



# Massimo D'Isidoro

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## ● WORK EXPERIENCE

05/2010 – CURRENT Bologna, Italy

### SENIOR RESEARCHER (SINCE NOV 2023) ENEA - AIR POLLUTION LABORATORY

Some activities I am/was involved within INAT (Air Pollution Laboratory):

- Principal Investigator for ENEA in the Copernicus Project CAMS2\_72IT.
- Principal Investigator for ENEA in the Copernicus Project CAMS2\_40.
- Involved in EU Project CAMEO.
- Since 2020: I am in charge of the development and maintenance of the national modelling system for air quality forecasts over Italy FORAIR-IT.
- Atmospheric modelling: (meteorology and air quality) using limited area models for both research and practical applications.
- Meteorological modelling for applications in the field of renewable energy (wind and photovoltaic).
- Involvement in the development of the modelling system MINNI (National Integrated Model to support the international negotiation on atmospheric pollution).
- Use of meteorological models WRF and RAMS for air quality applications.
- Use of Chemistry Transport Model FARM for air quality and radionuclide diffusion studies.
- Involvement in the development of numerical algorithms for MINNI validation purposes.
- Involvement in the development of data assimilation algorithms for the MINNI modelling system.
- Involvement in the demonstrative project DIFURAD aiming at providing a service for risk management in case of accidental radionuclide release in atmosphere.

During this period I represented ENEA at IAEA (International Atomic Energy Agency) for the meeting MODARIA (Modelling and Data for Radiological Impact Assessment).

I was a member of the Big Data Technopole task-force in ENEA (April 2020 - September 2021) aiming having the scope of collect relevant information on activities involving Big Data management and High performance Computing in the Agency..

I was the Principal Investigator of the project "Renewable Energy Potential Maps for Lesotho" funded (1.2MEUR) by the Italian Ministry for the Environment, Land and Sea for the period 2018-2020.

Since 2010 I was involved in more than 20 projects funded by EU or Italian public bodies or companies and I was author and co-author of more than 30 peer reviewed publications on international journals.

03/06/2008 – 25/05/2010 Bologna, Italy

### FIXED TERM RESEARCHER CNR - ISAC

During this period, my research activity was funded by the EU FP7 projects CITYZEN and MACC.

I was involved in the development and testing of the limited area air quality model BOLCHEM, in particular adding the aerosol module AERO3.

In addition to the code development, I implemented an operational modelling chain to provide daily air quality forecasts over Italy with BOLCHEM, in cooperation with the University of Genova.

In this period, I also carried out research activity in the theoretical aspects of data assimilation in dynamical systems with Dr. Anna Trevisan, participating at the design and development of an innovative assimilation algorithm name 4dVar-AUS (Assimilation on the Unstable Subspace). I also conducted a study aimed to evaluate the effect of horizontal grid resolution in the relative importance of numerical and physical horizontal diffusion in air quality models.

I had the following assignments:

- Delegate for ISAC-CNR at the FINAL GEMS ASSEMBLY, 31 March - 3 April 2009, Julich (D);
- Delegate for ISAC-CNR at the MACC ANNUAL ASSEMBLY, 11-15 January 2010, Reading (UK).

05/2007 – 05/2008 Bologna, Italy

**RESEARCH ASSISTANT** CNR - ISAC

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Research activity with Dr. Alberto Maurizi at ISAC-CNR, funded by EU FP6 project GEMS.

In this period I developed an operational numerical air quality forecast at ECMWF (European Centre for Medium-range Weather Forecasts) HPC facility, using the BOLCHEM model which participated in the models' ensemble within the GEMS project. Furthermore, I developed a data assimilation algorithm on BOLCHEM, based on Optimal Interpolation, devoted to assimilate in situ and vertical profiles measurements of O<sub>3</sub> and NO<sub>x</sub>.

05/2004 – 05/2007 Bologna, Italy

**RESEARCH ASSISTANT** CNR - ISAC

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My research activity was developed at ISAC-CNR in Bologna, under the supervision of Dr. Alberto Maurizi, funded by the EU FP6 project GEMS.

I actively contributed to the design and development of the limited area air quality model BOLCHEM, based on two different gas schemes (SAPRC90 e CB-IV), on-line coupled with the meteorological model BOLAM

- In particular, I was responsible for:
- implementing the interface between meteorology and chemistry;
- implementing wet and dry gas deposition parameterizations;
- implementing advection-diffusion scheme for chemical species;
- implementing all the pre and post processing software.

During this period I also had the following assignments:

- Delegate for ISAC-CNR at the GEMS-RAQ (Regional Air Quality workshop ), 8-9 December 2005, Paris.
- Delegate for ISAC-CNR at the 1<sup>st</sup> GEMS ANNUAL ASSEMBLY, 6-12 February 2006, Reading (UK).
- Delegate for ISAC-CNR at the 2<sup>nd</sup> GEMS ANNUAL ASSEMBLY, 5-9 February 2007, Toulouse (F).

