## PERSONAL INFORMATION

Margherita Bufalini

https://orcid.org/0000-0003-3278-7058

Sex

Date of birth

Nationality Italian

## RESEARCH ACTIVITY

The scientific activity mainly deals with quaternary geomorphological dynamics and related geological risks (particularly in the Adriatic sector of central Italy) and landscape transformation triggered by human activity. Among the analyzed processes, particular care has been devoted to the study of deep and superficial mass movements, mainly addressed to evaluation of the land hazard assessment to the relationships between slope and fluvial dynamics and the activation and control factors of fast and linear erosion processes (badlands); of such processes, geological and geomorphological conceptual and numerical models have been defined.

In particular concerning erosion processes on slopes, the focus has been on the analysis of badland processes, with an evaluation through direct and indirect models of soil erosion and also through the use of satellite images and orthophotos (PhD thesis and scientific papers in progress). Another important line of research is the for the evaluation of flood hazard in major river in the adriatic sea (through the use of software such as Hec-HMS/RAS implemented in a GIS environment (performed using QGIS, ArcGIS, SAGA and Grass), and role of climate and climate change in controlling the evolution of the river processes.

During the last year she has gained expertise in the field of geomorphological surveys and of basic and applied geomorphological mapping, also participating in testing the applicability of the new legend of the Italian Official Geomorphological Mapping of ISPRA.

A recent line of research concerns geo-archaeological studies and also performing geophysical prospecting (electrical tomography) and UAV surveys. During the last 4 years, she collaborated with the Archaeological Superintendencies of Marche, Lazio and Sicily, contributing to traditional historical-archaeological studies and researches; field surveys, integrated by geophysical surveys and aerial photo interpretation using drones, have been carried out in several sites of central and southern Italy, as Amandola (Marche), Borgo Velino (Rieti Lazio), the archaeological parks of Selinunte and Vassallaggi (Sicily); these studies are still ongoing

## EDUCATION AND TRAINING

December 2022 - Present

**RTD-A (Fixed Term Researcher at University of Camerino)**

Geomorphology, Hydrogeology and Soil Erosion

December 2020-December 2022

**Post-Doctoral researcher**

Settore scientifico-disciplinare: GEOS-03/A "Geografia fisica e geomorfologia". Topics of research: geophysical surveys; definition of the local seismic response; GIS modelling (ArcGIS and QGIS)

January 2020 - December 2020

**Researched Scholarship at University of Camerino, Geology Division**

"Modelli numerici idrologico ed erosione del suolo"

Topics of research: Hydrological modelling, soil erosion, GIS modelling (ArcGIS and QGIS) and Python (programming language).

November 2016-July 2020

**PhD- University of Camerino, Geology Division**

"Methods and Models for Direct and Indirect Evaluation of Hydrological Processes and Soil Erosion. Case Studies on the Adriatic Side of the Central Apennines" in collaboration with the Consorzio di Bonifica delle Marche, Macerata (MC).

Topics of research: Groundwater modelling and environmental simulation modelling, landslides evolution, fluvial geomorphology, agriculture, soil erosion and GIS modelling.

April 2016 - December 2013

**Master Degree (cum laude) in Geoenvironmental Resources and Risks**

"Natural and Human factors influencing the hydrologic-hydraulic modeling of a stream catchment: the case study of Ete Morto River (central Marche, Italy)".
Topics: Hydrogeological Hazard, Groundwater Resources, GIS and Geomorphology

December 2013

**Bachelor Degree in Geological, Natural and Environmental Sciences**

"Approccio metodologico geo-ambientale e geo-botanico per il recupero di un'area interessata da attività estrattiva".

Topics: Environmental Geology and Geo-botany

## HONOURS and AWARDS

2023

GRANT for participation in the RCG 2023 - IAG Regional Conference on Geomorphology (Cappadocia, 12-14 september 2023).

2018

Best master degree thesis in the topic of "Hydrogeological Risk of Mountain Areas" from University of Camerino

## FORMATION

September 2023

Conseguimento Abilitazione Scientifica Nazionale – Professore di II Fascia GEOS03/A

2022

WINTER SCHOOL - Scuola Invernale di Rilevamento Geomorfologico (University of Camerino).

