



## **Pablo Sangrà Inciarte (1963 – 2016)**

Pablo Sangrà Inciarte was born in Barcelona on 13 March 1963, one of eight children of Francisco Sangrà and Teresa Inciarte. He went to school in Barcelona and grew up in close contact with the seagoing world of the small town of Cadaqués, where his parents had a house and, most important, a sailing boat. Sangrà soon learnt to sail and, as a teenager, became one of the instructors in the local sailing facilities. His fascination for boats and the sea drove him to start a degree in Nautical Engineering but, in 1983, after learning that his myopia would not allow him to become a ship's pilot, he switched to a five-year undergraduate degree in Marine Sciences, a new degree in the Spanish university system that was pioneered by the *Universidad de Las Palmas de Gran Canaria* (ULPGC). This was the beginning of a life-long relation with the Canary Islands: its people, landscape, weather and surrounding ocean.

Sangrà graduated in 1988 and soon after was granted an assistantship (1989-1992) to work on his doctoral dissertation. In 1990 and 1991 he spent some time at

the University of Liege and the Chesapeake Bay Institute, developing a numerical circulation model to simulate the flow through and behind islands. In 1992 he became a lecturer at the ULPGC. In July 1995 he completed his doctoral dissertation on the generation and characteristics of mesoscale vortices south of the Canary Islands, and in January 2000 he obtained a tenured position at the ULPGC. Between 1992 and 2016, he taught many different courses on geophysical data analysis and dynamics at the ULPGC's School of Marine Sciences at both undergraduate and graduate level. During the 2010-2011 academic year, he spent a sabbatical at the University of California, Los Angeles.

Pablo Sangrà was an observational physical oceanographer interested in a multitude of processes, ranging from the microscale to the regional scale, with a special attraction for the mesoscale and submesoscale and its importance in biogeochemical fluxes. He participated in some 15 scientific cruises carried out between 1994 and 2014, in many cases as chief scientist. His sampling

strategy often consisted of first positioning the meso-scale feature using both remote sensing and a coarse grid of hydrographic stations, and then fine-sampling it with different instruments, including drifters. After the cruise, he enjoyed dissecting the data in all possible ways, until he was totally satisfied. He complemented his field approach using all sorts of numerical, reanalysis and even laboratory data.

Pablo Sangrà explored the characteristics of meanders, vortices and filaments in the Canary Islands, off NW Africa and Chile, in the Strait of Bransfield (Antarctica) and in the Gulf of Mexico. In particular, he pioneered the study of the dynamics of mesoscale vortices generated as the Canary Current and the trade winds encounter the deep-ocean Canary Islands (Sangrà et al. 2005, 2007), and he discovered the existence of the Canary Eddy Corridor, a major pathway for these eddies to export water mass and biogeochemical properties from the eastern boundary of the subtropical gyre to the interior Atlantic Ocean (Sangrà 2009). He also initiated the study of small eddies in the Strait of Bransfield (Sangrà et al. 2011) and recently focused on the origin and characteristics of submesoscale phenomena in the Cape Ghir region (Sangrà et al. 2015).

Sangrà also made significant contributions to the analysis of water masses and the description of the regional circulation in the Canary Basin and NW Africa upwelling region, and laid out the first integrated description of the mesoscale and regional features in the Strait of Bransfield, introducing the concepts of the Bransfield Gravity Current and the Bransfield Current System (Sangrà et al. 2011, 2016). He also did substantial research on small-scale motions, from rheological processes at the smallest oceanic scales to the generation of internal waves in the shelf break of oceanic islands, including a novel approximation that modelled fine-scale stratification as resulting from shear-induced vertical turbulence with finite temporal memory (Pelegrí and Sangrà 1998).

Sangrà's entire scientific career was characterized by an interdisciplinary approach to the marine system, with substantial contributions on the distribution of biogeochemical properties and the importance of physical processes in the marine ecosystem. The funding he received from the Spanish National R&D Plan is an example of this integral approach. In the projects "Physical-biological coupling at the mesoscale range around South Shetland Islands (Antarctica)" (2009-2011) and "Study of the vertical oceanic pump in mesoscale eddies" (2013-2015), he found that the fluxes of biogeochemical properties are modulated at the submesoscale through turbulence and ageostrophic motions. His most recent project, "Carbon fluxes in a coastal upwelling system (Cape Blanc, NW Africa)" (2016-2018), was a continuation of this cross-cutting approach to the ocean system.

As a graduate advisor, Pablo Sangrà directed 12 successfully completed doctoral dissertations—plus many more at master's level—that encompassed observational, laboratory, conceptual and numerical studies. In particular, he guided his students to apply different circulation models, including high-resolution regional

ocean model systems, to the Canary Basin. Recently, he was supervising another two theses that were close to completion, on topics as diverse as submesoscale and vertical motions in vortices and the atmospheric conditions leading to events of extreme precipitation over Iraq. Sangrà was not only an effective supervisor but also a devoted mentor to his students and many young researchers, caring for them during and beyond their graduate studies.

Sangrà often appeared reserved and distracted but in fact he was an attentive person, very much aware of what was happening in his workplace and ready to discuss news and politics. His somewhat clumsy and absent-minded appearance were tricks he used to get away from administrative tasks and the situations of conflict that he disliked. Indeed, he was a discreet and serene person who evaded notoriety and had the ability to enjoy both intense situations, such as a lively jazz concert, and the peaceful passing of time, either in his boat or absorbed in quiet music. This gentle personality made him an excellent team person, a companion who was appreciated and loved by his friends and colleagues – somebody to rely on and to seek advice from. He was equally liked by his students, as he taught his passion for the ocean through daily example, to the extent that on some occasions he was chosen as their sponsor in the graduation ceremony.

Pablo Sangrà had two loves. One of them was his family: his parents, brothers and sisters, with his wife Anna and daughters Marta and Tere in the centre of his circle of life. The other one was the ocean. He went to sea as much as he could and each time he was enthralled in peaceful communion, the sea transported him far into the horizon and permeated through his eyes and into his lungs. He had an enigmatic—boundless and intimate—connection with the ocean; his research was certainly one way he had found to extend this harmony. Pablo died on 13 August 2016 from a heart attack while sailing his boat in Cala Jonquet, a small and most beautiful bay north of Cadaqués. His spirit flew away and became one with his beloved ocean.

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