05/2002 – 05/2004 Bologna, Italy

**RESEARCH ASSISTANT** CNR - ISAC

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Research activity under the supervision of Dr. Andrea Buzzi at ISAC-CNR in Bologna within the project "ROSA" (Radio Occultation Sounder of the Atmosphere) funded by the Italian Space agency.

I performed a feasibility study on the feasibility of the assimilation of GPS radio occultation temperature and humidity profiles in a meteorological mode, in particular aiming to improve the Quantitative Precipitation Forecast predicted by the model. The study was conducted using BOLAM and was based on a nudging assimilation scheme.

During this period, I also used the non-hydrostatic meteorological model MOLOCH, developed at ISAC-CNR, to study case of heavy precipitation due to Alpine cyclogenesis.

05/2001 – 05/2002 Bologna, Italy

**RESEARCH ASSISTANT** CNR - ISAC

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Research activity under the supervision of Dr. Andrea Buzzi at ISAC-CNR in Bologna, funded by the CLIMAGRI (Cambiamenti Climatici e Agricoltura) project of the Italian Ministry for Agriculture. I participated in the development of a data assimilation algorithm in the model BOLAM based on an Optimal Interpolation scheme.

05/2000 – 05/2001 Bologna, Italy

**RESEARCH FELLOW** CNR - ISAO

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Research activity conducted under the supervision of Dr. Piero Malguzzi at ISAO-CNR in Bologna. The activity was funded within the STOWASUS2100 (Regional STorm, Wave and Surge Scenarios for the 2100 century) project by the EU Environment and Climate program. I studied Mediterranean cyclones having tropical cyclone-like structure. The main project focus was to study the frequency and intensity change of such phenomena in a doubled CO<sub>2</sub> atmospheric concentration scenario, by means of numeric simulations performed with the BOLAM model.

07/1998 – 11/1998 Bologna, Italy

**CONSULTANT** CNR - FISBAT

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My work was based on the study of physical processes involved in the formation and development of a tropical cyclone. In particular, the research work focused on the use of the meteorological model BOLAM to evaluate the role of humidity and heat fluxes at the atmosphere-ocean interface in the development of a tropical cyclone.

## ● EDUCATION AND TRAINING

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16/06/2008 – 20/06/2008 Bologna, Italy

**ADVANCED SCHOOL ON DATA ASSIMILATION** CMCC (Euro-Mediterranean Center on Climate Change)

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29/08/2004 – 03/09/2004 L'Aquila, Italy

**ISSAOS 2004 SUMMER SCHOOL: "ATMOSPHERIC DATA ASSIMILATION"** University of L'Aquila

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08/09/2003 – 12/09/2003 Reading, United Kingdom

**ANNUAL SEMINAR: "RECENT DEVELOPMENTS IN DATA ASSIMILATION FOR ATMOSPHERE AND OCEAN"** ECMWF

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05/2003 – 05/2006 Ferrara, Italy

**PHD IN PHYSICS** University of Ferrara

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**Thesis** Valutazione dell'Impatto di Dati Osservativi sulle Previsioni Numeriche a Mesoscala

26/08/2002 – 30/08/2002 Sardinia, Italy

**SUMMER SCHOOL ON MOUNTAIN METEOROLOGY: "MODIFICATION OF AIRFLOW BY MOUNTAINS"** University of Trento

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26/06/2002 – 05/07/2002 St. Oyen, Italy

**GRAND COMBIN SUMMER SCHOOL: "PHYSICS AND PREDICTABILITY OF RAINFALL AND FLOODS."** CNR-ISAC

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04/2001 – 05/2001 Reading, United Kingdom

**METEOROLOGICAL TRAINING COURSES: MET PA: "NUMERICAL WEATHER PREDICTION. PARAMETERIZATION OF DIABATIC PROCESSES"** European Center for Medium Range Weather Forecasts (ECMWF)

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04/2001 – 05/2001 Reading, United Kingdom

**METEOROLOGICAL TRAINING COURSES: MET DA: "NUMERICAL WEATHER PREDICTION. DATA ASSIMILATION AND USE OF SATELLITE DATA"** European Center for Medium Range Weather Forecasts (ECMWF)

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12/1998

**MASTER DEGREE IN PHYSICS** University of Bologna

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**Thesis** Studio di predicibilità e dei processi fisici di un supertifone del Pacifico

## ● LANGUAGE SKILLS

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Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	B1	C1	B1	B1	B2
<b>SPANISH</b>	C1	C2	B1	B1	B1

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

## ● **DIGITAL SKILLS**

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### **Operating Systems**

Unix Linux

### **Programming Languages**

Python (Base) | R | C (Base) | Perl (Base) | Bash (avanzato) | Fortran 90 (avanzato)

### **Parallel Computing**

MPI (OpenMPI)

### **Stats/data handling/graphics**

dati GRIB, NetCDF, HDF5, BUFR e librerie GRIB\_API, BUFRDC/ECCODES | GNU Octave

## ● **PUBLICATIONS**

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### **Peer reviewed Journals**

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I am author or co-author more than 40 publications and my H-Index is 23 (Source: google scholar).