



CURRICULUM VITAE

CLAUDIA ZOCCARATO

Personal Information

Address: Via Marzolo, 9 – PADOVA (ITALY)

Telephone: +39 349 7982068

E-mail: claudia.zoccarato@unipd.it

Date of birth: 08 May 1987

Nationality: Italian

Education

- 2013-2015 **Doctor of Philosophy** (PhD) in Sciences of Civil and Environmental Engineering, University of Padova, Padova (Italy) (Advisor: Prof. Giuseppe Gambolati).
- 2014 Colorado State University (Colorado, USA), research period at Department of Civil and Environmental Engineering (Advisor: Prof. Domenico Baù).
- 2009-2012 **Master degree in Environmental Engineering**, University of Padova, Padova (Italy). Thesis title: Spatial Distribution of Tidally-averaged diffusion coefficient in the Venice Lagoon (Advisor: Prof. Andrea Defina). Degree Mark: 110/110 cum laude.
- 2011 Technical University of Denmark (Denmark), Erasmus program.
- 2006-2009 **Bachelor degree in Environmental Engineering**, University of Padova, Padova (Italy). Thesis title: Evaluation of bioaccumulation and translocation of heavy metals in suitable plant species for Phytoextraction (Advisor: Prof. Luca Palmeri). Degree Mark: 106/110

Academic Experience

- 2020 – present **Research Fellow**, Department of Civil, Architectural and Environmental Engineering, University of Padova, Padova (Italy).
- 2019 – 2020 **Postdoctoral Research Fellow**, Department of Civil, Architectural and Environmental Engineering, University of Padova, Padova (Italy). Research topic: Data assimilation techniques for the simulation of an offshore gas reservoir.
- 2018 – 2019 **Postdoctoral Research Fellow**, Department of Civil, Architectural and Environmental Engineering, University of Padova, Padova (Italy). Research topic: Geomechanical modelling of transitional coastal environments.
- 2016 – 2017 **Postdoctoral Research Fellow**, Department of Civil, Architectural and Environmental Engineering, University of Padova, Padova (Italy). Research topic: Data Assimilation algorithms for reservoir geomechanics and induced seismicity.

Teaching Experience

- 2021/2022 Teaching Assistant of Underground Fluids, Energy and Environment (master class in Environmental Engineering), University of Padova, Padova, Italy.
- 2020/2021 Teaching Assistant of Underground Fluids, Energy and Environment (master class in Environmental Engineering), University of Padova, Padova, Italy.
- 2019/2020 Teaching Assistant of Numerical Methods and Programming undergraduate class in Aerospace Engineering), University of Padova, Padova, Italy.
- 2017/2018 Teaching Assistant of Numerical Methods and Programming (undergraduate class in Civil Engineering), University of Padova, Padova, Italy.
- 2016/2017 Teaching Assistant of Numerical Methods and Programming (undergraduate class in Civil Engineering), University of Padova, Padova, Italy.

2017	Teaching Assistant of Numerical Methods and Programming (undergraduate class), École Nationale Supérieure de Travaux Publiques (ENSTP), Yaoundé, Cameroon.
2015/2016	Teaching Assistant of Numerical Methods and Programming (undergraduate class in Environmental Engineering), University of Padova, Padova, Italy.

Academic supervision

Master students:

2022	Giulio Carazzolo, co-supervised, University of Padova
2021	Gasparotto Alessandro, co-supervised, University of Padova
	Selena Baldan, co-supervised, University of Padova
2020	Anita Rigoni, co-supervised, University of Padova
	Eugenia Parrella, co-supervised, University of Padova
2019	Riccardo Xotta, co-supervised, University of Padova
2018	Laura Gazzola, co-supervised, University of Padova

Membership of Scientific Societies

2021 - ongoing	Associate Member of the UNESCO Land Subsidence International Initiative https://www.landsubsidence-unesco.org/
2018 – ongoing	UNESCO-IGCP Project 663: Impact, Mechanism, Monitoring of Land Subsidence in Coastal cities.
2014 – 2019	UNESCO-IGCP Project 641: Mechanisms, monitoring and modeling earth fissure generation and fault activation due to subsurface fluid exploitation.
2015-2017-2018-2021 since 2017	American Geophysical Union (AGU) European Geosciences Union (EGU)
2015-2016-2017-2021	Society for Industrial and Applied Mathematics (SIAM)

