

CURRICULUM VITAE: Fernández Pérez , Fiz

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Current position: Research Professor of Consejo Superior Investigaciones Cientificas (CSIC)

Date of birth: 23–Sept–57

Research fields: UNESCO (251002, 2510). Carbon system in seawater. Water masses. Climate change.

Education

Graduate in Chemistry in June 1979. University of Santiago

BsC.- Chemistry in Decembre 1979. University of Santiago.

PhD,- Chemistry in March 1985. University of Santiago.

Professional Background:

From 2003- Research Professor of CSIC

1993-2003: Scientist research of CSIC

1987-1993: Tenure Research of CSIC

1986-87: Postdoctoral fellowship of CSIC

1981-85: Postgraduate fellowship of CSIC

1980–81: Postgraduate fellowship of County Pontevedra

External Evaluation

162 PAPERS: 148 REPORTED IN THE SCOPUS: Times Cited: 3789 H-index=35 ; H=42 Google Scholar 5504 citas.

Scientist publications in the Q1 (first quartil)

1. Carracedo, L.I., Pardo, P.C., Flecha, S., Pérez, F.F. On the Mediterranean Water Composition. *J. Phys. Oceanogr.* 46, 1339–1358, DOI: 10.1175/JPO-D-15-0095.1. 2016.

2. Fontela, M., García-Ibáñez, M.I., Hansell, D.A., Mercier, H., Pérez, F.F. Dissolved Organic Carbon in the North Atlantic Meridional Overturning Circulation. *Scientific Reports* 6, 26931, DOI: 10.1038/srep26931. 2016.

3. García-Ibáñez, M.I., Zunino, P., Fröb, F., Carracedo, L.I., Ríos, A.F., Mercier, H., Olsen, A., Pérez, F.F. Ocean acidification in the subpolar North Atlantic: rates and mechanisms controlling pH changes. *Biogeosciences* 13, 3701–3715, DOI: 10.5194/bg-13-3701-2016.2016

4. Daniault, N., Mercier, H., Lherminier, P., Sarafanov, A., Falina, A., Zunino, P., Pérez, F.F., Ríos, A.F., Ferron, B., Huck, T., Thierry, V., Gladyshev, S. The northern North Atlantic Ocean mean circulation in the early 21st century. *Progress in Oceanography* 146, 142–158, DOI: 10.1016/j.pocean.2016.06.007..2016.

5. Lauvset, S.K., Key, R.M., Olsen, A., van Heuven, S., Velo, A., Lin, X., Schirnack, C., Kozyr, A., Tanhua, T., Hoppema, M., Jutterström, S., Steinfeldt, R., Jeansson, E., Ishii, M., Perez, F.F., Suzuki, T., Watelet, S. A new global interior ocean mapped climatology: the 1°x1° GLODAP version 2. *Earth System Science Data* 8, 325–340, DOI: 10.5194/essd-8-325-2016. 2016.

6. Olsen, A., Key, R.M., van Heuven, S., Lauvset, S.K., Velo, A., Lin, X., Schirnack, C., Kozyr, A., Tanhua, T., Hoppema, M., Jutterström, S., Steinfeldt, R., Jeansson, E., Ishii, M., Pérez, F.F., Suzuki, T. The Global Ocean Data Analysis Project version 2 (GLODAPv2) - an internally consistent data product for the world ocean. *Earth System Science Data* 8, 297–323, DOI: 10.5194/essd-8-297-2016. 2016

7. Rosón, G., Guallart, E.F., Pérez, F.F., Ríos, A.F., 2016. Calcium distribution in the subtropical Atlantic Ocean: Implications for calcium excess and saturation horizons. *Journal of Marine Systems* 158, 45–51, DOI: 10.1016/j.jmarsys.2016.01.011 2016.

