

**Andrea Columbu, PhD**

Date of Birth: 01/07/1987  
 Birth Place: Reggio Emilia (Italy)  
 Nationality: Italian  
 Institution Address: University of Parma (Italy), Department of Chemistry, Life Sciences and Environmental Sustainability (SCVSA). Earth Sciences Division. Address: Parco Area delle Scienze 157/A, 43124 Parma (Pr)  
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**Languages:** Italian (native), English (Academic, fluent), French (Basic), Spanish (Basic)

**NATIONAL LICENSE AS A/PROFESSOR**

A. Columbu fulfils the requirements to be Associate Professor in the Italian Academic system in sector **04/A1: Geochemistry, Vulcanology, Georesources and applications** (validity of the license: from 31/05/2021 to 31/05/2030)

A. Columbu fulfils the requirements to be Associate Professor in the Italian Academic system in sector **04/A3: Applied Geology, Physical Geography and Geomorphology** (validity of the license: from 10/06/2021 to 10/06/2030)

**ACTUAL ACADEMIC POSITION**

**01/09/2021** Research Fellow (RTDa in the Italian Academic System). University of Parma (Italy), Department of Chemistry, Life Sciences and Environmental Sustainability. Earth Sciences Division.  
Professor for the class: “Carbonate deposits: from micro to macroscopic” (BSc). 48 hours.

**PREVIOUS WORK & ACADEMIC EXPERIENCE/ACTIVITIES**

**01/04/2021** Senior PostDoc. Project: *Quaternary climate-driven variability of the thermal water level in Monsummano Hill*. Fundend by Giovani@Ricerca\_Scientifica grant (see later). University of Bologna (Italy), Department of Biological, Geological and Environmental Science (BiGeA).  
**31/08/2021**

**01/03/2017** Junior PostDoc. Project: *Geomicrobiological factors influencing quartz-sandstone weathering and deposition of silica speleothems*. University of Bologna (Italy), Department of Biological, Geological and Environmental Science (BiGeA).  
**31/03/2021**

**01/10/2019** Lab visitor/guest researcher, Institute of Global Environmental Change, Xi’an Jiatong University (China), Isotope Laboratory (Leonardo Da Vinci Project). Supervisor: Prof. Hai Cheng.  
**31/10/2019**

**01/05/2019** Lab visitor/guest researcher, Natural History Museum (London, UK), Mineral & Planetary Science Division. CT-scan, SEM & ICP-MS Laboratory, Europlanet 2019 project. Supervisor: Dr. Sara Russell  
**15/05/2019**

**2017-2019** Lab visitor/guest researcher (multiple visits), University of Genova (Italy), DISTAV Department. SEM/FESEM laboratory. Supervisor: Prof. Cristina Carbone

**01/07/2018** Lab visitor/guest researcher (two visits), University of Innsbruck (Austria), Institute of Geology (Innsbruck Quaternary Research Group), stable isotope laboratory. Supervisor: Prof. Christoph Spötl  
**15/07/2018**  
**and**  
**1/11/2018**  
**30/11/2018**

**2017-2018** Teaching Tutor, BiGeA department (University of Bologna). Course: Geography [00455].  
**and** Activities: teaching basic geology and geomorphology in class and in the field; supervision

- 2018-2019** thesis. ~30 hours per year
- 2017-2018** Academic assistant of Prof. Jo De Waele, BiGeA department (University of Bologna). Course: Speleology [08623]. Activities: teaching basic geology and geomorphology in the field and in caves. ~100 hours
- 2013 – 2016** Research assistant. Oxygen and carbon stable isotope laboratory at the School of Geography and U-Th isotopes at the School of Earth Sciences (University of Melbourne). ~100 hours per year.
- 01/02/2014** Academic assistant of Prof. Russell Drysdale, School of Geography (University of Melbourne).  
**01/06/2014** Course: Global climate change in context [GEOG30023]. Activities: teaching basic geological, climatic and palaeoclimatic principles in class and in the field; supervision students in lab and in the field. ~100 hours
- 01/04/2011** Internship during MSc degree. BGS, British Geological Survey (UK, Nottingham). Research  
**01/07/2011** team: shallow karst hazards. Activities: geological surveys.

## EDUCATION

- 15/04/2013** PhD Science, Land & Environment at the School of Geography-Earth Sciences, University of  
**24/02/2017.** Melbourne (Australia). Thesis: The potential of carbonate speleothems from Mediterranean gypsum caves for palaeoclimate and palaeoenvironmental reconstructions. Supervisors: Profs. Russell Drysdale and Jon Woodhead. Thesis accepted “without major amendments”.
- 18/12/2009** MSc, Geology & Land Management at the University of Bologna (Italy), Department of  
**22/03/2012** Biological, Geological and Environmental Science. Thesis: Geomorphological study and morphogenetic interpretation of the cool water travertine deposit (tufa) in Via Gellia Road (Cromford, Central England). Supervisors: Anthony Cooper (British Geological Survey), Jo De Waele (Bologna Uni). Grade: 110 Lode (1<sup>st</sup> class with Honours equivalent).
- 01/10/2006** BSc, Earth Sciences at the University of Bologna (Italy), Department of Biological, Geological  
**17/12/2009** and Environmental Science. Thesis: *Flash flood analysis in the carbonatic canyon of Flumineddu (Sardinia, Italy)*”. Supervisor: Jo De Waele. Department of Earth Sciences, University of Bologna (Italy). Grade: 110 Lode (1<sup>st</sup> class with Honours equivalent).