Awards & Honors

2021	SEAL OF EXCELLENCE award with the project n. 101062246 titled PRESERVE (Plant Roots as bio-foundations for rESiliEnt tRansitional enVironmEnts) and submitted to the call Horizon Europe Marie Skłodowska-Curie Actions HORIZON-MSCA-2021-PF-01-01 — MSCA Postdoctoral Fellowships 2021.
2020	SEAL OF EXCELLENCE award with the project n. 101062246 titled PRESERVE (Plant Roots as bio-foundations for rESiliEnt tRansitional enVironmEnts) and submitted to the call Horizon Europe Marie Skłodowska-Curie Actions H2020-MSCA-IF-2020 — MSCA Postdoctoral Fellowships 2021.
2016	Thesis award winner of the "Gustavo Sclocchi" Theses Awards 2016 for Doctors of Philosophy and University Graduates in Petroleum Engineering, Geo-Sciences and other disciplines related to the Oil & Gas Industry.
2015	First Edition winner of the "5 minutes speech contest" organized at the 12° Offshore Mediterranean Conference - OMC 2015, Ravenna (Italy), March 25-27.

Organization of Scientific Meetings

2021	EGU General Assembly 2021, organization of the session titled 'From the Source to the Sea: rivers, estuaries, deltas, marshlands, and coastal seas under global changes'
2016	Member of the organizing committee of the 2nd International Workshop on Coastal Subsidence, Venice (Italy).
2015	Data assimilation in subsurface applications: advances in model uncertainty quantification, mini-symposium organized at the SIAM Conference on Mathematical and Computational Issues in Geosciences, Stanford University, Stanford, California, USA.

Training/Workshops/Exchanges

2020	Venice salt marshes as a carbon sink: from theory to practice - Workshop organised by We Are Here Venice, Venice, Italy
------	---

2019	Compaction Modelling Workshop organised by Matt Brain - Department of Geography, Durham University, Durham
2017	PARAMetric UNCertainty - Workshop and summer school on Uncertainty Quantification, Budapest, Hungary
2015	Scientific exchange investigating the application of surrogate models in land subsidence modelling at Technische Universitat Braunschweig, Braunschweig, Germany.
2014	Short-term research period at Colorado State University, Fort Collins, Colorado, US.
2011	Erasmus student at Denmark Technical University (DTU), Lyngby, Denmark.

Projects

2013	<p>PROGETTO: DAG - Data assimilation in Geomechanics finanziato da ENI E&P RUOLO: tesi di dottorato su progetto DAG DURATA PROGETTO: 3 anni (2013-2015) ATTIVITA': Caratterizzazione dei parametri meccanici di modelli numerici agli elementi finiti per la calibrazione di mezzi porosi saturi mediante osservazioni di spostamento superficiale ottenute da immagini satellitari e assimilate con approcci di data assimilation tipo Ensemble Smoother.</p>
2015	<p>PROGETTO: IGCP 641 - Mechanisms, Monitoring and Modeling Earth Fissure generation due to subsurface Fluid exploitation promosso e supportato da UNESCO RUOLO: membro gruppo di lavoro DURATA PROGETTO: 4 anni (2015-2019) ATTIVITA': Simulazione di flusso sotterraneo in prossimita' di mezzi porosi fagliati per la predizione di possibili meccanismi di sismicita' indotta. L'attivita' ha previsto l'impiego di simulatori agli elementi finiti per la risoluzione delle equazioni di flusso in mezzi porosi saturi e per la simulazione delle conseguenti deformazioni nel mezzo continuo e a ridosso della discontinuita' di faglia.</p> <p>COLLABORAZIONE: PCE based Ensemble smoother and mean square estimator for reservoir parameter identification RUOLO: responsabile DURATA: 31 Luglio 2015 -in corso ATTIVITA': Sviluppo di adeguate metodologie per la costruzione di modelli surrogati atti a ridurre il costo computazionale di modelli numerici agli elementi finiti per la simulazione della subsidenza antropica. L'attività ha previsto l'utilizzo dell'approccio basato sull'espansione in chaos polinomiale che permette, nel contesto della costruzione del modello surrogato, di poter condurre un'appropriate analisi di sensitività globale basata sugli indici di Sobol.</p>
2017	<p>PROGETTO: RITMARE Flagship Project - National Research Programmes finanziato dal Ministero Italiano per l'Universita' e la Ricerca RUOLO: partecipazione DURATA PROGETTO: 5 anni (2012-2017) ATTIVITA': Implementazione di un modello 2D (software NATSUB2D) per la simulazione dell'accrescimento e della deformazione verticale tipici dei processi di deposizione che avvengono in ambienti costieri di transizione quali per esempio lagune e delta. Mediante discretizzazione a elementi finiti vengono risolte in modo accoppiato le equazioni di flusso in mezzo saturo e la consolidazione conseguente alla dissipazione di sovrappressione per deposito di nuovo sedimento. Il modello è sviluppato in grandi deformazioni mediante un approccio di tipo Lagrangiano in cui la griglia di calcolo aumenta in dimensione per seguire il processo di deposizione ma, al contempo, si deforma per compattazione del mezzo poroso stesso.</p> <p>PROGETTO: Numerical Simulations of Large Scale Models to Study Earth Fissure Generation finanziato da Jiangsu Geological Survey, China RUOLO: partecipazione DURATA PROGETTO: 2017-2020 ATTIVITA': Sviluppo di modelli numerici per la simulazione di fratture originate dallo sfruttamento delle risorse idriche in bacini sedimentari.</p>