2019

1st Summer School of International Statistical analysis of spatial Data in Agro-Environmental research (Como).

2018

Achievement of 24 CFU in anthropo-psycho-pedagogicaldisciplines and in teaching methodologies and technologies (University of Camerino)

2018

TerreLogiche Training Course (Roma): "GIS Open Source Avanzato (QGIS)".

June 2017 — Enabled as Professional Geologist following a state examination at the University of Camerino

2017 — University of Camerino-AIGeo “V Stage per Giovani Geomorfologi (Camerino): I paesaggi legati ai terremoti: effetti geomorfologici di superficie

2017 — TerreLogiche Training Course (Milano): “Programmare i GIS con Python. Creare script e plugin in QGIS”.

## FURTHER INFORMATION

Author of more than 15 scientific publications in national and international journals and thematic volumes. She is also a reviewer for the following international journals:

- Applied Sciences
- Remote Sensing
- Geosciences
- Natural Hazards

Collaboration for the activity of “Ricostruzione dell’assetto idrogeologico dei principali fiumi della Regione Marche” as part of a project to study the regional water balance. (GeoMORE s.r.l.)

2024-Today — Member of Commissione Didattica of AIGeo (Italian Association of Physical Geography and Geomorphology).

Guest Editor — Special Issue “Geo-Information Science for Environmental Management under Climate Change” ISPRS International Journal of Geo-Information (ISSN 2220-9964), https://www.mdpi.com/journal/ijgi/special_issues/environmental_management_climate

Special Issue “Multimodal Remote Sensing and Artificial Intelligence Technologies for Disaster Prevention and Mitigation” Remote Sensing (ISSN 2072-4292).

## RESEARCH MANAGEMENT AND FUNDINGS

Scientific coordinator of a contract between Comune di Numana and the University of Camerino for the study of “Valutazioni idrologico-idrauliche ed eventuale revisione dello studio effettuato da terzi per la realizzazione della dell’impianto di smaltimento delle acque meteoriche dell’area residenziale ubicata in via Litoranea in località Marcelli del Comune di Numana (area ex Santa Cristiana) anche con indicazioni circa eventuali manutenzioni/controlli necessari per la gestione delle soluzioni scelte”.

Scientific coordinator of a contract between Comune di Amandola and the University of Camerino for the study of “Attività d’indagine geomorfologica e geoarcheologica, nell’area del sito dell’Abbazia dei SS Ruffino e Vitale (comune di Amandola)”.

Scientific coordinator of a contract between SAGMA s.r.l. and the University of Camerino for the study of “Valutazioni, analisi ed interpretazione dei dati di carattere idrogeologico nell’areale delle sorgenti Fonte Preistorica e San Gallo ubicate nel comune di Montefortino”

Scientific coordinator of a project “Lo sviluppo di specifiche aree tematiche prodromiche all’approfondimento del quadro conoscitivo posto a base della pianificazione, alle misure di rilievo, controllo e monitoraggio e alla vulnerabilità dei beni” between Autorità di Bacino Distrettuale dell’Appennino Centrale, the Università Politecnica delle Marche, the University of Urbino and the

University of Camerino

## TEACHING AND MENTORING ACTIVITIES

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|---|---|
| November 2016-Today | Assistant to the lessons, laboratories and field trip of the course in Groundwater Resources and Risks (Master Degree on “Geoenvironmental Resources and Risks), at the University of Camerino. |
| Since 2023 | Course on *Fondamenti di GIS*, (Bachelor Degree on “Tecnologie e Diagnostica per i Beni Culturali), at the University of Camerino |
| Since 2024 | Course on *Geologia II* (Geomorfologia - Bachelor Degree on “Ambiente e Gestione Sostenibile -delle Risorse Naturali”), at the University of Camerino. |
| Since 2025 | Course on *GIS per l'Ambiente e il Territorio* (Bachelor Degree on “Geological Science”) at the University of Camerino |
| | Expert Professor within Progetto PON (modulo 06) “*Catalogazione Georeferenziata San Severino*” (I.T.I.S. “E. Divini”, San Severino Marche – 21h). |