## SUPERVISING & MENTORING ACTIVITY

- 2021** Internship supervisor. 100 hours internship supervisor. The activity aims to quantitatively understand the relation between Nuragic buildings and the geological characteristics of the Sardinian territory (Italy). Candidate: Giovanni Bombardini, Bologna University, Earth Sciences BSc.
- 2021** Internship supervisor. 250 hours internship supervisor for the project: Evolgypsum. Main activities: sampling and cataloguing. Candidate: Luca Vidilini, Bologna University, Natural Sciences BSc.
- 2021** Thesis supervisor. Thesis (BSc): Carbonate fabric of Nuragic Era speleothems (Central Sardinia): cultural, palaeoclimate-environmental implications. Candidate: Luca Vidilini, (Natural Sciences, University of Bologna (Italy), BiGeA Department).
- 2020** Thesis supervisor. Thesis (BSc): The Pozzo Cucù stalagmite: from scientific application to museum exposition. Candidate: Laura Calabrò (Natural Sciences, University of Bologna (Italy), BiGeA Department)
- 2020** Thesis supervisor. Thesis (BSc): Karst in Holtas: first sulphuric ipogenic caves in Albania. Candidate: Alessandro Marraffa (Earth Sciences, University of Bologna (Italy), BiGeA Department).
- 2018** Thesis supervisor. Thesis (BSc): Rainfall isotopic composition in Italy during 2014-2015 hydrological year. Candidate: Cecilia Valla (Natural Sciences, University of Bologna (Italy), BiGeA Department).

## RESEARCH EXPEDITIONS

Activities: surface and/or cave sampling; geological & geomorphological mapping

**As leader:**

**Sardinia** (Italy) Summers 2013, 2014, 2019; December 2017. >50 days in total.  
**Apulia** (Italy) July 2019, April 2021. 25 days  
**Northern Apennines** (Italy) July 2013-2014. 10 days  
**Derbyshire** (UK) May 2011. 15 days

**Participant:**

**Lessini** (Italy): May 2019 and 2021, October 2020 and May. 10 days.  
**Guizhou** (China): October 2019. 4 days.  
**Praça Valley** (Bosnia Herzegovina): July 2014. 15 days.  
**New Zealand**: February 2014. 15 days.  
**Southern Spain**: October 2014. 7 days.  
**Calabria** (Italy): June 2010. 7 days.  
**Alps** (Italy): Summers 2008, 2009 and 2010. 30 days.

**RESEARCH GROUPS & ONGOING PROJECTS**

**PI** of the project: Quaternary climate-driven variability of the thermal water level in Monsummano Hill. Financed by the call: [Giovani@Ricerca\\_Scientifica](mailto:Giovani@Ricerca_Scientifica) (see fundings section). Since 2021 – ongoing.

**PI** of the project: Palaeoclimate reconstruction of the last glacial period in Apulia (Southern Italy) and palaeoanthropological implications. Financed by “Leonardo da Vinci Project”, Ministry of Education and University (Italy) (see fundings section). Since 2018 – ongoing.

**PI** of the project: Reconstructing the MIS6 climate in Palawan (Philippines). Financed by LaVenta exploration and inter-departmental collaborations. Since 2018 – ongoing.

**PI** of the project: Uncovering past climates in the Island of Sardinia (Italy). Financed by inter-departmental collaborations. Since 2017 – ongoing.

**Regional Coordinator** for the group: SISAL (Speleothem Isotopes Synthesis and Analysis) group, [http://pastglobalchanges.org/people/people-database/index.php?option=com\\_comprofiler&task=userprofile&user=7581&lang=en](http://pastglobalchanges.org/people/people-database/index.php?option=com_comprofiler&task=userprofile&user=7581&lang=en) . Financed by PAGES (Past Global Changes). Since 2018 – ongoing.

**Participant** in the project: geo paleontological investigation of Quaternary sediments from San Donato Cave (Italy, BL). Leader: Dr. Paolo Reggiani. Financed by Unione Montana Feltrina. Since 2021.

**Participant** in the project: SUCCESS – The Earliest Migrations of Homo Sapiens in Southern Europe. Understanding the biocultural processes that define our uniqueness. Leader: Prof. Stefano Benazzi (Bologna University). Financed by European Research Council, ERC grant no. 724046—SUCCESS (<https://ERC-SUCCESS.eu>). 2018 – 2022.

**Participant** in the project: Geological and palaeoenvironmental reconstruction of Southern Alps. Leader: Prof. Francesco Sauro, Bologna University. Financed by “Dolomiti Bellunesi Natural Park”. Since 2017.

**Participant** in the project: EvolGyps. The evolution of gypsum terrains in Northern Italy. Project leader: Prof. Jo De Waele, University of Bologna. Financed by Emilia Romagna region. Since 2017.