2018

PROGETTO: UGS - Safe Operational Bandwidth Phase I finanziato da Ministry of Economic Affairs of The Netherlands

RUOLO: partecipazione

DURATA PROGETTO: 6 mesi (2018) 1 dicembre 2017 - fine giugno 2018

ATTIVITA': Definizione di linee guida atte all'individuazione del rischio causato dall'estrazione di gas dal sottosuolo in giacimenti compartimentalizzati e caratterizzati dalla presenza di faglie. L'attività ha previsto la simulazione numerica in casi studio test concordati con l'ente finanziatore in grado di simulare in modo realistico la geologia tipica del sottosuolo olandese.

PROGETTO: VENEZIA 2021 - Programma di ricerca scientifica per una laguna "regolata" finanziato dal Provveditorato Interregionale per il Veneto, Trentino Alto Adige, Friuli Venezia Giulia del Ministero Infrastrutture e Trasporti

RUOLO: partecipazione alla Linea 3.1. Subsidenza della laguna di Venezia e evoluzione morfologica connessa a processi erosivi e deposizionali combinati a Relative Sea Level Rise

DURATA PROGETTO: 1 novembre 2018 e terminerà il 31 dicembre 2021

ATTIVITA': Caratterizzazione delle proprietà idromeccaniche dei suoli barenicoli nella laguna di Venezia mediante sperimentazione di campo e simulazione numerica dell'evoluzione a lungo termine delle barene stesse in relazione all'innalzamento del medio mare.

PROGETTO: Modellistica Geomeccanica Previsionale finanziato da ENI E&P (contratto nr. 2500029113)

RUOLO: partecipazione

DURATA PROGETTO: 2018-in corso

ATTIVITA': verifica dell'attualità e dello stato di aggiornamento del modus operandi di Eni nel settore della Modellistica Geomeccanica Previsionale nell'ottica di contribuire all'aggiornamento dell'approccio metodologico adottato nello svolgimento di simulazioni geomeccaniche per la previsione della subsidenza su campi in produzione.

PROGETTO: IGCP 663 - Impact, Mechanism, Monitoring of land subsidence in coastal cities (IM2LSC) promosso e supportato da UNESCO

RUOLO: partecipazione al gruppo di ricerca

DURATA PROGETTO: 2018-2021

ATTIVITA': progetto di ricerca per l'approfondimento della conoscenza sul tema della subsidenza a scala globale, con particolare interesse alle regioni in via di sviluppo quali Asia, Africa e America latina. Il progetto si propone di valutare gli impatti delle attività antropiche e dell'innalzamento del livello del mare, i meccanismi idromeccanici e le tecniche di monitoraggio della subsidenza nelle città costiere.