During the last years she has been the supervisor of 5 Bachelor and Master degree theses on topics related to Geomorphology, Applied Geomorphology and Hydrogeomorphology

## PERSONAL SKILLS

Mother tongue(s): Italian

Other language(s):

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken interaction | Spoken production | |
| English | B2 | B2 | B2 | B2 | B2 |

Computer skills:
- Proficient command of Microsoft Office™ 365.
- Proficient in ArcGIS Pro (v. 10.8).
- Proficient in Hec-RAS, Hec-HMS.
- Proficient in QGIS Software.
- Good knowledge and programming skills with Python.
- Good knowledge and use of CORELDRAW Software.
- Fair knowledge and use of AutoCAD Software.
- Good ability to browse the Internet as regards research and the selection of scientific information.

Licences: FLIGHT LICENCE A1-A2-A3 for UAVs (unmanned aerial vehicles)

Driving licence: B

## ORAL AND POSTER PRESENTATIONS AT INTERNATIONAL AND NATIONAL CONFERENCES

**Oral Presentation as a Speaker**

5th “Women in Geomorphology” Online Workshop as invited speaker (8th March 2025- Invited Speaker)

Libera Università per Adulti Senigallia per discutere i temi relativi all’ impatto delle alluvioni (uomo vs natura) (Senigallia, Marzo 2025).

Cambiamenti climatici e CSR Marche: prevenzione del rischio idrico e idrogeologico organizzato dalla Regione e dal CSR Marche (Ascoli Piceno, Ottobre 2024).

L’ingegneria della natura del XXI secolo: la Natura che salva se stessa. Infrastrutture e ambiente possono convivere. Piante erbacee a radicazione profonda per il blocco dell’erosione e la regimentazione delle acque superficiali e meteoriche: aspetti tecnici, ambientali, energetici e di inquinamento organizzato dall’Ordine dei Geologi delle Marche (Ancona, Novembre 2023).

“EGU General Assembly 2022”. Session: Natural Hazard 3.6- Space and time forecasting of landslides (Vienna, May 2022).

90° Congresso della Società Geologica Italiana “Geology without borders”. Session 25: Urban Geology and Geomorphology (Trieste, September 2021).

4° Convegno dei Geologi marini Italiani- La Geologia marina in Italia” (February 2021).

“The Role of Geomorphology in Modern Society” organized by the Hellenic Committee for Geomorphology & Environment of the Geological Society of Greece (December 2020).

Regional Conference of Geomorphology: Geomorphology of Climatically and Tectonically sensitive areas (Athens, September 2019).

**Poster Presentation**

Geoheritage and Geodiversity – IAG Regional Conference of Geomorphology (Cappadocia, Türkiye, 12-14 September 2023)

La Dinamica Fluviale - La conoscenza del Fiume per la pianificazione e la salvaguardia del territorio (Perugia, Maggio 2023).

5th Biohydrology Conference (Valencia, Spain, 20-27 July 2019).

VIII Italian Young Geomorphologists’ days (Milan and Veny Valley, Italy, 26th-28th June 2019).

Sediment Management in Channel Networks: from Measurements to Best Practices (Free University of Bozen-Bolzano, Italy, 8-9 November, 2018).

**Convener**

Session S25 “Landslide monitoring, modelling, and prediction: bridging new tools and data to the 'slope-failure model' perspective”. Congresso congiunto SGI - SIMP - Geology for a sustainable management of our Planet (Bari, 3-5 settembre 2024).

Sub-session “Geoheritage, Cultural Geomorphology and Geotourism” (insieme alla Dr.ssa Anna Chrobak- Žuffová). RCG 2023 - IAG Regional Conference on Geomorphology (Cappadocia, 12-14 september 2023).