**Participant** in the project: Silica biomobilization in quartzitic caves. Leader: Prof. Francesco Sauro, University of Bologna. Financed by Rolex Awards and Europlanet Horizon2020. Since 2017.

**Participant** in the project: MIS9-Holocene climate and environmental changes along the Croatian coastline. Leader: Prof. Maša Surić, University of Zadar (Croatia). Financed by PI’s funding. Since 2016.

**Participant** in the project: Andalusian caves and water corridors. Leader: Dr. Walter Capella, Utrecht University. Financed by PI’s funding. 2015-2018.

**Participant** in the project: Migration of South African Hominins. Leader: Prof. Robyn Pickering, University of Cape Town (South Africa). Financed by PI’s funding. Since 2015.

**PUBLICATIONS**

**2021** Bernardini S, Bellatreccia F, **Columbu A**, De Waele J, Millo C, Jovane L, Sodo A, Vaccarelli I, Pellegrini M, Jurado V, Del Gallo M, Saiz-Jimenez C. Morpho-Mineralogical and Bio-Geochemical

Description of Cave Manganese Stromatolite-Like Patinas (Grotta del Cervo, Central Italy) and hints on their paleohydrological-driven genesis. *Frontiers in Earth Science*. In Print. <https://doi.org/10.3389/feart.2021.642667>

- 2021** **Columbu A**, Calabró L, Chiarini V, De Waele J. Stalagmites: from science application to museumization. *Geoheritage* 13: 1-11. <https://doi.org/10.1007/s12371-021-00573-9>
- 2021** Surić M, **Columbu A**, Lončarić R, Bajo P, Bočić N, Lončar N, Drysdale R, Hellstrom J. Holocene hydroclimate changes in continental Croatia recorded in speleothem  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  from Nova Grgosova Cave. *The Holocene* 31: 1401-1416. <https://doi.org/10.1177/09596836211019120>
- 2021** Sauro F, Fellin MG, **Columbu A\***, Hauselmann P, Borsato A, Carbone C, De Waele J. Hints on the Late Miocene evolution of the Tonale-Adamello-Brenta region (Alps, Italy) based on allocthonous sediments from Raponzolo cave. **\*Corresponding Author**. *Frontiers in Earth Sciences* 9: 411. <https://doi.org/10.3389/feart.2021.672119>
- 2021** Boschini F, **Columbu A\***, Spagnolo V, Crezzini J, Bahain J, Falgueres C, Benazzi S, Boscato P, Ronchitelli A, Moroni A, Martini I. Human occupation continuity in southern Italy towards the end of the Middle Palaeolithic. A palaeoenvironmental perspective from Apulia. **\*=corresponding author**. *Journal of Quaternary Science*. In print. <https://doi.org/10.1002/jqs.3319>
- 2021** Ghezzi D, Sauro F, **Columbu A**, Carbone C, Hong P, Vergara F, De Waele J, Cappelletti M. Transition from unclassified Ktedonobacterales to Actinobacteria during amorphous silica precipitation in a quartzite cave environment. *Scientific Reports* 11: 1-17 <https://doi.org/10.1038/s41598-021-83416-5>
- 2021** **Columbu A**, Audra P, Gazquez, D'Angeli I, Bigot J Y, Koltai G, Chiesa R, Yu T L, Hu H M, Shen C C, Carbone C Heresanu V, Nobecourt J C, De Waele J. Hypogenic speleogenesis, late stage epigenic overprinting and condensation-corrosion in a complex cave system in relation to landscape evolution (Toirano, Liguria, Italy). *Geomorphology*. 376:107561. <https://doi.org/10.1016/j.geomorph.2020.107561>
- 2020** **Columbu A**, Chiarini V, Spötl C, Benazzi S, Hellstrom J, Cheng H, De Waele J. Speleothem record attests to stable environmental conditions during Neanderthal–modern human turnover in southern Italy. *Nature Ecology and Evolution*, 2020, 4: 1188-1195. <https://doi.org/10.1038/s41559-020-1243-1>
- 2020** Comas-Bru L, Rehfeld K, Roesch C, Amirnezhad-Mozhdehi S, Harrison S, Atsawawaranunt K, Ahmad S, Ait Brahim Y, Baker A, Bosomworth M, Breitenbach S, Burstyn Y, **Columbu A**, Deininger M, Demény A, Dixon B, Fohlmeister J, Hatvani I, Hu J, Kaushal N, Kern Z, Labuhn I, Lechleitner F, Lorrey A, Martrat B, Novello V, Oster J, Pérez-Mejías C, Scholz D, Scroxton N, Sinha N, Ward B, Warken S, Zhang H, and the SISAL members. A comprehensive speleothem isotope database with multiple age-depth models. *Earth System Science Data*, 2020, 12: 2579–2606 <https://doi.org/10.5194/essd-12-2579-2020>
- 2020** Sauro F, Mecchia M, Tringham M, Arbenz T, **Columbu A**, Carbone C, Pisani L, De Waele J. Speleogenesis of the world's longest cave in hybrid arenites (Krem Puri, India). *Geomorphology*, 2020, 359: 107-130. <https://doi.org/10.1016/j.geomorph.2020.107160>
- 2019** **Columbu A**, Spötl C, De Waele J, Tsai-Luen Y, Shen C C, Gazquez F. A long record of MIS 7 and MIS 5 climate and environment from a western Mediterranean speleothem (SW Sardinia, Italy). *Quaternary Science Reviews*, 2019, 220: 230-243. <https://doi.org/10.1016/j.quascirev.2019.07.023>
- 2019** Sauro F, Mecchia M, Piccini L, De Waele J, Carbone C, **Columbu A**, Vergara F. Genesis of giant sinkholes and caves in the quartz sandstone of Sarisariñama tepui, Venezuela. *Geomorphology*, 2019, 342: 223-238. <https://doi.org/10.1016/j.geomorph.2019.06.017>
- 2019** **Columbu A**, Drysdale R, Hellstrom J, Woodhead J, Cheng H, Hua Q, Zhao J, Montagna P, Pons-Branchu E, Edwards L. U-Th and radiocarbon dating of calcite speleothems from gypsum caves (Emilia Romagna, North Italy). *Quaternary Geochronology*, 2019, 52: 51-62. <https://doi.org/10.1016/j.quageo.2019.04.002>
- 2019** Comas-Bru L & SISAL Working Group Members. Evaluating model outputs using integrated global speleothem records of climate change since the last glacial. *Climate of The Past* 2019, 15: 1557-1579. <https://doi.org/10.5194/cp-15-1557-2019>
- 2019** Mecchia M, Sauro F, Piccini L, **Columbu A**, De Waele J. A hybrid model to evaluate subsurface chemical weathering and fracture karstification in quartz sandstone. *Journal of Hydrology*, 2019, 572: 745-760. <https://doi.org/10.1016/j.jhydrol.2019.02.026>
- 2018** **Columbu A**, Sauro F, Lundberg J, Drysdale R, De Waele J. Palaeoenvironmental changes recorded by Southern Alps speleothems (Piani Eterni karst system, Belluno, Italy) during four different interglacial to glacial climate transition. *Quaternary Science Reviews*, 2018, 197: 319-335. <https://doi.org/10.1016/j.quascirev.2018.08.006>