2019

PROGETTO: HIETE - The Holocene Imprint on the future Evolution of Transitional Environments finanziato da Fondazione CaRiPaRo - Cariverona (€ 250000 BUDGET).

RUOLO: partecipazione

DURATA PROGETTO: 3+1 anni (2019-2022)

2020

PROGETTO: RESERVOIR - sustainable groundwater RESources managEment by integrating eaRth observation deriVed monitoring and fIOW modellng Results

RESERVOIR e' parte di "PRIMA Programme" finanziato dall'Unione Europea nel contesto del programma "Horizon 2020" (€ 1240000 BUDGET, grant agreement No. 1924).

RUOLO: partecipazione

DURATA PROGETTO: 4 anni (2020-2024)

ATTIVITA': sviluppo e implementazione di modelli accoppiati flusso-deformazione in mezzi porosi saturi e insaturi con applicazione a casi studio pilota situati in quattro aree del Mediterraneo (Spagna, Italia, Turchia e Giordania). Lo scopo ultimo e' quello di caratterizzare le proprietà idromeccaniche degli acquiferi e ottimizzare i modelli numerici con dati di deformazione superficiale disponibili da satellite.

PROGETTO: “best practice” per la caratterizzazione degli effetti geomeccanici connessi alla fase post-produttiva di un giacimento e applicazione a due casi reali finanziato da ENI E&P (contratto nr. 2500029113)

RUOLO: partecipazione

DURATA PROGETTO: 2020-in corso

ATTIVITA': L'obiettivo della presente fase consiste nello sviluppo di una “best practice” che consenta di individuare i termini per la dismissione del monitoraggio altimetrico e di compattazione, se presenti pozzi a marker, al termine della vita produttiva di un giacimento

Publications

Articles in International Journals:

- Li Y., Friedman N., Teatini P., Benczur A., Ye S., Zhu L., **Zoccarato C.**, Sensitivity analysis of factors controlling earth fissures due to excessive groundwater pumping. *Stoch Environ Res Risk Assess*, 2022.
- Li, J., Zhu, L., Gong, H., Zhou, J., Dai Z., Li X., Wang H., **Zoccarato C.**, Teatini P. Unraveling elastic and inelastic storage of aquifer systems by integrating fast independent component analysis and a variable preconsolidation head decomposition method. *Journal of Hydrology*, 127420, 2022.
- Friedman, N., **Zoccarato, C.**, Zander, E., & Matthies, H. G. A Worked-out Example of Surrogate-based Bayesian Parameter and Field Identification Methods. *Bayesian Methods for the Analysis of Engineering Systems*; Chiachio Ruano, J., Chiachio Ruano, M., Sankararaman, S., Eds, 2021.
- Gazzola, L., Ferronato, M., Frigo, M., Janna C, Teatini P., **Zoccarato C.**, et al. A novel methodological approach for land subsidence prediction through data assimilation techniques. *Comput Geosci* 25, 1751, 2021.
- Li, Y., Teatini, P., Yu, J., Franceschini, A., Frigo, M., **Zoccarato, C.**, & Ye, S. Aseismic Multifissure Modeling in Unfaulted Heavily Pumped Basins: Mechanisms and Applications. *Water Resources Research*, 57(10), e2021WR030127, 2021