## SCIENTIFIC PAPERS AND BOOKS

***SCIENTIFIC PAPERS***

1. Bendia, F., Farabollini, P., Materazzi, M., & Bufalini, M. (2026). The 15 September 2022 floods in northern Marche (Central Italy): disaster analysis, case studies and mitigation strategies for hydro-geomorphological hazard. *Natural Hazards and Earth System Sciences,26*(3), 1119-1140.

2. Aringoli, D.; Pambianchi, G.; Bendia, F.; Bufalini, M.; Farabollini, P.; Lampa, F.; Materazzi, M.; Gentilucci, M. (2025). Sustainability of the River Environment Related to Hydro-Chemical Stresses of Sewage Treatment Plants in Chienti and Potenza Rivers (Central Italy). Sustainability 2025, 17, 2711. https://doi.org/10.3390/su17062711

3. Ciccolini, U., Bufalini, M., Materazzi, M., & Dramis, F. (2024). Gully Erosion Development in Drainage Basins: A New Morphometric Approach. Land, 13(6), 792. https://doi.org/10.3390/land13060792

4. Martinello, C., Mercurio, C., Cappadonia, C., Bellomo, V., Conte, A., Mineo, G., ... & Rotigliano, E. (2023). Using Public Landslide Inventories for Landslide Susceptibility Assessment at the Basin Scale: Application to the Torto River Basin (Central-Northern Sicily Italy). Applied Sciences, 13(16), 9449.

5. Martinello, C., Bufalini, M., Cappadonia, C., Rotigliano, E., & Materazzi, M. (2023). Combining multi- typologies landslide susceptibility maps: a case study for the Visso area (central Italy). Journal of Maps, 1-10. https://doi.org/10.1080/17445647.2023.2198148

6. Bufalini, M.; Aringoli, D.; Bendia, F.; Farabollini, P.; Gentilucci, M.; Lampa, F.; Martinello, C.; Materazzi, M.; Pambianchi, G. (2023). The Role of Wastewater in Controlling Fluvial Erosion Processes on Clayey Bedrock. Land, 12, 227. https://doi.org/10.3390/land12010227

7. Farabollini P., Aringoli D., Bendia F., Bufalini M., Cingolani R., Fuffa E., Gentilucci M., Lampa F., Lugeri F., Mainiero M., Materazzi M. Pambianchi G., Prati S. & Geomore srl (2022) - The geo-itinerary of “Anello della Sibilla” between sciences, history and myth: a vehicle for the renaissance of the territories affected by the earthquake using GIS technologies. Rend. Online Soc. Geol. It., 58, 28-33, https://doi.org/10.3301/ROL.2022.18.

8. Bufalini, M., Materazzi, M., Martinello, C., Rotigliano, E., Pambianchi, G., Tromboni, M., & Paniccià, M. (2022). Soil Erosion and Deposition Rate Inside an Artificial Reservoir in Central Italy: Bathymetry versus RUSLE and Morphometry. *Land, 11,* 1924. https://doi.org/10.3390/land11111924

9. Materazzi, M., Bufalini, M., Dramis, F., Pambianchi, G., Gentili, B., & Di Leo, M. (2022). Active tectonics and paleoseismicity of a transverse lineament in the Fabriano valley, Umbria-Marche Apennine (central Italy). *International Journal of Earth Sciences*, 1-11.

10. Bufalini, M., Omran, A., & Bosino, A. (2022). Assessment of Badlands Erosion Dynamics in the Adriatic Side of Central Italy. *Geosciences,12(5)*, 208.

11. Bufalini, M., Aringoli, D., Didaskalou, P., Materazzi, M., Pallotta, F., Pambianchi, G., & Pierantoni, P. P. (2022). Geo-environmental changes and historical events in the area of the Greek archaeological site of Selinunte (Western Sicily, Italy): Mudanças geoambientais e eventos históricos na área do sítio arqueológico grego de Selinônte (Sicília Ocidental, Itália). *Caminhos da Histór*

27(1), 70-95.