- 2018** Sauro F, Cappelletti M, Ghezzi D, **Columbu A**, Hong P-Y, Zowawi H.M, Zannoni D, Carbone C, Piccini L, Vergara F, De Waele J. Microbial diversity and biosignatures of amorphous silica deposits in orthoquartzite caves. *Scientific Reports*, 2018, 8 (1): 1-14. <https://doi.org/10.1038/s41598-018-35532>
- 2018** Gazquez F, **Columbu A**, De Waele J, Breitenbach F.M, Huang R, Shen C-C, Yanbin L, Hodell D. Quaternary paleo-aquifer changes in SW Sardinia revealed by carbonate speleothems. *Chemical Geology*, 2018, 493, 246-257. <https://doi.org/10.1016/j.chemgeo.2018.05.046>
- 2018** De Waele J, Fabbri S, Santagata T, Chiarini V, **Columbu A**, Pisani L. Geomorphological and speleogenetical observations using terrestrial laser scanning and 3D photogrammetry in a gypsum cave. *Geomorphology*, 2018, 319: 47-61. <https://doi.org/10.1016/j.geomorph.2018.07.012>
- 2018** Lechleitner F, Amirnezhad-Mozhdehi S, **Columbu A**, Comas-Bru L, Labhun I, Pérez C, Rehfeld K. The Potential of Speleothems from Western Europe as Recorders of Regional Climate: a Critical Assessment of the SISAL Database. *Quaternary*, 2018, 1: 1-30. <https://doi.org/10.3390/quat1030030>
- 2018** De Waele J, D'Angeli I, Bontognali T, Tuccimei P, Scholz D, **Columbu A**, Bernasconi S, Fornós J, González EG, Tisato. Speleothems in a north Cuban cave register sea level changes and Pleistocene uplift rates. *Earth Surface Processes and Landforms*, 2018, 43(11): 2313-2326. <https://doi.org/10.1002/esp.4393>
- 2018** Atsawawaranunt K & SISAL Working Group Members. The SISAL database: a global resource to document oxygen and carbon isotope records from speleothems. *Earth System Science Data*, 2018, 10: 1687–1713. <https://doi.org/10.5194/essd-10-1687-2018>
- 2017** **Columbu A**, Chiarini V, De Waele J, Drysdale R, Woodhead J, Hellstrom J, Forti P. Late quaternary speleogenesis and landscape evolution in the northern Apennine evaporite areas. *Earth Surface Processes and Landforms*, 2017, 42(10): 1447-1459. <https://doi.org/10.1002/esp.4099>
- 2017** **Columbu A**, Drysdale R, Capron E, Woodhead J, De Waele J, Sanna L, Hellstrom J, Bajo P. Early last glacial intra-interstadial climate variability recorded in a Sardinian speleothem. *Quaternary Science Review*, 2017, 169: 391-397. <https://doi.org/10.1016/j.quascirev.2017.05.007>
- 2017** De Waele J, Piccini L, Columbu A, Madonia G, Vattano M, Calligaris C, D'Angeli I, Parise M, Chiesi M, Sivelli M, Vigna B, Zini L, Chiarini V, Sauro F, Russell D, Forti P. Evaporite karst in Italy: a review. *International Journal of Speleology*, 2017, 46(2): 137-168. <http://dx.doi.org/10.5038/1827-806X.46.2.2107>
- 2015** **Columbu A**, De Waele J, Forti P, Montagna P, Picotti V, Pons-Branchu E, Hellstrom J, Bajo P, Drysdale R. Gypsum caves as indicators of climate-driven river incision and aggradation in a rapidly uplifting region. *Geology*, 2015, 43(6): 539-542. <https://doi.org/10.1130/G36595.1>
- 2013** **Columbu A**, Banks V, De Waele J, Cooper A, Jones P. Tufa deposits in the Via Gellia, Derbyshire. *Mercian Geologist*, 2013, 18 (2). <http://nora.nerc.ac.uk/id/eprint/503566>

