



Interview with CONCAWE's first Research Associate



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Lucia Gonzalez Bajos
talks about her
experience as
CONCAWE's first
Research Associate.
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Lucia Gonzalez Bajos, seconded from Repsol, became CONCAWE's first Research Associate in October 2011 to advance air quality studies using remote sensing techniques. The CONCAWE Review departs from its usual format to interview Lucia about her experiences at CONCAWE and in Brussels so far.

Q: Lucia, before we talk about your work at CONCAWE, please tell us a little about yourself, including your experience living in Brussels.

A: *I am a chemist by training and worked for five years in Repsol's Technology Centre in Madrid. My initial assignment at Repsol was in the R&D department and focused on the optimization of several refining processes, including sulphur recovery, fluidized catalytic cracking, and catalytic reforming. In the three years before I came to CONCAWE in 2011, my work changed to focus more on biofuels and environmental issues.*

I have always enjoyed travelling and experiencing other cultures, so living outside of Spain was very appealing. Because Brussels is a smaller city than Madrid, I have found that it is also an easier city to live in and has an extraordinary range of cultural and sporting activities. I have been to the theatre more often this year than in my whole life and even bought a bicycle so that I can cycle to the office every day. This is something I would never have thought to do in Madrid!

Most importantly, I would like to thank all of the CONCAWE Secretariat staff for making me feel at home from the very first moment after my arrival!

Q: Why did CONCAWE decide to create the 'Research Associate' position?

A: *The Research Associate concept originated from a study that CONCAWE completed in 2010. This study looked at ways to improve the overall efficiency of the Secretariat operation, including staffing, procurement, project tracking, and so on. In some technical areas, there were special activities that seemed to be ideally suited for a 'Research Associate', that is, someone who could work closely with the Secretariat's Technical Coordinators and take responsibility for specific projects. CONCAWE's management team decided that this approach was a good way to complement*

the Secretariat staff and should be tested to see how well it would work.

Q: Why were you interested in taking this position?

A: *Since 2008, I had been involved in CONCAWE activities by participating in the Air Quality Management Group and several other task forces. Because I was already quite familiar with many air quality projects, I decided that working with experts from different member companies was a perfect opportunity to further develop my professional career. Fortunately, my home company, Repsol, agreed and I was lucky enough to be selected as CONCAWE's first Research Associate.*

Q: What projects have you been working on during your time at CONCAWE?

A: *In my first year, I focused primarily on two projects related to the estimation of diffuse emissions of volatile organic compounds (VOCs). My main project focuses on the application of a remote sensing technique, called Differential Absorption Light Detection and Ranging, or DIAL for short, to estimate diffuse VOC emissions that can originate from petroleum storage tanks. In the past few years, remote sensing studies have been published that reported higher VOC emissions than those estimated using current emission factors. Attempts to explain the big discrepancies focused mostly on the accuracy of the emission factors that were being used. However, much less research had been done regarding uncertainties associated with the determination of the emitted VOC flow rates using remote sensing methods.*

So, in 2010, before I began my current assignment, CONCAWE started a research project to explore these uncertainties in more detail. The first stage of this project was completed in 2011 and included wind tunnel measurements and computational fluid dynamic modelling of the results. This part of the study examined, under controlled conditions, the flow and dispersion of diffuse VOC emissions from scale models of storage tanks.

From these results, we concluded that previous remote sensing studies had probably over-estimated tank emissions because the measurements were made too close to the tank. VOC concentra-



tion measurements should ideally be made at a distance of a few tank heights away from storage tanks in order to reduce uncertainties that arise in estimates of the emitted flow due to variations in the tank's shape and the source of the emissions compared to the prevailing wind field.

In 2012, we went one step further by completing a field trial on an outside storage tank to test the conclusions from the wind tunnel studies and look at other possible sources of uncertainty. We are still analysing the results of this trial and expect to publish a report on the results in 2013. We believe that these results will contribute to the development of a robust testing protocol for the application of remote sensing techniques to the determination of diffuse VOC emission flows, possibly even a CEN standard method.

My other main project is also related to the estimation of VOC diffuse emissions but is focused on emissions from primary oil/water separators in refinery waste water treatment plants. This study has reviewed different methods that can estimate these emissions and applied some of these in two field trials carried out in European refineries in 2011. Average VOC emission estimates during the trial periods have been obtained using four published emission factors, three different models and an empirical algorithm. The DIAL technique was also used to derive estimates of short-term emission fluxes from remote measurements of VOC concentrations. An assessment of the strengths and weaknesses of each method has also been carried out and the report on this work will be published in 2013.

Q: These sound like interesting projects. What else have you been working on?

A: Yes, in my 'spare time', I have been working on an analysis of the refining sector data included in the European Pollutant Release and Transfer Register database (for more information on the E-PRTR, see CONCAWE Review Vol. 19, No. 1). This work is developing a standardised reporting methodology based on the publicly-available E-PRTR data for refining. Most of our readers are also aware that we are currently in the review process for the Best Available Techniques Reference (BREF) document

for refining so I am helping CONCAWE's Technical Coordinators prepare for the next commenting phase.

Q: How has your experience at CONCAWE helped you in your career?

A: Working at CONCAWE and living in Brussels has been an extraordinary experience for me and I feel very privileged to have been selected for this position. By leading the storage tanks project, I have developed special expertise in remote sensing techniques and their application to the refining industry and, of course, have developed my project management skills at the same time. I have had the opportunity to work closely with many contractors and professionals including the chair and member company experts on my CONCAWE research team. This has allowed me to develop valuable contacts and gain a much broader perspective of the refining industry. Finally, living in Brussels, besides being a lot of fun, has enabled me to improve my language skills in both English and French and I have even started taking German lessons!

Q: Will the 'Research Associate' position continue at CONCAWE?

A: Well, I'm very happy to say that my own assignment has been extended for an additional year so that I can continue to develop the DIAL protocol. We have also started a new project on optical gas imaging techniques so I will be quite busy.

Based on my own positive experience, CONCAWE is already looking for another Research Associate who will be brought in to extend our in-house capabilities in refinery, vehicle and fuel demand modelling. I am looking forward to helping the next CONCAWE Research Associate get off to a good start in 2013!