12. Gentilucci, M., Bufalini, M., D'Aprile, F., Materazzi, M., & Pambianchi, G. (2021). Comparison of Data from Rain Gauges and the IMERG Product to Analyse Precipitation in Mountain Areas of Central Italy. *ISPRS International Journal of Geo-Information*, 10(12), 795.

13. Gentilucci, M., Bufalini, M., Materazzi, M., Barbieri, M., Aringoli, D., Farabollini, P., & Pambianchi, G. (2021). Calculation of Potential Evapotranspiration and Calibration of the Hargreaves Equation Using Geostatistical Methods over the Last 10 Years in Central Italy. *Geosciences*, *11*(8), 348. https://doi.org/10.3390/geosciences11080348

14. Aringoli, D., Farabollini, P., Pambianchi, G., Materazzi, M., Bufalini, M., Fuffa, E., ... & Scalella, G. (2021). Geomorphological Hazard in Active Tectonics Area:Study Cases from Sibillini Mountains Thrust System (Central Apennines). *Land*, *10*(5), 510. https://doi.org/10.3390/land10050510

15. Schillaci, C., Perego, A., Valkama, E., Märker, M., Saia, S., Veronesi, F., ... & Acutis, M. (2021). New pedotransfer approaches to predict soil bulk density using WoSIS soil data and environmental covariates in Mediterranean agro-ecosystems. *Science of The Total Environment*, *780*, 146609. https://doi.org/10.1016/j.scitotenv.2021.146609

16. Bufalini, M., Materazzi, M., De Amicis, M., & Pambianchi, G. (2021). From traditional to modern 'full coverage' geomorphological mapping: a study case in the Chienti river basin (Marche region, central Italy). *Journal of Maps*, 1-12. https://doi.org/10.1080/17445647.2021.1904020

17. Buccolini, M., Bufalini, M., Coco, L., Materazzi, M., & Piacentini, T. (2020). Small catchments evolution on clayey hilly landscapes in Central Apennines and northern Sicily (Italy) since the Late Pleistocene. *Geomorphology*, *363*, 107206.https://doi.org/10.1016/j.geomorph.2020.107206

18. Materazzi, M., Bufalini, M., Gentilucci, M., Pambianchi, G., Aringoli, D., & Farabollini, P. (2021). Landslide Hazard Assessment in a Monoclinal Setting (Central Italy): Numerical vs. Geomorphological Approach. *Land*, *10*(6), 624. https://doi.org/10.3390/land10060624

19. Farabollini P., Angelini S., Fazzini M., Lugeri F.R., Scalella G., Aringoli D., Bufalini M., Fuffa E., Giacopetti M., Materazzi M Pambianchi G. (2018). The seismic sequence of central Italy on August 24 and following: Contributions to knowledge and the database of surface effects [La sequenza sismica dell'Italia centrale del 24 agosto e successive: Contributi alla conoscenza e la ban dati degli effetti di superficie]. *Rendiconti Online Soc. Geol. It., 46*, 9-15. Doi: 10.3301/ROL.2018.45

20. Aringoli, D., Bufalini, M., Farabollini, P., Giacopetti, M., Materazzi, M., Pambianchi, G., & Scalella, G. (2018). Effetti geomorfologici e variazioni idrogeologiche indotti dai terremoti: esempi nell'area epicentrale della sequenza sismica 2016-2017 del centro Italia. *Geologia dell'Ambiente*,1, 239-248.

21. Margherita Bufalini, Farabollini Piero, Fuffa Emy, Materazzi Marco, Pambianchi Gilberto, Tromboni Michele. The significance of recent and short pluviometric time series for the assessment of flood hazard in the context of climate change: examples from some sample basins of the Adriatic Central Italy[J]. *AIMS Geosciences*, 2019, 5(3): 568-590. http://www.aimspress.com/article/10.3934/geosci.2019.3.568

***BOOKS***

1. Bosino, A., Bufalini, M., & Ferrando, A. (2023). Geomorfologia di terreno delle forme fluviali, fluvio- glaciali e dovute al dilavamento- Atlante pratico per il rilevamento e la cartografia. Dario Flaccovio editore.

**Signature**
*Margherita Bufalini*