#### PAPERS IN REVIEW (up to September 2021)

- In review** **Columbu A**, Nannoni A, Grasso N, Dabove P, Fiorucci A, Vigna B, Bertagni M, Camporeale C, Forti P, De Waele J and Spötl C. Genesis of wavy carbonate flowstone deposits in Bossea Cave (North Italy) and hydroclimatic significance. *Catena*
- In review** Hu M, Marino G, Pérez-Mejías C, Spötl C, Kano A, Yu J, Yokoyama Y, Zhang X, **Columbu A**, Tan L, Michel V, Mii H, Zanchetta G, Regattieri E, Valensi P, Tsai H, Chien W, Sung W, Su H, Hsu C, Starnini E, Zunino M, Chou Y, Lee S, Jiang X, Shen CC. Impact of ice-sheet on deglacial European westerly winds. *Science Advance*.
- In review** Fohlmeister J, Sekhon N, **Columbu A**, Vettoretti G, Weitzel N, Rehfeld K, Veiga-Pires C, Marwan N, Boers N. Global reorganization of atmospheric circulation during Dansgaard-Oeschger cycles. *Nature Geosciences*
- In review** Fana Y, **Columbu A**, Xiong K, Luo G, Li A, Wange X. Formation of the Huajiang Grand Canyon(southwest China) driven by the evolution of a Late Pleistocene tiankeng. *Chinese Geological Journal*

#### INVITED TALK

- 2022** **Columbu A**. (invited lecture). Title: Methods of sampling, Environmentally friendly sampling, and handling the samples post research. Event: Summer school of speleothem science (S4), winter activities. 24<sup>th</sup> January 2022. On Line. Oral.

- 2021** **Columbu A.** (invited talk). Title: Dating cave deposits: geological, paleoclimatic and paleoenvironmental applications. Event: Seminar for PhD students and all people interested, Milano Bicocca University, Department of Earth and Environment. 20th May 2021. Oral.
- 2019** **Columbu A.** (invited talk). The potential of speleothems from Western Europe as recorders of regional climate. SISAL 4th Workshop: Exploiting the SISALv2 database for evaluating climate processes.” Xi’an (China), October 2019. Oral.