- C. Zoccarato**, C. Da Lio. The Holocene influence on the future evolution of the Venice Lagoon tidal marshes. *Communications Earth & Environment*, 2 (1), 1-9, 2021.
- P. Teatini, Martelli, G., Comerlati, A., Paiero, G., and **Zoccarato, C.** Managed versus natural recharge of pre-Alpine phreatic aquifers. *Water Resources Research*, 56, e2020WR027848. <https://doi.org/10.1029/2020WR02784>, 2020.
- C. Zoccarato**, Gazzola, L.; Ferronato, M.; Teatini, P. Generalized Polynomial Chaos Expansion for Fast and Accurate Uncertainty Quantification in Geomechanical Modelling. *Algorithms*, 13, 156, 2020.
- R. Boni', C. Meisina, P. Teatini, F. Zucca, **C. Zoccarato**, A. Franceschini, P. Ezquerro, M. Bejar-Pizarro, J. A. Fernandez-Merodo, C. Guardiola-Albert, J. L. Pastor, R. Tomas and G. Herrera. 3D groundwater flow and deformation modelling of Madrid aquifer, *Journal of Hydrology*, 585, 124773, doi: 10.1016/j.jhydrol.2020.124773, 2020.
- Mazzia, M. Ferronato, P. Teatini, **C. Zoccarato**. Virtual element method for the numerical simulation of long-term dynamics of transitional environments, *Journal of Computational Physics*, 407, 109235, doi:10.1016/j.jcp.2020.109235, 2020.
- Zoccarato, C.** Da Lio, L. Tosi and P. Teatini, A coupled biomorpho-geomechanical model of tidal marsh evolution, *Water Resources Research*, 55(11), 8330-8349, doi:10.1029/2019WR024875, 2019.
- Zoccarato, M.** Ferronato, A. Franceschini, C. Janna, P. Teatini. Modeling fault activation due to fluid production: Bayesian update by seismic data, *Computational Geosciences*, 1-18, doi:10.1007/s10596-019-9815-3, 2019.
- Corbau C., U. Simeoni, **C. Zoccarato**, G. Mantovani, and P. Teatini. Coupling land use evolution and subsidence in the Po Delta, Italy: Revising the past occurrence and prospecting the future management challenges, *Science of the Total Environment*, 654, 1196-1208. doi:10.1016/j.scitotenv.2018.11.104, 2019.
- Zoccarato, P.** S. J. Minderhoud and P. Teatini. The role of sedimentation and natural compaction in a prograding delta: insights from the mega Mekong delta, Vietnam, *Scientific Reports*, 8, 11437, doi:10.1038/s41598-018-29734-7, 2018.
- C. Zoccarato**, M. Ferronato, and P. Teatini. Formation compaction vs land subsidence to constrain the rock compressibility of hydrocarbon reservoirs. *Geomechanics for Energy and the Environment*, 2018, 13, 14-24, <https://doi.org/10.1016/j.gete.2017.12.002>
- C. Zoccarato**, P. Teatini. Numerical simulations of Holocene salt-marsh dynamics under the hypothesis of large soil deformations, *Advances in Water Resources*, 110 (2017), 107-119, <http://dx.doi.org/10.1016/j.advwatres.2017.10.006>