8. Flecha S., F. F. Pérez, J. García-Lafuente, S. Sammartino, A. F. Ríos and E. Huertas. Trends of pH decrease in the Mediterranean Sea through high frequency observational data: indication of ocean acidification in the basin. *Scientific Reports*. 5 - 16770, pp. 1 - 8. 2015

9. Le Quere, C. and Moriarty, R. and Andrew, R. M. and Canadell, J. G. and Sitch, S. and Korsbakken, J. I. and Friedlingstein, P. and Peters, G. P. and Andres, R. J. and Boden, T. A. and Houghton, R. A. and House, J. I. and Keeling, R. F. and Tans, P. and Arneeth, A. and Bakker, D. C. E. and Barbero, L. and Bopp, L. and Chang, J. and Chevallier, F. and Chini, L. P. and Ciais, P. and Fader, M. and Feely, R. A. and Gkritzalis, T. and Harris, I. and Hauck, J. and Ilyina, T. and Jain, A. K. and Kato,

E. and Kitidis, V. and Klein Goldewijk, K. and Koven, C. and Landschutzer, P. and Lauvset, S. K. and Lefevre, N. and Lenton, A. and Lima, I. D. and Metzl, N. and Millero, F. and Munro, D. R. and Murata, A. and Nabel, J. E. M. S. and Nakaoka, S. and Nojiri, Y. and O'Brien, K. and Olsen, A. and Ono, T. and P'erez, F. F. and Pfeil, B. and Pierrot, D. and Poulter, B. and Rehder, G. and Rodenbeck, C. and Saito, S. and Schuster, U. and Schwinger, J. and Seferian, R. and Steinhoff, T. and Stocker, B. D. and Sutton, A. J. and Takahashi, T. and Tilbrook, B. and van der Laan-Luijkx, I. T. and van der Werf, G. R. and van Heuven, S. and Vandemark, D. and Viovy, N. and Wiltshire, A. and Zaehle, S. and Zeng, N. Global Carbon Budget 2015 *Earth Syst. Sci. Data*, 7, 349-396, doi:10.5194/essd-7-349-2015 www.earth-syst-sci-data.net/7/349/2015/2015. 2015

10. Zunino P., P. Lherminier, H. Mercier, X. A. Padín, A.F. Ríos and Fiz F. Pérez. Dissolved Inorganic Carbon budgets in the eastern Subpolar North Atlantic in the 2000s from in situ data. *Geophysical Research Letters*. 42 - 21, 2015.

11. de la Paz M., I. E. Huertas, S. Flecha, A.F. Pérez. F. F. Perez. Nitrous oxide and methane in Atlantic and Mediterranean waters in the Strait of Gibraltar: Air-sea fluxes and inter-basin exchange. *Progress in Oceanography*. 138, pp. 18- 31, 2015

12. Fajar N.M., M. García-Ibañez, M. I. SanLeón-Bartolomé, Marta Alvarez and F. F Pérez. Spectrophotometric Measurements of the Carbonate Ion Concentration: Aragonite Saturation States in the Mediterranean Sea and Atlantic Ocean. *Environment Science Technology*. 49 - 19, pp. 11679 - 11687. 2015.

13. Rios, AF; Resplandy, L., Garcia-Ibanez, MI Garcia-Ibanez, N.M. Fajar, A. Velo, X.A. Padin, R. Wanninkhof, R. Steinfeldt, G. Roson and F.F. Perez. Decadal acidification in the water masses of the Atlantic Ocean. *Proceedings Of The National Academy Of Sciences Of The United States Of America*. 112 - 32, pp. 9950 - 9955.

14. Zunino, P, F.F. Perez, N.M. Fajar, E.F. Guallart, A.F.Rios, J.L.; Pelegri, A. Hernandez-Guerra. Transports and budgets of anthropogenic CO₂ in the tropical North Atlantic in 1992-1993 and 2010-2011. *GLOBAL BIOGEOCHEMICAL CYCLES*. 29, pp. 1075 - 1091. 2015.

15. García-Ibañez M.I.; P.C Pardo, L.I. Carracedo, H. Mercier, P. Lherminier, A. F Ríos, F. F Pérez. Structure, transports and transformations of the water masses in the Atlantic Subpolar Gyre. *Progress in Oceanography*. 135, pp. 18 - 36. 2015.

16. Fajar N.M; E. F. Guallart, R. Steinfeldt, A. F. Rios. C. Pelejero, E. Calvo and F. F Perez. Anthropogenic CO₂ changes in the Equatorial Atlantic Ocean. *Progress in Oceanography*. 134, pp. 256 – 270. 2015.

