Bernat Puigdomènech Treserras

Contact Information

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Interests

Research in atmospheric sciences (ground-based and space-borne weather instruments, cloud and precipitation microphysics, numerical weather prediction), data analysis, visualization, design and development of scientific software

Education

Polytechnic University of Catalonia, Barcelona, Spain   2009

> Superior Computer Engineering - B.S. in Computer Engineering (180 ECTS) followed by a 2 year Software Engineering specialization (120 ECTS)

Work Experience

J.S. Marshall Radar Observatory, McGill University, Montréal, CANADA
> Research Assistant / Professional Associate   Nov 2009 - Current

Applied Hydrometeorology Research Center (CRAHI), Barcelona, SPAIN
> Scientific Software Developer   Oct 2006 - Oct 2009

Publications

Cloud and Precipitation Microphysical Retrievals from the EarthCARE's Cloud Profiling Radar: the C-CLD product
> Mroz K., Puigdomènech B. et al., 2023

Processing reflectivity and Doppler velocity from EarthCARE's Cloud Profiling Radar: the C-FMR, C-CD and C-APC products
> Kollias K., Puigdomènech B. et al., 2022

The classification of atmospheric hydrometeors and aerosols from the EarthCARE radar and lidar: the A-TC, C-TC and AC-TC products
> Irbah A., Delanoë J., Zadelhoff G., Donovan D., Kollias P., Puigdomènech B. et al., 2022

Science Applications of Phased Array Radars
> Kollias K., Puigdomènech B. et al., 2022

Going mobile to address emerging climate equity needs in the heterogeneous urban environment
> Lamer K, Puigdomènech B. et al., 2022

Mind the Gap -Part 3: Doppler Velocity Measurements From Space
Kollias K., Battaglia A., Lamer K., Puigdomènech B. et al., 2022

Calibration of the 2007-2017 record of ARM Cloud Radar Observations using CloudSat
Kollias P., Puigdomènech B. and Protat A., 2019

Characterization of Shallow Oceanic Precipitation using Profiling and Scanning Radar Observations at the Eastern North Atlantic ARM Observatory
Lamer K., Puigdomènech B., et al., 2019

On the climatological use of radar data composites: Possibilities and challenges
Fabry F., Meunier V., Puigdomènech B., Cournoyer A. and Nelson B., 2017

Conferences

Doppler velocity measurements from space
Kollias P., Puigdomènech B. et al.
11th European Conference on radar in Meteorology and Hydrology, Switzerland, Aug 2022

Radar-based tracking of convective cell lifecycles using the Multisensor Agile Adaptive Sampling framework
Kollias P., Puigdomènech B. et al.
11th European Conference on radar in Meteorology and Hydrology, Switzerland, Aug 2022

A L1 transformational operator for the objective evaluation of the EarthCARE Cloud Profiling Radar data products using suborbital observations
Pfitzenmaier L., Puigdomènech B. et al.
European Meteorological Society Annual Meeting, Germany, Sep 2022

Examining Impacts of Aerosols on Convective Cell Properties Using Cloud Resolving Model Simulations, Radar Simulator, and Cell Tracking
Oue M., Puigdomènech B. et al.
Aerosols, Clouds, Precipitation and Climate Workshop, May 2022

A synergistic product to optimize EarthCare's joint radar and lidar observations when probing the atmosphere
Irbah A., Puigdomènech B. et al.
Living Planet Symposium, May 2022

The dynamics and microphysics of the high-latitude clouds during the COMBLE field experiment
Mages Z., Puigdomènech B. et al.
American Geophysical Union Fall Meeting, New Orleans, USA, Dec 2021

Convective Vertical Air Motion Retrievals by the Spaceborne Doppler Radars of NASA Aerosols, Clouds, Convection, and Precipitation (ACCP) Observing System.
Kollias P., Puigdomènech B. et al.
American Geophysical Union Fall Meeting, New Orleans, USA, Dec 2021

Multisensor Agile Adaptive Sampling of the Atmosphere Driven by Real-time Analytics
    Kollias P, Puigdomènech B. et al.
    American Geophysical Union Fall Meeting, Dec 2020

An Analysis of Dynamical and Microphysical Characteristics Using Wind Profiler and C-band Scanning Radars for Deep Convective Clouds Observed During CACTI Field Campaign
    Oue M., Puigdomènech B. et al.
    Atmospheric System Research STM, Maryland, USA, Jun 2019

Shallow Precipitation variability during the Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA)
    Puigdomènech B. And Kollias P.
    2018 DOE ARM/ASR Radar Workshop, New York, USA, Mar 2018

Evaluation of GPM and CloudSat satellite data for cloud and precipitation studies
    Puigdomènech B. and Kollias, P.
    2017 DOE ARM/ASR Radar Workshop, New York, USA, Oct 2017

Predictability and nowcasting of precipitation using a weather radar attractor
    Foresti, L., Sidérais I.V., Nerini D., Germann U., Puigdomènech, B., Atencia A. and Zawadzki I.
    Weather Radar and Hydrology, Seoul, Korea, Apr 2017