- **C. Zoccarato**, D. Baù, M. Ferronato, G. Gambolati, A. Alzraiee and P. Teatini. Data Assimilation of surface displacements to improve geomechanical parameters of gas storage reservoirs. *J. Geophys. Res. Solid Earth*, 2016, 121, doi:10.1002/2015JB012090.
- **C. Zoccarato**, D. Baù, F. Bottazzi, M. Ferronato, G. Gambolati, S. Mantica, and P. Teatini. On the importance of the heterogeneity assumption in the characterization of reservoir geomechanical properties. *Geophys. J. Int.*, 2016, 207, 47–58, doi:10.1093/gji/ggw259.
- Baù, A. Alzraiee, **C. Zoccarato**, G. Gambolati, M. Ferronato, F. Bottazzi, S. Mantica, and P. Teatini (2015). Testing a data assimilation approach to reduce geomechanical uncertainties in modelling land subsidence. *Environmental Geotechniques*, doi:10.1680/envgeo.15.00005.

Articles in International Conference Proceedings

- **C. Zoccarato**, M. Ferronato, P. Teatini (2021) A Surrogate Model for Fast Land Subsidence Prediction and Uncertainty Quantification. In: *Barla M., Di Donna A., Sterpi D. (eds) Challenges and Innovations in Geomechanics. IACMAG 2021. Lecture Notes in Civil Engineering*, vol 125. Springer, Cham. https://doi.org/10.1007/978-3-030-64514-4_103
- L. Gazzola, M. Ferronato, M. Frigo, P. Teatini, **C. Zoccarato**. Integration of Data Assimilation Techniques in Geomechanical Modelling: Ensemble Smoother with Multiple Data Assimilation Analysis. In: *Barla M., Di Donna A., Sterpi D. (eds) Challenges and Innovations in Geomechanics. IACMAG 2021. Lecture Notes in Civil Engineering*, vol 125. Springer, Cham. https://doi.org/10.1007/978-3-030-64514-4_93
- **C. Zoccarato**, T. Tornqvist, P. Teatini, and Jon. G. Bridgeman, A shallow compaction model for Holocene Mississippi Delta sediments. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 565-570, <https://doi.org/10.5194/piahs-382-565-2020>, 2020.
- P. Teatini, **C. Zoccarato**, M. Ferronato, A. Franceschini, M. Frigo, C. Janna and G. Isotton, About geomechanical safety for UGS activities in faulted reservoirs. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 539-545, <https://doi.org/10.5194/piahs-382-539-2020>, 2020.
- L. Gazzola, M. Ferronato, M. Frigo, P. Teatini, **C. Zoccarato**, M. Antonelli, A. A. I. Corradi, M. Carolina Dacome, M. De Simoni and S. Mantica, Blending measurements and numerical models: a novel methodological approach for land subsidence prediction with uncertainty quantification. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 457-462, <https://doi.org/10.5194/piahs-382-457-2020>, 2020.
- M. Frigo, M. Ferronato, L. Gazzola, P. Teatini, **C. Zoccarato**, M. Antonelli, A. A. I. Corradi, M. Carolina Dacome, M. De Simoni and S. Mantica, Numerical simulation of land subsidence above an off-shore Adriatic hydrocarbon reservoir, Italy, by Data Assimilation techniques. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 449-455, <https://doi.org/10.5194/piahs-382-449-2020>, 2020.
- R. Boni', C. Meisina, P. Teatini, F. Zucca, **C. Zoccarato**, A. Franceschini, P. Ezquerro, M. Bear-Pizarro, J. A. Fernandez-Merodo, C. Guardiola-Albert, J. Pastor, R. Tomas and G. Herrera, Understanding the dynamic behaviour for the Madrid aquifer (Spain): insights from the integration of A-DInSAR and 3-D groundwater flow and geomechanical models. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 409-414, <https://doi.org/10.5194/piahs-382-409-2020>, 2020.
- R. Tomas, J. Pastor, M. Bear-Pizarro, R. Boni', P. Ezquerro, J. A. Fernandez-Merodo, C. Guardiola-Albert, G. Herrera, C. Meisina, P. Teatini, F. Zucca, **C. Zoccarato** and A. Franceschini, Wavelet analysis of land subsidence time-series: Madrid Tertiary aquifer case study. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 353-359, <https://doi.org/10.5194/piahs-382-353-2020>, 2020.
- P. Teatini, C. Da Lio, L. Tosi, A. Bergamasco, S. Pasqual, P. Simonini, V. Girardi, P. Zorzan, **C. Zoccarato**, M. Ferronato, M. Roner, M. Marani, A. D'Alpaos, S. Cola, and G. Zambon, Characterizing marshland compressibility by an in-situ loading test: design and set-up of an experiment in the Venice Lagoon. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 345-351, <https://doi.org/10.5194/piahs-382-345-2020>, 2020.
- L. Bruno, B. Campo, B. Costagli, E. Stouthamer, P. Teatini, **C. Zoccarato** and A. Amorosi, Factors controlling natural subsidence in the Po Plain. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 285-290, <https://doi.org/10.5194/piahs-382-285-2020>, 2020.
- M. Ferronato, M. Frigo, L. Gazzola, P. Teatini and **C. Zoccarato**, On the radioactive marker technique for in-situ compaction measurements: a critical review. In: *Living with Subsidence - Proc. X Int. Symp. on Land Subsidence*, P. Fokker and G. Erkens eds., Proc. IAHS, 382, 83-87, <https://doi.org/10.5194/piahs-382-83-2020>, 2020.
- M. Ferronato, A. Franceschini, M. Frigo, P. Teatini, **C. Zoccarato**. Numerical investigation of fault activation in underground gas storage reservoirs. In F. Kongoli et al. (eds.), *Geomechanics and Applications for Sustainable*

