Anna Chiara Goglio

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WORK EXPERIENCE

19/05/2019 – CURRENT Bologna, Italy
JUNIOR RESEARCH ASSOCIATE EURO-MEDITERRANEAN CENTER ON CLIMATE CHANGE (CMCC)
FOUNDATION

Permanent position from August 2020
Main activities:

- Research and development of a 3D Mediterranean Sea NRT physical modeling system based on the NEMO model (Nucleus for European Modelling of the Ocean) in the framework of the CMEMS Med-MFC consortium (Copernicus Marine Environment Monitoring Service, Mediterranean - Monitoring and Forecasting Center). In particular my main contributions to the upgrade of the system concern the inclusion of tides and improvements to the river inputs.
- Implementation of pre- and post- processing procedures for the Mediterranean Sea analysis and forecast system, e.g. an operational procedure to generate river inputs from climatological values and runoff measurements, a detiding procedure to remove the tidal signal from the sea level field, the inclusion of an on-line computation for transports at Gibraltar and Messina Straits
- Validation of the Mediterranean Sea physical model developments and quality assessment of the system products by inter-comparing the outputs with respect to reference system runs, to literature results, in situ and satellite measurements and to available numerical results. In particular, I developed a package for the assessment of the surface tidal signal based on sea surface hight harmonic analysis and a tool to display the skill of operational forecasts.
- Product Quality Responsible for CMEMS Med-MFC (since July 2021)
- Involved in the H2020 Project IMMERSE for a contribution concerning the quality assessment of modeled currents (since April 2022)

Acquired knowledge:
- Basics of Oceanographic Physics
- Basics of theory of tides
- Harmonic analysis applied to tidal signals
- Signals filtering (e.g. Doodson, Killworth filters)

Methods, Tools :
- High Performance Computing
- Python, Fortran and BASH scripting
- NEMO numerical model (Nucleus for European Modelling of the Ocean)

28/02/2017 – 18/05/2019 Palmanova, Italy
ENVIRONMENTAL MODELLING EXPERT (AIR QUALITY) ARPA FVG (REGIONAL AGENCY FOR
ENVIRONMENTAL PROTECTION OF FRIULI VENEZIA GIULIA) - CRMA

Main activities:

- Implementation and calibration of a Kalman filter in an operative regional Air Quality Forecast System based on FARM model (Flexible Air quality Regional Model) in order to improve forecast skills ingesting measured particulate matter and ozone concentrations. This activity was carried out in the frame of the LIFE PrepAIR project (Po Regions Engaged to Policies of Air).

- Development of a workflow chain for numerical long-term Air Quality analysis with the aim to study the trends of air pollutants concentrations in the last years in the Friuli Venezia Giulia region.
- Evaluation of the suitability of Air Quality meta-models and tools (e.g. SHERPA, Delta Emission tool) to the Friuli Venezia Giulia region, activity within the ASI-ISPRA Project aimed to develop a national air quality modeling flow integrating models, remote sensing data and measurements.

Methods and Tools:
- High Performance Computing
- Workflow Manager (ecFlow)
- BASH Scripting
- Python, FORTRAN, and R programming languages
- FARM model (Flexible Air quality Regional Model)
- SHERPA meta-model (Screening for High Emission Reduction Potentials on Air quality)
- Delta Emission tool (comparison between pollutants emission inventories)

10/01/2016 – 30/01/2017 Palmanova, Italy
ENVIRONMENTAL MODELLING EXPERT (METEOROLOGY) ARPA FVG (REGIONAL AGENCY FOR ENVIRONMENTAL PROTECTION OF FRIULI VENEZIA GIULIA) - CRMA

Main activities:
- Research, development and implementation of an operative NRT meteorological high resolution modeling system for North East Italy area based on WRF (Weather Research and Forecasting) model. I started this activity from scratch, comparing available WRF parameterizations (e.g. land-surface schemes, boundary layer parameterizations), fixing a proper model domain and proper boundary conditions. Then I implemented a workflow to handle the pre-processing of the inputs, the numerical simulations, the post-processing and the archive of the outputs.
- Quality assessment of the NRT meteorological modeling system. In particular I developed an operative workflow suite aimed to perform statistical evaluation of the numerical results by comparison with respect to available observed data. Moreover I carried out a comparison between the outputs of a long model run with respect to the regional climatology of Friuli Venezia Giulia area in terms of meteorological fields and made the results available on a webpage.
- Assistant supervisor of student's master thesis (title: Quality evaluation of different Atmospheric Boundary Layer parameterizations implemented in the meteorological WRF model. An annual focus study over Friuli Venezia Giulia - Author: Pierluigi Masai - Supervisor: Dario B. Giaiotti - 2017)

