

## Bio

Paul Poli earned a "Diplome d'Ingenieur" in Meteorology -- an equivalent of a M.S. in Meteorology -- from the Ecole Nationale de la Meteorologie in Toulouse, France in 1999. (1) His first appointment was in the Numerical Weather Prediction (NWP) section of the Centre National de Recherches Meteorologiques (CNRM, Meteo-France research center) in Toulouse. (2) Between 2004-2004 he completed a Ph.D. in Atmospheric Physics at the University of Maryland, Baltimore County (UMBC) while serving for the Joint Center for Earth Systems Technology (JCET) at the NASA Goddard Space Flight Center (NASA-GSFC) in Greenbelt, Maryland. (3) From 2004-2008 he returned to CNRM in Toulouse and applied his research in an operational environment. (4) Since October 2008, Paul has joined the Reanalysis project at the European Centre for Medium-range Weather Forecasts (ECMWF) in Reading, U.K.

Over the years, Paul has served as a reviewer for several journals and national funding organizations and space agencies. In 2006 he served as an Associate Editor for the Monthly Weather Review, a publication of the American Meteorological Society. He has contributed to and put together several proposals, namely for NASA, the NASA/NOAA/DoD Joint Center for Satellite Data Assimilation, ESA, and CNES. He is thus very aware of the funding context in which the Earth science community operates and the constraints under which scientific findings must be delivered -- whether they be good or bad news -- and in an understandable manner to our societies.

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(1) For the second half of 1999, Paul worked at the Centre National de Recherches Meteorologiques (CNRM) in Toulouse on the assimilation of radiances collected by the High resolution Infrared Radiation Sounder (HIRS) and the Advanced Microwave Sounder Unit-A (AMSU-A) in the Meteo France global Numerical Weather Prediction (NWP) system.

(2) From 2000 to 2004, Paul served as a Visiting Faculty Research Assistant for the Joint Center for Earth Systems Technology (JCET), a cooperative agreement between UMBC and the NASA Goddard Space Flight Center (GSFC). During that time, he conducted research at NASA-GSFC on the assimilation of space-based measurements into NWP systems. He worked as part of the NASA-GSFC Data Assimilation Office (DAO, now called Global Modeling and Assimilation Office) on several atmospheric remote sensing techniques. These include infra-red sounding from HIRS and the Atmospheric InfraRed Sounder (AIRS), microwave sounding from AMSU-A and the Microwave Limb Sounder (MLS), and in particular radio occultation (RO) using the Global Positioning System (GPS). After assimilating GPS RO data collected by the 1995 GPS/MET mission in collaboration with NASA-JPL into the DAO NWP system, Paul joined the CHAMP Science Team of co-investigators and used GPS RO data from CHAMP and SAC-C to demonstrate that more information could be extracted from GPS RO measurements by properly accounting for atmospheric inhomogeneities along the limb line-of-sight. Overall, Paul's interest into GPS RO stems from the novel approach this measurement technique represents when it comes to probing our atmosphere using an independently-calibrated reference, and the peculiar nature of the geometries involved. At NASA, Paul was advised and supervised by Dr. Joanna Joiner and benefited from numerous interactions with related fields. In parallel to this experience, Paul also worked toward a M.Sc. and a PhD in Atmospheric Physics at UMBC. His PhD Thesis, completed in 2004, was advised by Pr. Raymond Hoff and focused on the GPS RO

technique.

(3) Between mid-2004 and October 2008, Paul returned to Meteo France's CNRM after having completed his PhD.

There, he conducted research on the use of data collected by means of ground-based GPS stations from various networks over Europe. His work has shown that the atmospheric delays derived from ground-based GPS data can be used at low cost within an NWP system to yield a substantial improvement in weather predictions both in terms of precipitation as well as synoptic atmospheric flow. These results were obtained over a wide range of cases and in a four dimensional variational assimilation system and made Meteo-France to the first global NWP center to use these data in its global model operations. Later that use was extended to three-dimensional variational assimilation systems for the 10-km horizontal resolution model ALADIN-France covering Europe and the 2.5-km horizontal resolution model AROME covering France. Between 2005-2008, Paul served as a NWP consultant expert for the European meteorological service network GPS water Vapor Programme (E-GVAP).

At Meteo France, Paul also worked under a contract with ESA in collaboration with the ECMWF to develop the Level-2B processor for the future ADM-AEOLUS wind lidar mission. This mission, expected to be launched in 2010, is to demonstrate the first direct measurement of atmospheric winds from space, along a lidar line-of-sight with unprecedented accuracy, thus improving our understanding of the upper-air global circulation from space.

Still at Meteo-France, Paul brought to operational stage the assimilation of AIRS (infra-red) data and reported to the International TOVS Working Group on the impact of the not-so-trivial slanted geometry of nadir sounders.

Paul also brought to operational stage the assimilation of GPS RO data from the CHAMP and GRACE-A satellites, and from the six-satellite FORMOSAT-3/COSMIC constellation. To achieve this, Paul devised original quality control procedures for GPS RO measurements, and derived observation error estimates for these measurements, based on formal data assimilation theory. Doing so, Paul was able to demonstrate the existence of strong vertical correlations in GPSRO measurements -- something which so far had only been suggested by simulations by previous works. Paul has also conducted an innovative impact study in order to evaluate the scalability of the impact of GPS RO data on NWP forecast skill improvement. This study demonstrated that doubling the number of GPS RO data did not automatically double the impact in terms of forecast improvement, but that overall the improvement ratio was still very much favourable, suggesting that more GPS RO should be collected for NWP benefit. Paul also followed the evolution of the GPS RO field serving as a scientific advisor in the development of a GPS receiver by a contractor for the French Centre National d'Etudes Spatiales (CNES).

(4) In October 2008, Paul joined the Reanalysis project at ECMWF to act as a Consultant from Meteo-France. His interests there will be mainly to assist in the production of the current reanalysis (ERA-Interim -- which will eventually extend from 1989 to the present), with an emphasis on the observational aspect of the system. He will also help with preparations for an ambitious, next-generation reanalysis, possibly going back further in time than the ERA-40 reanalysis, and using as many observations as possible.