- Development, vol. 7: Schrefler Int. Symp., pp. 151-159. Sustainable Industrial Processing Summit and Exhibition, FLOGEN, 2019. ISBN: 978-1-989820-06-3 (CD). ISSN: 2291-122.
- P. Teatini, M. Ferronato, A. Franceschini, M. Frigo, C. Janna, **C. Zoccarato** and G. Isotton, Gas storage in compartmentalized reservoirs: a numerical investigation on possible “unexpected” fault activation In: 53rd US Rock Mechanics/Geomechanics Symposium , American Rock Mechanics Association, paper# ARMA 19-1991, 2019.
 - L. Gazzola, M. Ferronato, M. Frigo, C. Janna, P. Teatini, **C. Zoccarato**, M. Antonelli, A. Corradi, M. C. Dacome and S. Mantica, Uncertainty quantification and reduction through Data Assimilation approaches for the geomechanical modeling of hydrocarbon reservoirs. In: 53rd US Rock Mechanics/Geomechanics Symposium , American Rock Mechanics Association, paper# ARMA 19-208, 2019
 - M. Ferronato, A. Mazzia, P. Teatini, **C. Zoccarato**. A Virtual Element Model for the prediction of long-term salt marsh dynamics. In: MODSIM 2017 - Managing cumulative risks through model-based processes, G. Syme et al. eds., The Modelling and Simulation Society of Australia and New Zealand Inc. Publ., ISBN 978-0-9872143-6-2, 305-311, 2017.
 - **C. Zoccarato**, · D. Baù, · M. Ferronato, · G. Gambolati, and· P. Teatini (2016). Ensemble smoothing of land displacements and deep compaction for the geomechanical characterization of hydrocarbon reservoirs. *Rock Mechanics and Rock Engineering: from the Past to the Future – Ulusay et al. (eds) Taylor & Francis Group, London, ISBN 978-1-138-03265-1, Vol. 2, 1171-1176.*
 - **C. Zoccarato**, · D. Baù, · F. Bottazzi, · M. Ferronato, · G. Gambolati, · S. Mantica, and· P. Teatini (2015). Estimate of a spatially variable reservoir compressibility by assimilation of ground surface displacement data. *Proceedings of the International Association of Hydrological Sciences*, DOI: 10.5194/piahs-372-351-2015.
 - **C. Zoccarato**, A. Alzraiee, D. Baù, M. Ferronato, G. Gambolati, C. Janna, and P. Teatini. Data Assimilation of SAR-Based Measurements for Geomechanical Characterization (2014). *Computer Methods and Recent Advances in Geomechanics*, F. Oka et al. eds., Taylor and Francis Group, London, DOI: 10.1201/b17435-216.
 - **C. Zoccarato**, A. Alzraiee, D. Baù, M. Ferronato, G. Gambolati, C. Janna and P. Teatini (2014). Geomechanical characterization of storage reservoirs by assimilation of surface displacements. In: Fourth EAGE CO2 Geological Storage Workshop, Paper C06, *European Association of Geoscientists & Engineers*, DOI: 10.3997/2214-4609.20140086.

Articles in National Conference Proceedings

- **C. Zoccarato**, R. Zotta, C. Da Lio, L. Tosi and P. Teatini. RESILIENZA DI AMBIENTI BARENICOLI LAGUNARI: ACCOPPIAMENTO DI PROCESSI BIO-MORFOLOGICI E GEOMECCANICI. In: XXXVII Convegno Nazionale di Idraulica e Costruzioni Idrauliche, Reggio Calabria, 7-9 Settembre 2020.
- S. Nardean, Y. Zhang, M. Ferronato, S. Ye, **C. Zoccarato** and P. Teatini. MODELLAZIONE FISICA E NUMERICA DELLA GENERAZIONE DI FRATTURE IN ACQUIFERI SOVRA-SFRUTTATI. In: XXXVII Convegno Nazionale di Idraulica e Costruzioni Idrauliche, Reggio Calabria, 7-9 Settembre 2020.
- P. Teatini, **C. Zoccarato**, C. Da Lio, and L. Tosi, Sull'evoluzione altimetrica delle barene della Laguna di Venezia in relazione all'atteso “RSLR”. In: LXXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche, Ancona, 12-14 Settembre 2018, ISBN 9788894379907, Memoria #98, 2018.