Acquired knowledge:
- Basics of Atmospheric Physics
- Basics of statistical methods in Atmospheric Physics

Methods and Tools:
- High Performance Computing
- Workflow Manager (ecFlow)
- BASH Scripting
- FORTRAN, C and R programming languages
- Weather Research and Forecasting (WRF) Model
- Unified WRF Post Processor (NCEP UPP)
- Post-processing softwares: GRADS, R, gnuplot
- Tools for GRIB and netCDF formats handling: Climat Data Operators (CDO), wgrib, GRIB API

EDUCATION AND TRAINING

01/11/2022 – CURRENT Bologna, Italy
INDUSTRIAL PHD - FUTURE EARTH, CLIMATE CHANGE AND SOCIETAL CHALLENGES PHD PROGRAM University of Bologna and CMCC

- First Chapter: Forecasting Venice Acqua Alta Events
- Second Chapter: Barotropic Modes in the Mediterranean Sea

Website https://phd.unibo.it/future-earth-climate-change-societal-challenges/en | **Field of study** Oceanography |

Thesis Analyzing the mediterranean sea circulation and tidal dynamics through numerical experiments

2009 – 2014 Pisa, Italy
MASTER DEGREE IN PHYSICS University of Pisa

- **Principal subjects**: Quantum Field Theory, Standard Model Phenomenology, Cosmology, Physics of elementary particles
- **Thesis**: "The dynamics of pyroclastic density currents down volcanic slopes" at INGV (National Institute of Geophysics and Volcanology), Pisa, Italy. In my thesis activity I contributed to the improvement of a Computational Fluid Dynamics numerical model and applied it to analyze the dynamics of the propagation of a multiphase flow on a slope - https://core.ac.uk/download/pdf/79618198.pdf
- **Final Mark**: 109/110

Field of study Theoretical Physics

2004 – 2009 Pisa, Italy
BACHELOR'S DEGREE IN PHYSICS University of Pisa

- **Principal subjects**: General Physics and laboratories, Mathematical Analysis, Linear Algebra, Fundamentals of Computer Programming, Physics of elementary particles, Quantum Theory of Matter, Nuclear Physics, Mathematical Methods for Physics, Quantum Mechanics
- **Thesis**: "Analysis of calorimeter response to single hadrons signals at ATLAS experiment (CERN)" (Data and MonteCarlo simulations analysis) at INFN (National Institute of Nuclear Physics) Pisa, Italy. In my thesis I presented the results of the comparison between numerical simulations and observed data concerning the response of the calorimeter to the signal obtained from test beams.
- **Final Mark**: 109/110

1999 – 2004 Lucca, Italy
HIGH SCHOOL Scientific Lyceum A. Vallisneri

- Specializing in scientific subjects

- Thesis: "Sailing Aerodynamics and historical development of sailing vessels"
- Final Mark: 95/100

LANGUAGE SKILLS

Mother tongue(s):   **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

PROJECTS

Projects
- **CMEMS Med-MFC**: Copernicus Marine Environment Monitoring Service, Mediterranean - Monitoring and Forecasting Center: https://marine.copernicus.eu/about/producers/med-mfc
- **IMMERSE H2020:** Improving Models for Mrine EnviRonment SErvices https://immerse-ocean.eu/

- **NAUSICA**: Downscaling of High resolution Meteorological Analysis on Friuli Venezia Giulia Region https://www.arpa.fvg.it/temi/temi/modellistica-ambientale-crma/pubblicazioni/progetto-nausica/

- **PREPAIR LIFE 15 IPE IT 013:** Po Regions Engaged to Policies of Air European Project https://www.lifeprepair.eu
- **ASI-ISPRA** Project: Development of a national air quality modeling flow integrating models, remote sensing data and measurements https://www.isprambiente.gov.it/it/progetti/cartella-progetti-in-corso/emergenza-e-sorveglianza-ambientale/asi-ispra-piattaforma-tematica-del-sentinel-collaborative-gs-per-habitat-mapping-2017-2021

JOB-RELATED SKILLS

General skills

- Problem solving attitude
- Good physical and mathematical background
- Knowledge of several programming languages
- Experience in High Performance Computing (HPC)