17. Guallart E.F., U. Schuster, N.M. Fajar, O. Legge, P. Brown, C. Pelejero, M.-J. Messias, E. Calvo, A. Watson, A. F. Ríos, F. F. Pérez, Trends in anthropogenic CO₂ in water masses of the Subtropical North Atlantic Ocean, *Progress in Oceanography*, 131, 21-32, 2015. <http://dx.doi.org/10.1016/j.pocean.2014.11.006>.

18. Guallart E.F, N.M. Fajar; X.A. Padín; M. Vázquez-Rodríguez; E. Calvo; A.F. Ríos; A. Hernández-Guerra; Carles Pelejero; Fiz F Pérez. Ocean acidification along the 24.5°N section in the subtropical North Atlantic. *Geophysical Research Letters*. 42, 450–458, doi:10.1002/2014GL062971.2015.

19. Carracedo L.I., M. Gilcoto, H. Mercier, F.F. Pérez. Quasi-synoptic transport, budgets and water mass transformation in the Azores–Gibraltar Strait region during summer 2009. *Progress in Oceanography*. 130, pp. 47 - 64. 2015

20. Pardo P.C, F.F. Pérez; S. Khatiwala; A.F. Ríos. Anthropogenic CO₂ estimates in the Southern Ocean: Storage partitioning in the different water masses. *Progress in Oceanography*. 120, pp. 230 - 242. 2014

21. Carracedo L.I.; M. Gilcoto; H. Mercier; F.F. Pérez. Seasonal dynamics in the Azores-Gibraltar Strait region: A climatologically-based study. *Progress in Oceanography*. 122, pp. 116 - 130. 2014.

22. Zunino, P., Garcia-Ibañez, M. I., Lherminier, P., Mercier, H., Rios, A. F., and Pérez, F. F.: Variability of the transport of anthropogenic CO₂ at the Greenland–Portugal OVIDE section: controlling mechanisms, *Biogeosciences*, 11, 2375-2389, doi:10.5194/bg-11-2375-2014, 2014.

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24. Racapé, V., Pierre, C., Metzl, N., Lo Monaco, C., Reverdin, G., Olsen, A., Morin, P., Vázquez-Rodríguez, M., Ríos, A.F., Pérez, F.F., Anthropogenic carbon changes in the Irminger Basin (1981–2006): Coupling $\delta^{13}\text{C}_{\text{DIC}}$ and DIC observations. *Journal of Marine Systems*. doi: 10.1016/j.jmarsys.2012.12.005.2013.

25. Pérez, F.F., Mercier, H., Vázquez-Rodríguez, M., Lherminier, P., Velo, A., Pardo, P.C., Rosón, G., Ríos, A.F., 2013. Atlantic Ocean CO₂ uptake reduced by weakening of the meridional overturning circulation. *Nature Geoscience*. doi: 10.1038/ngeo1680.

26. Otero P., X.A. Padin, M. Ruiz-Villareal, L.M. García-García, A. F. Ríos, and F.F. Pérez. Net sea-air CO₂ flux uncertainties in the Bay of Biscay based on the choice of wind speed products and gas transfer parameterizations. *Biogeosciences*. 10, pp. 2993 – 3005. 2013.

27. Álvarez-Salgado X.A., M. Nieto-Cid, M. Álvarez, F.F. Pérez, P. Morin, and H. Mercier. New insights on the mineralization of dissolved organic matter in central, intermediate, and deep water masses of the northeast North Atlantic. *Limnology and Oceanography*. 58, pp. 681 - 696. 2013.