#### CONFERENCES ABSTRACTS & PRESENTATIONS (selected)

- 2021** **Columbu A** et al. Exploring climate and environmental changes in Sardinia around the end of the Nuragic Era. Italian Geological Society (SGI) Conference 2021, 14-16 September 2021, Trieste. Oral
- 2021** **Columbu A** et al. The last deglaciation in Italy: timing and pattern from a precisely dated stalagmite. Italian Geological Society (SGI) Conference 2021, 14-16 September 2021, Trieste. Oral
- 2021** **Columbu A** et al. The longest last glacial continuous speleothem record from the western Mediterranean (105-10 ka) and its potential extension further back in time. Climate Change - The Karst Record IX Conference, Innsbruck (Austria), July 2020. Accepted oral (Postponed 2022 due to Covid19).
- 2021** **Columbu A** et al. Dating speleothems in Southern Italy (Apulia and Sardinia): palaeoclimate implications and speleogenetic clues. UIS Scientific Conference - Union Internationale de Spéléologie. Savoie Mont Blanc (France), August 2021 (Postponed 2022 due to Covid19). Accepted (to be decided the format)
- 2021** Suric et al. Hydroclimate history of the Croatian Adriatic coast from MIS 10 to MIS 1 – partial reconstruction from the Modrič Cave speleothems. Climate Change - The Karst Record IX Conference, Innsbruck (Austria), July 2020. Accepted oral (Postponed 2022 due to Covid19).
- 2021** Bajo et al. Multiple speleothem record of holocene climate variability from nova grgosova cave, Croatia. Climate Change - The Karst Record IX Conference, Innsbruck (Austria), July 2020. Accepted oral (Postponed 2022 due to Covid19).
- 2020** **Columbu A** et al. A long continuous palaeoclimate-paleoenvironmental record of the last glacial period from southern Italy and implications for the coexistence of Anatomically Modern Humans and Neanderthals. EGU conference, Vienna (Austria), May 2020. Accepted Oral (Converted in “Display” due to Covid19).
- 2020** Gazquez F et al. Gypsum speleothems record the triple oxygen ( $\delta^{17}\text{O}$  and  $\delta^{18}\text{O}$ ) and hydrogen ( $\delta^2\text{H}$ ) isotopic composition of cave dripwater: potential paleoenvironmental implications. EGU conference, Vienna (Austria), May 2020. Accepted Oral (Converted in “Display” due to Covid19).
- 2019** Ghezzi et al. Biodiversity and metabolic potentials in deep quartzitic caves. 8th Congress of European Microbiologists (FEMS2019). Glasgow (Scotland), September 2019. Oral.
- 2019** Surić M et al. Environmental change in the Adriatic region over the last 365 kyr from episodic deposition of Modrič Cave (Croatia) speleothems. INQUA 2019, Dublin (Ireland), July 2019. Oral.
- 2019** **Columbu A** et al. Apulian stalagmites for the study of the Last Glacial period in Western Mediterranean: palaeoclimate and anthropological implications. Workshop: The last Interglacial-glacial Climate. Italian National Centre of Research CNR – Bologna (Italy), June 2019. Oral.
- 2019** Ghezzi D et al. Cave environments for the discovery of novel microbes and bioactive molecules. SIMGBM Conference 2019, Firenze (Italy), June 2019. Oral.
- 2019** Amirnezhad-Mozhdehi S et al. Patterns of spatial and temporal variability of speleothem  $\delta^{18}\text{O}$  records in Western Europe: an initial assessment of SISAL database. EGU 2019, Vienna (Austria), April 2019. Oral.
- 2018** Lechleitner F et al. What do speleothems in Western Europe record? Assessing regional and temporal trends in speleothem  $\delta^{18}\text{O}$  with the SISAL database. 16th Swiss Geoscience Meeting, Bern, December 2018. Oral.
- 2018** **Columbu A** et al. Last glaciation 70 kyrs-long stalagmite palaeoclimate record from Southern Italy: implication for Mediterranean climate during glacial shifts. Italian Geological Society (SGI) Conference 2018, Catania (Italy), September 2018. Oral.
- 2018** Capella W & Columbu A. Proposal to investigate potential Atlantic-Mediterranean connection through karst conduits during the Messinian Salinity Crisis. Italian Geological Society (SGI) Conference 2018, Catania (Italy), September 2018. Poster.
- 2018** **Columbu A** et al. Laser scanning and 3D printing of Ca’ Castellina cave ceiling (North Italy): a novel approach to visualize and better understand underground morphologies. EGU 2018, Vienna (Austria), April 2018. Poster
- 2017** **Columbu A** et al. Age and speleogenesis of gypsum caves in Emilia-Romagna (N Italy). International Conference of Speleology, Sydney (Australia), July 2017. Poster.

- 2017** Surić M et al. Eastern Adriatic paleoenvironmental changes recorded from MIS 10 to the Recent in the Modrič Cave (Croatia) Speleothems – Preliminary Report. Climate Change, The Karst Record VIII Conference, Austin (USA), May, 2017. Oral.
- 2016** **Columbu A** et al. Carbonate speleothems from gypsum caves for palaeoclimatic and palaeoenvironmental reconstructions. Italian Geological Society (SGI) Conference, Naples (Italy), September 2016. Oral.
- 2016** **Columbu A** et al. Carbonate speleothems from western Mediterranean gypsum karst: palaeoclimate implications. EGU conference, Vienna (Austria), April 2016. Poster
- 2016** **Columbu A** et al. Age and speleogenesis of epigenic gypsum caves in northern Apennines (Italy). EGU conference, Vienna (Austria), April 2016. Poster.
- 2016** Sauro F et al. Multilevel karst system evolution in relationship to palaeo-climate and palaeo-geography: hints from a 500 ky speleothem record from the Piani Eterni Karst System, Belluno Dolomites, Italy. EGU conference, Vienna (Austria), April 2016. Oral.
- 2015** Drysdale R & **Columbu A**. Speleothems records from the Last Interglacial and MIS11: a review. QUIGS1 Meeting, Cambridge (UK), November, 2015. Oral.
- 2015** **Columbu A** et al. Variation of Last Interglacial palaeorainfall dynamics derived from an Italian carbonate speleothem. INQUA Conference, Nagoya (Japan), July, 2015. Poster.
- 2015** **Columbu A** et al. The first multi-proxy palaeoclimate record (~115ky-110ky) from the Island of Sardinia: implications for the AICC2012 ice-core chronology. INQUA Conference, Nagoya (Japan), July, 2015. Oral.
- 2015** **Columbu A** et al. Dating Carbonates speleothems in the evaporites of Emilia Romagna (Italy): speleogenetic and palaeoclimate implications. XXII Italian National Congress of Speleology. 30 Pertosa-Auletta (Italy), June, 2015. Poster.
- 2014** **Columbu A** et al. Local response to global warm pulses over the last 250,000 years: the case of Central Italian gypsum karst. Climate Change, The Karst Record VII Conference, Melbourne (Australia), September 2014. Poster.
- 2014** **Columbu A** et al. Deciphering intra-decadal climate variations in the Central Mediterranean area during the Last Interglacial using speleothems. Climate Change, The Karst Record VII Conference, Melbourne (Australia), September 2014. Poster.