Evaluation of the NASA GPM-DPR for precipitation studies
    Puigdomènech B. and Fabry F.
    Environment and Climate Change Canada (invited seminar, part I), Sep 2016

Ground-based radar simulator
    Puigdomènech B. and Fabry F.
    Environment and Climate Change Canada (invited seminar, part II), Sep 2016

Radar data visualization
    Puigdomènech, B.
    2016 DOE ARM/ASR Radar Workshop, Miami, USA, May 2016

Why do we seek help from "big data" in nowcasting of precipitation?
    Zawadzki I., Atencia A., Surcel M. and Puigdomènech, B.
    Big Data and the Environment Workshop, Buenos Aires, Argentina, Nov 2015

Toward an Attractor of Radar Precipitation Data
    Atencia A., Puigdomènech, B. and Zawadzki I.
    37th Conference on Radar Meteorology, Norman, USA, Sep 2015

A climatology of mesoscale motions of precipitation patterns
    Zawadzki I. and Puigdomènech B.
    8th European Conference on radar in Meteorology and Hydrology, Germany, Sep 2014

Ensemble retrievals of rain parameters from radar measurements
    Zawadzki I. and Puigdomènech B.
    CMOS/AMS Congress, Montréal, Canada, Jun 2012

Ensemble retrievals
    Zawadzki I. and Puigdomènech B.
    7th European Conference on radar in Meteorology and Hydrology, France. Jun 2012

Skill of Nowcasting of precipitation by NWP and by lagrangian persistence
    Zawadzki I., Germann U., Lee, G., Berenguer M., Kilambi A., Surcel M. and Puidomènech B.
    NCAR Workshop, Oct 2012

Software

Multi-sensor Agile Adaptive Sampling (MAAS)
    A framework designed to track convective cell lifecycles with the C-Band Scanning ARM
    Precipitation Radar using external observations to optimize the radar's sampling strategy
    http://doppler.somas.stonybrook.edu/maas/

StonyBrook's Multi-cell Identification and Tracking algorithm (SMCIT)
    Algorithm developed to identify and track the evolution of convective cells to study the
    evolution during their entire lifecycle

Satellite Radar Simulator (SR-SIM)
    A space borne radar forward model operator able to convert WRF and GEM model
    simulations to GPM-DPR and EarthCare synthetic radar observations

EarthCare's CPR Antenna Pointing Characterization (C-APC)
    A processor able to estimate and correct any possible radar antenna miscalibration using
    echoes from 2 different source of natural targets: Earth's surface and ice clouds

EarthCare's CPR Profile processor (C-PRO)
    The main radar quality control algorithm, providing feature masks, best estimates of the
    radar Reflectivity and mean Doppler velocity and target classification variables defining
    cloud boundaries, precipitation classification, etc.

EarthCare's CPR Cloud and Precipitation Microphysics Retrieval (C-CLD)
    Retrieval algorithm providing information on cloud and precipitation microphysics for all
    significant cloud and precipitation systems observed by the radar

Radar Science Real Time imagery site
    StonyBrook Radar science real-time imagery site

Profilers
    Specialized software to analyze and visualize data from several meteorological instruments
    and NWP models; ground-based radars, disdrometeres, WRF and MAS data, MAPLE
    nowcast, etc.

MeteoVis
    Portable version of Profilers adapted to visualize data from the C-band weather radar
    network of MeteoSwiss

IDLCpuPM
    Open Source library for parallel processing under IDL
    https://github.com/bernatp3rs/idl_cpu_pm/wiki

Software Contributions

McGill Algorithm for Precipitation nowcasting by Lagrangian Extrapolation (MAPLE)
> Code refactoring, operational display and extensive updates and improvements

SIGMA
> Specialized Geographic Information System (GIS) customized to analyze and visualize meteorological information (radar, satellite, ground-based sensors and NWP data)

GenRad
> Generation of processed products from the MeteoSat satellite and the MM5 model

HydroVis
> Interactive hydrological flood detection system based on weather radar data

Other Contributions

David's Fanning book "Coyote's Guide to Traditional IDL graphics" and its related package of resources "Coyote Library"

Lazaro's Valentin Zuquette book "Natural and technological hazards, risk and disasters"

Technical Skills

Programming	IDL, Fortran, Python, Java, C, C++, Fortran, bash scripting Parallel programming with OpenMP and MPI Code versioning and management tools with Git and SVN
Web Technologies	HTML, Javascript, CSS, PHP, CMS (WordPress, Joomla and Weebly)
Data Bases	Exist, SQL
Software	Eclipse, ArcGIS, Illustrator and most common productivity packages
Operating Systems	GNU/Linux , Apple OS X and Microsoft Windows family

Excellent teamwork skills, and ability to learn new programming languages and/or technologies

Awards

Caja Madrid Fellowship   2007 - 2008
> Awarded with the Caja Madrid Graduate Fellowship Exchange Program

Others

Languages	Catalan, Spanish, French, Portuguese and English
Citizenship	Spanish, Canadian