28. Sabine, C. L., Hankin, S., Koyuk, H., Bakker, D. C. E., Pfeil, B., Olsen, A., Metzl, N., Kozyr, A., Fassbender, A., Manke, A., Malczyk, J., Akl, J., Alin, S. R., Bellerby, R. G. J., Borges, A., Boutin, J., Brown, P. J., Cai, W.-J., Chavez, F. P., Chen, A., Cosca, C., Feely, R. A., González-Dávila, M., Goyet, C., Hardman-Mountford, N., Heinze, C., Hoppema, M., Hunt, C. W., Hydes, D., Ishii, M., Johannessen, T., Key, R. M., Körtzinger, A., Landschützer, P., Lauvset, S. K., Lefèvre, N., Lenton, A., Lourantou, A., Merlivat, L., Midorikawa, T., Mintrop, L., Miyazaki, C., Murata, A., Nakadate, A., Nakano, Y., Nakaoka, S., Nojiri, Y., Omar, A. M., Padin, X. A., Park, G.-H., Paterson, K., Perez, F. F., Pierrot, D., Poisson, A., Ríos, A. F., Salisbury, J., Santana-Casiano, J. M., Sarma, V. V. S. S., Schlitzer, R., Schneider, B., Schuster, U., Sieger, R., Skjelvan, I., Steinhoff, T., Suzuki, T., Takahashi, T., Tedesco, K., Telszewski, M., Thomas, H., Tilbrook, B., Vandemark, D., Veness, T., Watson, A. J., Weiss, R., Wong, C. S., and Yoshikawa-Inoue, H.: Surface Ocean CO₂ Atlas (SOCAT) gridded data products, *Earth Syst. Sci. Data*, 5, 145-153, doi:10.5194/essd-5-145-2013, 2013.
29. Velo, A., Pérez, F.F., Tanhua, T., Gilcoto, M., Ríos, A.F., Key, R.M., 2013. Total alkalinity estimation using MLR and neural network techniques. *Journal of Marine Systems* 111–112, 0, 11–18. doi: 10.1016/j.jmarsys.2012.09.002.
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31. Flecha, S., Pérez, F.F., Navarro, G., Ruiz, J., Olivé, I., Rodríguez-Gálvez, S., Costas, E., Huertas, I.E., 2012. Anthropogenic carbon inventory in the Gulf of Cádiz. *Journal of Marine Systems* 92, 1, 67–75. doi: 10.1016/j.jmarsys.2011.10.010.
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88. Ríos A.F., T. Anderson, F. F. Pérez. The carbonic system distribution and fluxes in the NE Atlantic during spring 1991. *Progress in Oceanography*, 35,295-314.1995.
89. Pérez F. F., A. F. Rios, B.A. King and R.T. Pollard. Decadal changes of T–S relationship of the Eastern North Atlantic Central Water (ENAW). *Deep-Sea Research*, 42, 1849-1864. 1995.
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91. Álvarez-Salgado X.A., G. Rosón, F.F. Pérez, Y. Pazos. Hydrographic variability off the Rias Baixas (NW Spain) during the upwelling season. *Journal of Geophysical Research*, 98, 14447-14455.1993.
92. Pérez F.F. et al., Displacement of water masses and remineralization rates off the Iberian Peninsula by nutrient anomalies. *Journal of Marine Research*, 51, 869-892. 1993.
93. Pérez F.F., F. Fraga. A precise and rapid analytical procedure for alkalinity determination. *Marine Chemistry*, 21,169-182. 1987.
94. Pérez F.F., F. Fraga. The pH measurements in seawater on the NBS scale. *Marine Chemistry*, 21, 315-327. 1987.