Digital skills

- Competence in the following scientific **softwares and languages**: BASH scripting (advanced), Python (good), FORTRAN (good), C (basic), JavaScript (basic), C++ (basic), R (basic), MATLAB (basic), PARAVIEW (basic), gnuplot (good), OFFICE (good), OpenFOAM (basic), ROOT (basic), GRADS (basic), GRIB API (advanced), CDO (advanced), wgrib (advanced), QGIS (basic), LATEX (advanced) and BEAMER (good)
- Experience with the following numerical models: WRF(Weather Research and Forecasting model), NEMO (Nucleus for European Modeling of the Ocean), PDAC (Pyroclastic Dispersal Analysis Code), FARM (Flexible Air quality Regional Model)
- Workflow manager (ecFlow) user
- GIT version-control system user

CONFERENCES, WORKSHOPS AND COURSES

Conferences and Workshops (as a presenter)

- Ocean Science Meeting AGU2024 - New Orleans (USA) - February 2024
- Workshop on Scientific Collaboration Activities between CMCC and UNIBO - Bologna (Italy) - December 2023
- The Mediterranean Oceanographic Network for the Global Ocean Observing System (MonGOOS) - Tangeri (Morocco) - November 2023
- International Workshop on Modeling the Ocean - Hereon Helmholtz Zentrum- Hamburg (Germany) - June 2023
- Copernicus Marine Product Quality Working Group Meeting and TAC/MFC interfaces Working Group Meeting - Bruxelles (Belgium) - June 2023
- CMCC Foundation Annual Meetings - Lecce (Italy) - May 2023
- Copernicus Marine Product Quality Working Group Meeting - Toulouse (France) - June 2022

Attended Conferences, Workshops and Courses

- Copernicus Marine Product Quality Working Group Meeting - Toulouse (France) - June 2022
- CMCC Foundation Annual Meetings - Lecce (Italy) - November 2021
- International Remote Sensing for Hydrological Applications - EUMETSAT H-SAF - Roma (Italy) - November 2018
- Remote sensing, environmental data processing - ARPA FVG, Udine (Italy) - June 2018
- 14Th Advanced School on Parallel Computing - CINECA, Bologna (Italy) - February 2018

- Bayesian inference - ARPA FVG, Palmanova (Italy) - December 2017
- QGIS - ARPA FVG, Udine (Italy) - November 2017
- 16th EMS Annual Meeting & 11th European Conference on Applied Climatology (ECAC) - Trieste (Italy) - September 2016

CERTIFICATIONS

Certifications

- First Certificate in English, Cambridge University (B2 Level)
- Preliminary English Test, Cambridge University (B1 Level)

NOT PEER-REVIEWED PUBLICATIONS

Posters

- A baroclinic tidal forecasting model for the Mediterranean Sea - First validation results - **A.C.Goglio** et al. - EGU 2020 - https://meetingorganizer.copernicus.org/EGU2020/EGU2020-9400.html
- The propagation of pyroclastic density currents down slopes; **A.C. Goglio**, T. Ongaro - IUGG Praga - 2015 - https://www.czech-in.org/cm/IUGG/CM.NET.WebUI/CM.NET.WEBUI.scpr/SCPRfunctiondetail.aspx?confID=05000000-0000-0000-0000-000000000053&sesID=05000000-0000-0000-0000-000000003212&absID=07000
- Catene modellistiche operative regionali, nell'attesa di previsioni globali alla microscala meteorologica - Giovanni Bonafè, Irene Gallai, Dario B. Giaiotti, Elena Gianesini, **Anna Chiara Goglio**, Francesco Montanari, Alessandra Petrini - Prima Conferenza Nazionale sulle Previsioni Meteorologiche e Climatiche - Bologna 2019 - https://www.conferenzameteoclima.it/wp-content/uploads/2019/07/giaiotti1.pdf
- Previsione fisico-chimica dell'atmosfera. Modellistica per la mitigazione a breve termine; G.Bonafé, I.Gallai, D.Giaiotti, E.Gianesini, **A.C.Goglio**, F.Montanari, A.Petrini, F.Stel - Prima Conferenza Nazionale sulle Previsioni Meteorologiche e Climatiche - Bologna 2019 - https://www.conferenzameteoclima.it/wp-content/uploads/2019/07/bonafe-1.pdf