#### CONFERENCE ORGANIZATION (convener/chairperson)

- 2022** Session: Speleothem and Continental Carbonate Archives of Modern and Palaeoenvironmental Change. EGU2022 Conference, Vienna (Austria), 3-8 April 2022. Conveners: Warken S, Borsato A, Lechleitner F, Columbu A, Kaushal N. In Progress
- 2021** Session 4 (Open Topic, March 2021). Seminar series called KR Online (from December 2020 to March 2021) within: Climate Change - The Karst Record IX Conference (KR9). Conveners March 2021: A Columbu, Kathleen J, Koltai G.
- 2021** Session: Speleothem and Continental Carbonate Archives of Modern and Palaeoenvironmental Change. EGU2021 Conference, Vienna (Austria), 25-30 April 2021. Conveners: Fohlmeister J, Lechleitner F, Borsato A, Columbu A.
- 2021** Session: New developments in speleothem palaeoclimate and palaeoenvironmental science. Open Science Conference (OSM), Agadir (Morocco), 18-22 May 2021. Conveners: Columbu A, Lechleitner F, Comas-Bru L, Ait Brahim Y, Burstyn Y. Postponed to 2022 due to Covid19 (session accepted).
- 2020** Session: Caves and karst as paleoclimate archives. KR9 2020 Conference, Innsbruck (Austria), 12-15 July. Conveners: Munroe J, Columbu A. Postponed 2022 due to Covid19.
- 2020** Session: Erosion, weathering and sedimentation in mountain landscapes and caves. EGU2020 Conference, Vienna (Austria), 3-8 May 2020. Held as “Displays” due to Covid19. Conveners: Dingle E, Erlanger E, de Palezieux L, Haselberger S, Columbu A, Rugenstein J, Malatesta L.
- 2018** Session: Karst and cave studies: from ancient to modern processes. SGI Conferenze, Catania (Italy), 13-15 September 2018. Conveners: Sanna L, Parise M, Columbu A, Madonia M, Vattano M.

#### EDITORIAL BOARD

**Since 2020** Member of the editorial board for the journal “International Journal of Speleology” <https://scholarcommons.usf.edu/ijs/>

Since 2020 Member of reviewer board for the journal “Quaternary”  
[https://www.mdpi.com/journal/quaternary/submission\\_reviewers](https://www.mdpi.com/journal/quaternary/submission_reviewers)

Since 2020 Topic editor for the journal “Water” [https://www.mdpi.com/journal/water/topic\\_editors](https://www.mdpi.com/journal/water/topic_editors)

### REVIEWER FOR (verified in WOS)

The Holocene (x1), The Quaternary (x1), Quaternary Science Reviews (x1), Sedimentary Geology (x1), Terra Nova (x1), Quaternary Geochronology (x1), Palaeogeography, Palaeoclimatology, Palaeoecology (x1), Geochimica Cosmochimica Acta (x1), Plos One (x1), International Journal of Speleology (x2), Minerals (x1), Water (x1), Tectonophysics (x2)

### REVIEWER FOR INTERNATIONAL PROJECTS

**2021.** A. Columbu has been selected as reviewer for a NERC (Natura Environment Research Council (x1)) project.

### ADVANCED COURSES & WORKSHOPS (selected)

**Participant @** Summer School: Principles, Applications And New Frontiers In Isotope Geochemistry. 14-17 June 2021. Milan (Italy). Organised by Earth Science Department, Milano University (Italy)

**Teacher @** CAI (Italian Alpine Club) training course for CAI 1st level speleological instructors. 13-16 May 2019. Class: The palaeoclimate/environmental significance of cave sediments and deposits

**Participant @** SISAL 4th Workshop: Exploiting the SISALv2 database for evaluating climate processes.” 14-18 October 2019, Xi’an (China). Organised by PAGES – Past Global Changes.

**Participant @** Last Interglacial and glacial Climate workshop. 17-18 June 2019, Bologna (Italy) Organised by the Italian National Research Council (CNR).

**Participant @** Writing a key scientific paper: hints & tricks (advanced course). 5-6 February 2016, Melbourne (Australia). Organised by the Melbourne University.

**Participant @** Isotopes and (palaeo)environments (advanced course). 1-3 April 2015, Wollongong (Australia). Organised by the Wollongong Isotope Geochronology Laboratory (WIGL).

**Participant @** Continental Carbonate Fabrics (Speleothem, Pedogenic Carbonate, Subglacial Calcite, Tufa and Travertine - advanced course). 14-15 June 2014, Pisa (Italy). Organised by the Pisa University, Earth Sciences Department, in collaboration with Prof. Silvia Frisia (Newcastle University, Australia).

**Participant @** Scientific English for non-native speakers (advanced course). 9-10 October 2014, Melbourne (Australia). Organised by the Melbourne University.

**Participant @** Quaternary Techniques: Measuring change and reconstructing past climate & environment (advanced course). 15-16 May 2013, Wellington (New Zealand). Organised by the Institute of Geological & Nuclear Sciences (GNS).