Books or Book chapters

- CLIMATE IN SPAIN: PAST, PRESENT AND FUTURE Regional climate change assessment report. Fiz F. Perez y Roberta Boscolo Editors (CSIC) (<http://clivar.iim.csic.es>) 83 pp. English ISBN: 978-84-614-8115-6
- CLIMA EN ESPAÑA: PASADO, PRESENTE Y FUTURO' un Informe de evaluación del cambio climático regional. Editores: Fiz F. Perez y Roberta Boscolo (CSIC) (<http://clivar.iim.csic.es>) 83 pp.
- Castro CG, Álvarez-Salgado XA, Gago J, Pérez FF, Bode A, Nogueira E, Ríos AF, Rosón G, Varela M. 2009. Evidencias biogeoquímicas do cambio climático. En: *Evidencias e impactos do cambio climático en Galicia* (Xunta de Galicia, Consellería de Medio Ambiente e Desenvolvemento Sostible), pp. 303–326.
- Rosón G, Cabanas JM, Pérez FF, Herrera JL, Ruíz-Villarreal M, Castro CG, Piedracoba S, Álvarez-Salgado XA. 2009. Hidrografía e dinámica. En: *Evidencias e impactos do cambio climático en Galicia* (Xunta de Galicia, Consellería de Medio Ambiente e Desenvolvemento Sostible), pp. 287–302.
- Ruiz-Villarreal M, Álvarez-Salgado XA, Cabanas JM, Pérez FF, Castro CG, Herrera JL, Piedracoba S, Rosón G. 2009. Variabilidade climática e tendencias decañais nos forzamentos meteorolóxicos e as propiedades das augas adyacentes a Galicia. En: *Evidencias e impactos do cambio climático en Galicia* (Xunta de Galicia, Consellería de Medio Ambiente e Desenvolvemento Sostible), pp. 271–286.
- Rosón G, Cabanas JM, Pérez FF. 2008. Hidrografía y Dinámica de la Ría de Vigo: un sistema de afloramiento. En: *La Ría de Vigo: Una aproximación integral al ecosistema marino de la Ría de Vigo*. (A González-Garcés, F Vilas, XA Álvarez-Salgado, eds.), pp. 51-84. Instituto de Estudios Vigueses, Vigo, ISBN: 978–84–89599–34–5.

Director(Co) of Doctoral Thesis

1. Flujos y ciclo del carbonato cálcico en la Ría de Arosa. **Gabriel Rosón Porto**. Univ. de Santiago de Compostela. Fac. de Química. 1992.
2. Mecanismos de transporte e balance bioxeoquímico do nitroxeno na ría de Arousa. **Xose Antón Alvarez Salgado**. Univ. de Santiago de Compostela. Fac. de Química. 1993.
3. Caracterización de las masas de Agua del Atlántico Norte con elementos biogeoquímicos. **Carmen Gonzalez Castro**. Univ. de Santiago de Compostela. Fac. de Química. 1997

4. Determinación y distribución del nitrógeno orgánico disuelto en el agua de mar. **Dolores Doval González**, Fac. de Química. Univ. de Santiago de Compostela. 1998.
5. Variabilidad temporal del acoplamiento hidrológico y meteorológico en la Ría de Vigo. **Enrique Nogueira García**. Univ. de Vigo. Fac. de Ciencias del Mar. 1998
6. Predicción numérica y contraste experimental de la circulación en la Ría de Vigo. **Carlos Alberto Souto Torres**. Univ. de Vigo. Fac. de Ciencias del Mar. 2000.
7. Transformaciones biogeoquímicas y flujos de carbono en la Ría de Vigo. Estudio de la variación estacional y de corta escala. **Jesus Gago Piñeiro**. Univ. de Vigo. Fac. de Ciencias del Mar. 2000.
8. Descripción dinámica de la circulación en dos Rías Baixas: Vigo y Pontevedra. **Belén Martín Míguez**. Univ. de Vigo. Fac. de Ciencias del Mar. 2003
9. Patrones de variabilidad termohalina en la Ría de Vigo. **Miguel Gil Coto**. Univ. de Vigo. Fac. de Ciencias del Mar. 2004
10. Ciclo de la materia orgánica disuelta en un sistema de afloramiento costero. **Mar Nieto Cid**. Univ. de Vigo. Fac. de Ciencias del Mar. 2005.
11. Variabilidad de la presión de CO₂ superficial en el Atlántico Norte. **Antonio Padin Alvarez**. Univ. de Vigo. Fac. de Ciencias del Mar. 2009.
12. Inventario de Carbono Antropogénico en el Atlántico. **Marcos Vazquez Rodriguez**. Univ. de Vigo. Fac. de Ciencias del Mar. 2009.
13. Temporal changes in natural and anthropogenic CO₂ in the North Atlantic Ocean. **Noelia Maria Fajar González**. Universidade de Santiago de Compostela, 2013.
14. El CO₂ antropico en el Océano Austral. **Paula Conde Pardo**. Facultad de Ciencias del Mar. Univ. de Vigo, 2013
15. Subtropical North-East Atlantic water masses and transports. **Lidia Carracedo Segade**. Facultad de Ciencias del Mar - Universidade de Vigo, 2013.
16. Optimización de métodos numéricos en la determinación de la acidificación en los océanos. **Antón Velo Lanchas**. Facultad de Ciencias del Mar - Universidade de Vigo, 2014.
17. Transporte de carbono y tasas de acidificación en el Atlántico Norte. **Maribel Garcia Ibañez**. Universidad de Vigo (Campus DO**MAR*). 2015.
18. Ocean acidification along the 24.5°N section in the subtropical North Atlantic. Elisa Fernandez Guallart. Universidad de las Palmas de Gran Canaria. Febrero 2016.