Oral presentation at Conferences, Workshops, Webinars

- **Goglio, A. C.** et al**.,** *Forecasting Venice Acqua Alta Events* - Ocean Science Meeting AGU2024 - New Orleans (USA) - February 2024
- **Goglio, A. C.** et al**.,** *Forecasting Venice Acqua Alta Events* - Workshop on Scientific Collaboration Activities between CMCC and UNIBO - Bologna (Italy) - December 2023
- **Goglio, A. C.** et al**.,** CMCC Webinar: *Impact of tides in modeling and forecasting the Mediterranean Sea dynamics* - October 2023 - https://www.cmcc.it/it/lectures_conferences/impact-of-tides-in-modeling-and-forecasting-the-mediterranean-sea-dynamics
- **Goglio, A. C.** et al**.,** *Venice Acqua Alta Events* - International Workshop on Modeling the Ocean - Hereon Helmholtz Zentrum- Hamburg (Germany) - June 2023 - https://ms.hereon.de/imperia/md/assets/main/institutes/coastal_systems/hydrodynamics_data_assimilation/images/13thiwmo_abstractbooklet_v2306.pdf
- Giurato M, **Goglio A.C.**, Clementi E., *Surface Current Validation* - Copernicus Marine Product Quality Working Group Meeting and TAC/MFC interfaces Working Group Meeting - Bruxelles (Belgium) - June 2023
- **Goglio, A. C.** et al**.,** *Venice Acqua Alta Events* - CMCC Foundation Annual Meetings - Lecce (Italy) - May 2023
- Clementi, E., **Goglio, A. C**., Aydogdu, A., Pistoia, J., Escudier, R., Drudi, M., Grandi, A., Mariani, A., Lyubartsev, V., Lecci, R., Cretí, S., Masina, S., Coppini, G., and Pinardi, N.: The new Mediterranean Sea analysis and forecasting system including tides: description and validation, EGU General Assembly 2021 online - https://doi.org/10.5194/egusphere-egu21-13531
- Regional Scale Air Quality Numerical Simulations: performances and improvement road map (an attempt) - **A.C. Goglio**, G. Bonafé, F. Montanari, and F. Stel (EMS 2019) - https://meetingorganizer.copernicus.org/EMS2019/EMS2019-918.pdf
- Reliability in modeling extreme precipitation rain rates supports in progress strategies for the improvement of operational severe weather forecasts and simulations of climate change scenarios - D. Giaiotti, G. Bonafè, F. Cocetta, I. Gallai, E. Gianesini, **A.C. Goglio**, F. Montanari, and F. Stel - EMS 2017 Dublin (EMS Annual Meeting Abstracts Vol. 14, EMS2017-161, 2017) - https://meetingorganizer.copernicus.org/EMS2017/EMS2017-161.pdf
- Air quality numerical models. Don't leave them alone. G.Bonafé, I.Gallai, **A.C.Goglio**, D.Giaiotti, E. Gianesini, F. Montanari, A. Petrini - GRASPA 2019, Pescara

Reports and Datasets

- Mediterranean Sea Production Centre MEDSEA_ANALYSISFORECAST_PHY_006_013; QUID (Quality Information Document); E. Clementi, A. Grandi, **A.C. Goglio**, A. Aydogdu, V. Lyubartsev, J. Pistoia, R. Escudier - 2021- https://catalogue.marine.copernicus.eu/documents/QUID/CMEMS-MED-QUID-006-013.pdf
- NAUSICA Project - Downscaling of High resolution Meteorological Analysis on Alpe Adria Region - **A.C. Goglio** - 2018 http://www.arpa.fvg.it/export/sites/default/tema/aria/utilita/Documenti_e_presentazioni/tecnico_scientifiche_docs/2018gen01_arpafvg_crma_goglio_nausica_rap2018_001.pdf
- NAUSICA Interim Project - Operative computational chain for meteorological analisys downscaling and climatological analisys of NAUSICA database - **A.C. Goglio** - 2019 - http://www.arpa.fvg.it/export/sites/default/tema/aria/utilita/Documenti_e_presentazioni/tecnico_scientifiche_docs/2019gen05_arpafvg_crma_goglio_nausica_interim_rap2019_01.pdf

HOBBIES AND INTERESTS

Personal interests and volunteering experiences
- My personal interests include traditional popolar dances, traveling (especially by walk), trekking, juggling, sailing and cinema.
- Volunteering experiences in the contex of a welcoming centre for refugees