Peer-Reviewed for: Water, Geomechanics for Energy and the Environment, Engineering Geology, Journal of Geophysical Research: Earth Surface, Scientific Report.

Selected contribution at international scientific conferences and workshops

- Minderhoud, ..., Zoccarato, et al., (2020). Unravelling and quantifying natural and anthropogenic subsidence drivers in a mega delta. Sharing Geosciences Online at EGU 2018, Vienna, Austria.
- Zoccarato et al. (2020). Investigating land subsidence of transitional environments, Sharing Geosciences Online at EGU 2018, Vienna, Austria.
- Zoccarato et al. (2020). Modelling the relative contribution of aggradation and compaction to saltmarshes evolution. Oral presentation at Eurolag 9 - Future vision and knowledge needs for coastal transitional environments, Venice, Italy.
- Zoccarato et al. (2018). Modeling long-term compaction of Mississippi delta wetlands. Oral presentation at State of the Coast conference, New Orleans, US.
- Zoccarato et al. (2018). Fault activation induced by human activities: uncertainty quantification and parameter update. Oral presentation at Computational Methods in Water Resources (CMWR), Saint Malo, France.
- Zoccarato et al. (2018). Hydro-geomechanical feedback on tidal marsh resilience. Presenting author Pietro Teatini at AGU 2018, Washington, D.C., US.
- Zoccarato et al. (2018). Bio-morpho-geomechanical modelling of salt marshes. Oral presentation at EGU 2018, Vienna, Austria.

- Zoccarato et al. (2017). Induced seismicity in producing hydrocarbon reservoir: a Bayesian approach. Oral presentation at The 22nd International Congress on Modelling and Simulation (MODSIM2017), Hobart, Tasmania, Australia.
- Zoccarato et al. (2017). Modelling Mekong delta evolution and shallow compaction over the past 4000 years. Presenting author Philip S.J. Minderhoud at AGU 2017, New Orleans, US.
- Zoccarato et al. (2017). Preliminary results on seismic data assimilation in geomechanical modeling. (Invited presentation at SIAM Conference on Mathematical and Computational Issues in the Geosciences, Erlangen, Germany.
- Zoccarato et al. (2017). Modelling the long-term vertical dynamics of salt marshes. Poster presentation at EGU 2017, Vienna, Austria.
- Zoccarato et al. (2016). Efficient gPCE-based rock characterization for the analysis of a hydrocarbon reservoir. Poster presentation at SIAM Conference on Uncertainty Quantification (UQ16), SwissTech Convention Center, Lausanne, Switzerland.
- Zoccarato et al. (2016). Land subsidence assimilation by a generalized Polynomial Chaos Expansion-based ensemble smoother. Oral presentation at Computational Methods in Water Resources (CMWR), University of Toronto, Toronto, Canada.
- Zoccarato et al. (2015). Spatially variable compressibility estimation using the Ensemble Smoother with bathymetry observations: application to the Maja gas reservoir. Oral presentation at AGU 2015, San Francisco, US.
- Zoccarato et al. (2015). Estimation of a spatially distributed reservoir compressibility by assimilation of ground surface displacement data. Oral presentation at SIAM Conference on Mathematical and Computational Issues in Geosciences, Stanford University, US.

Technical Skills

- Operating systems: Unix/Linux, Windows
- Programming: Fortran (77/90), Matlab, python (basic knowledge), C++ (basic knowledge)
- Data Visualization Software: Grace (2D graph plotting tool), VisIT (visualization and graphical analysis tool for data on 2D/3D meshes), Paraview (multi-platform data analysis and visualization application).
- Others: MS Office (Microsoft), LaTeX, Surfer (Golden Software), AutoCAD (AutoDesk), Photoshop (Adobe), Inkscape (vector graphics editor)
- Finite Element Gridding: MeshMaker (ArgusOne), GEN3D (developed by Unipd), TETGEN (WIAS)
- GEPS3D (3D geomechanical elastoplastic simulator developed by M3e - Unipd)
- SATG3D (3D non-linear flow simulator developed by Unipd)
- NATSUB2D (2D natural subsidence simulator - large deformations developed by Unipd)
- BIOMORFO (2D natural subsidence simulator coupled with biomorphological model evolution developed by Unipd)