Research Projects

1. Variabilidad espacio-temporal de los episodios de fertilización de las costas gallegas y sus consecuencias biológicas. Nacional Project (CICYT MAR88-245). From 1989 to 1991. IP F.F. **Pérez**.
2. Estudio y seguimiento químico y biológico del medio marino en la Ría de Vigo. Nacional Project CICYT (AMB92-0165). From 1992 to 1995. IP: F.F. **Pérez**.
3. Multidisciplinary oceanographic research in the eastern boundary of the North Atlantic (MORENA). European Project (UE. MAS2-CT93-0065), from 01-06-93 to 01-06-96. IP: F.F. **Pérez**.
4. Canary Islands, Gibraltar and Azores observation (CANIGO). European Project (UE. MAS3-CT96-0060). From 01-06-96 to 01-06-99. IP F.F. **Pérez**.
5. Dinámica y Biogeoquímica anual de la Plataforma Gallega: variación de corta escala (DYBAGA). Nacional Project (CICYT. MAR99-1039-C02-01). From 01-01-00 to 31-12-02. IP: F.F. **Pérez**.
6. Carbon Variability Studies By Ships Of Opportunity (CAVASSOO). European Project (EVK2-2000-22058). 01-12-00 to 31-12-03. IP: A.F. Ríos.
7. Marine carbon sources and sinks assessment (CARBOCEAN). European Union 511176-2. Funding 521.016 €. 1/1/2005 to 31/12/2009. IP: A.F. Ríos.
8. Circulación residual da Ría de Vigo: Dinámica e Hidrografía. Xunta de Galicia. PGIDIT05RMA4020PR. Funding 183.000 euros. 04/2005 to 04/2008. IP: E.D. Barton
9. Intercambio plataforma-oceano en el ecosistema marino de las islas canarias-peninsula iberica (CAIBEX). Nacional Project CTM2007-66406-CO2-01. Funding: 613.470 euros. 10/2007 to 30/2010. IP Eric D. Barton.
10. Multiparametric Model of Oceanic Water Mass Mixing (m4ao). Xunta de Galicia. PGIDIT07PXIB 402153PR. Funding 81.700 €. From 10/2007 to 10/2010.
11. Temporal trend of greenhouse gases along two Atlantic transoceanic sections (ghg4moc) Ministerio de Ciencia e Innovación. CTM2009-07574-E. Funding 32.000 €. From 01/01/2010 to 31/12/2010.
12. Transporte de carbono y tasas de acidificación en el atlántico norte. Ministerio de Ciencia e Innovación. Investigación CTM 2010- 17141. Funding 295.000€. From 01/01/2011 to 31/12/2013.
13. Carbochange (change in carbon uptake and emissions by a changing climate). European Union. FP7 ENV 2010 Funding : 510.020 €. From 01/03/2011 to 28/02/2015
14. Integrated non-CO₂ Greenhouse gas Observation System. European Union FP7-INFRASTRUCTURES: 284274. Funding 80.000 €. From 01/11/2011 to 31/10/2015.
15. Observación bienal del carbono, acidificación, transporte y sedimentación en el atlántico norte. (BOCATS). Ministerio de Ciencia e Innovación: CTM2013-41048-P. Funding 158.510€. From 01/01/2014 to 31/12/2016.

16. Optimizing and Enhancing the Integrated Atlantic Ocean Observing System (AtlantOS). Grant agreement no: 633211 of BG-08-2012 H2020. Funding 174.000€ from 1/04/2015 a 30/06/2019.

