiero, L., Tartarello, M.C., and Sacco, P., 2014, Mantle-derived CO₂ migration along active faults within an extensional basin margin (Fiumicino, Rome, Italy): *Tectonophysics*, v. 637, p. 137-149, <http://www.sciencedirect.com/science/article/pii/S0040195114005150>
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 - Jones, D.G., Barkwith, A.K.A.P., Hannis, S., Lister, T.R., Gal, F., Graziani, S., **Beaubien, S.E.**, and Widory, D., 2014, Monitoring of near surface gas seepage from a shallow injection experiment at the CO₂ Field Lab, Norway: *International Journal of Greenhouse Gas Control*, v. 28, p. 300-317, <http://www.sciencedirect.com/science/article/pii/S1750583614001789>
 - Jones, D.G., **Beaubien, S.E.**, Barlow, T.S., Barkwith, A.K.A.P., Hannis, S.D., Lister, T.R., Strutt, M.H., Bellomo, T., Annunziatellis, A., Graziani, S., Lombardi, S., Ruggiero, L., Braibant, G., Gal, F., Joublin, F., and Michel, K., 2014, Baseline variability in onshore near surface gases and implications for monitoring at CO₂ storage sites: *Energy Procedia*, v. 63, p. 4155-4162, <http://www.sciencedirect.com/science/article/pii/S1876610214022620>
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 - Donders, T.H., Decuyper, M., **Beaubien, S.E.**, van Hoof, T.B., Cherubini, P., and Sass-Klaassen, U., 2013, Tree rings as biosensor to detect leakage of subsurface fossil CO₂: *International Journal of Greenhouse Gas Control*, v. 19, p. 387-395, <http://www.sciencedirect.com/science/article/pii/S1750583613003514>
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