### AWARDS, FUNDINGS & SCHOLARSHIPS

**2021** Marie Skłodowska-Curie Standard European Fellowship Action: SEAL OF EXCELLENCE. Project: 160000 years of climate change through a West-to-East Mediterranean Transect (Acronym: WET). Final score: 91.2/100. Minimal score for funding (Action 2020/2021): 93/100.

**2021** Giovani@Ricerca\_Scientifica Award/Funding, 2021. Two-years funding for the project: Quaternary climate-driven variability of the thermal water level in Monsummano Hill. Financed by Cassa di Risparmio di Pistoia e Pescia (Prot. n. 2020.0279/bl), 59500 €. Funded after project proposal peer-review.

**2021** Funding from Unione Montana Feltrina (2500 €) for a speleothem based geochronological study within the project geo-paleontological analyses of Quaternary sediments in San Donato Cave (PI: Dr Paolo Reggiani). Direct funding.

**2020** Travel & Accommodation support for the conference “Climate Change, The Karst Record IX Conference, Innsbruck (Austria), July 2020” by the organising committee, 540 €.

**2019** Leonardo Da Vinci Award/Funding 2019. Annual national funding reserved to the 8 best italian project (among all scientific fields). Project: Isotopic study of stalagmites from Apulia: palaeoclimate and palaeoanthropological implications during the last glacial period in Southern Italy and Western Mediterranean. Founded by MIUR (Italian Ministry of Education, University and Research, DD MIUR No 787, 15/04/2019), 5000 €. Funded after project proposal peer-review.

- 2019** Europlanet 2019 Award/Funding. Project: Silica stromatolites from cave environments and implications for silica subsurface deposits on Mars. Travel/accommodation support and analyses costs for ~10 days visiting at the laboratories of the Mineral and Planetary Sciences Division, Natural History Museum, London (UK). Funding from the European Union's Horizon 2020, grant agreement No 654208, ~10000 € in total. Funded after project proposal peer-review.
- 2013-2016** Melbourne International Research Scholarship (MIRS) and Melbourne International Fee Remission Scholarship (MIFRS) for conducting the PhD at Melbourne University. >200000 AUD in total. Funded after project proposal and CV peer-review.
- 2011** Erasmus Placement, three months overseas internship (@British Geological Society, Nottingham, UK). UE funding. ~1500 € per month.
- 2007-2011** “Assegno di Merito” scholarship, based on academic achievement only (6000 € each year). Regional funding

## OUTREACH ACTIVITIES

- 2021** GEO Magazin (Germany) featured a main article on the scientific activity of A. Columbu, about palaeoclimate reconstructions based on Southern Italian speleothems and anthropological implications. Issue: August 2021. Lars Abromeit (GEO Magazin journalist) directed the article, involving a cave expedition together with A. Columbu and the photographer Bettina Theuerkauf (GEO Magazin).
- 2021** Lecture (invited) during the on-line seminar series Cave Science Pills, organised by Italian touristic caves association in collaborazione with Italian Speleological Society (SSI) and Alpine Italian Club (CAI). Title: how was climate in southern Italy at Neanderthal's demise? Clues from stalagmites
- 2021** Chapter in the book: Manual of Speleology. Title: Cave Deposits. Edited by the Italian Alpine Club (CAI). The book will be published in 2022. Single author (invited).
- 2020** Permanent exposition of didactic panels @ Re Tiberio Science & Cave Museum, Riolo Terme (Italy). Scientific consultant and author of text/images.
- 2019** Educational article in: Journal of Belluno Dolomites National Park (in Italian). Title: Palaeoenvironmental variations recorded by speleothems. Frammenti, Vol. 9, 29-48. First Author
- 2019** Educational article in: Memories of the Italian Institute of Speleology (In Italian). Title: Dating carbonate speleothems and speleogenetic implications in the area of Monte Mauro and Stella Basino. Memories Series II, vol. XXXIV. First Author
- 2019** Educational article in: Memories of the Italian Institute of Speleology (In Italian). Title: The ceiling of Ca Castellina cave: 3D laser scanner reconstruction. Memories Series II, vol. XXXIV. Coauthor.
- 2018** Talk during the event: Science & Wine (@Bologna University). Speleothems and landscape evolution: the case of Northern Apennines foothills. (April 2018)
- 2018** Educational article in: Memories of the Italian Institute of Speleology (In Italian). Title: Gypsum karst around Bologna: Age and evolution. Memories Series II, vol. XXXII. First Author.
- 2017** Talk during the “Earth Day” (@Natural Sciences Museum, Faenza Italy). Science in cave. Palaeoclimate & Palaeoenvironmental reconstructions through speleothems. (October 2017).
- 2017** Talk during the “freshmen Day” (@Bologna University, Italy). Science in cave. (September 2017).
- Since 2017** Member of the scientific-editorial board of the website [www.theanthropictimes.it](http://www.theanthropictimes.it); the website focuses on the critical aspects of Human activities in shaping the Earth.
- 2015** Educational article in: Speleology of Emilia-Romagna. Title: How old are caves in Emilia Romagna? Vol. 6 (V-XXXV). First Author.
- Since 2015** Instagram account “geosciences\_facts”. The account conveys geo-based information in the form of “Did you know that...”