17. ACIDIFICACION EN LAS RIAS Y PLATAFORMA OCEANICA IBERICA (ARIOS). Ministerio de Ciencia e Innovación: CTM2016-76146-C3. Funding 281.000€. From 01/01/2017 to 31/12/2019.

Oceanographic cruises

1997.- CO₂ measurements on cruise Met37/2 on board of METEROR Jan 2006.

1998.- Chief of the international cruise "AZORES 1" on board BIO HESPERIDES (28 July to 28 August 1998). Cruise of CANIGO european project.

2000.- Chief of the cruise "FICARAM 1" on board BIO HESPERIDES (24/10 to 11/11 2000). Cruise of CAVASSOO european project.

2001.- Chief of the cruise on board of B/O 'Mytilus' in the Galiciam shelf from 15/5/2000 to 30/4/2001). National project DIBAGA.

2002.- Chief of the cruise "FICARAM IV" on board BIO HESPERIDES (2/3 to 12/4/2002). Cruise of CAVASSOO european project.

2002, 04,06.- CO₂ measurements on cruise "OVIDE'02, OVIDE'04 and OVIDE08" on board R/O THALASSA (5/6 to 6/7/2002, 10/6 to 11/7/2004, 20/5 to 26/6/2006).

2002-2003.- Advisor of Prestige Committee on board R/O ATALANTE: Cruises PRESTINAUT 1 and 2/12/12/2002 to 6/2/2003.

Diving n° 1502 y 1520 Submarine NAUTILE down to 3800m days 12th Dec/02 and 23rd Jan/03.

2008.- CO₂ measurements on cruise "SUBPOLAR'08" on board R/O THALASSA (24/08 to 15/09/2008).

2009.- CO₂ measurements on cruise "CAIBOX fase II" on board "Sarmiento de Gamboa" (24/7 to 15/8/2009).

2010.- CO₂ measurements on cruise "MOC2 Equatorial" on board "HESPERIDES" (24/3 to 15/5/2010).

2012.- Cruise "CATARINA" a bordo del BIO Sarmiento de Gamboa, 23 June. 25 July. Proyecto CATARINA

2013.- Cruise "FICARAN XV" a bordo del BIO HESPERIES, 22 April to 22. May 2013. Proyecto CATARINA

2014.- Cruise "GEOVIDE" a bordo del POURQUOIS PAS? , 15 May to 30 June 2014. Proyecto CATARINA

2016.- Scientific chief of the cruise "BOCATS" a bordo del BIO Sarmiento de Gamboa, 18 Junio al 31 Julio 2016.

Abroad Scientific stays

University of Princeton 6th June to 30 Septiembre 2006. Carina database and water masses studies in the Oceans.

IFREMER Brest. January 2007 (two weeks) and November 2007 (two weeks). Anthropogenic CO₂ transport in the North Atlantic.

Southampton Oceanographic Centre three months from 1 June to 31 August 1992.

Scientific assessor

- Assessor NORKLIMA panel of Research Council of Norway (Nov'2007)

- 16 project of science and infrastructure to the Spanich Agence 'ANEP'

- European project: MAST III and V Framprogram

- Panel 'Climate Feedback of Council Science of Norway (2007).

- Supervisor PhD thesis Universidades of Vigo (2) , Santiago de Compostela (1), Cádiz (2).

- Nacional Science Foundation 2002.

- Scientific auditory Soutampton Oceanography Center (NERC). Diciembre 2004

- Journal Reviewer of Deep-Sea Research, Jounal Marine Systems, Continental Shelf Research, Oceanologica Acta y Geophysical Research Letters. Global Biochemical cycles, Scientific Reports of Nature, Journal Climate.

Scientific Panels:

North Atlantic Panning Group (JGOFS).

Comisión del Area de Recursos Naturales del CSIC. (1996-2000)

Oceanographic ship building. Mytilus (1997- 2000),

Oceanographic ship building. Sarmiento de Gamboa (2003-2005),

Committe of PRESTIGE spill-oil. (2003-2004)

Unidad Tecnologica Oceanografica (UTO). Xunta-CSIC-MEC. 2007/8.

Membership and Chairman of Network CLIVAR Spain (2004-2007)