CV date	14/07/2023

Part A. PERSONAL INFORMATION

First name	Rafel		
Family name	Simó		
Gender (*)	Male	Birth date (dd/mm/yyyy)	20/10/1965
ID number		35091154P	
e-mail	rsimo@icm.csic.es	URL Web: https://simolab.icm.csic.es	
Open Researcher and Contributor ID (ORCID) (*)		0000-0003-3276-7663	

A.1. Current position

Position	Research Professor (Profesor de Investigación)		
Initial date	04/2016		
Institution	Institut de Ciències del Mar, CSIC		
Department/Center	Marine Biology and Oceanography		
Country	Spain	Phone number	932309590
Key words	biogeochemistry, climate, microbial ecology, sulfur, volatiles, plankton, interactions, ocean, atmosphere, aerosols		

A.2. Previous positions (research activity interuptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
2007-2016	Senior Researcher (Investigador Científico), ICM-CSIC
2001-2007	Tenured Scientist (Científico Titular), ICM-CSIC

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD Chemistry (Environmental)	Universitat de Barcelona	1995
Bachelor Chemistry	Universitat Autòmoma de Barcelona	1989

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

My career aims at studying the exchanges of substances between the marine biosphere and the atmosphere, and the role these substances play in the functioning of the marine ecosystem and the Earth System. To this aim I make use of a wide array of approaches, from genomics and transcriptomics to numerical ecosystem modeling, from single-cell and population biogeochemistry to global satellite observations, from strain culturing to lagrangian ecosystem studies at sea, from seawater to aerosol analyses.

Major research achievements:

(i) GLOBAL BIOGEOCHEMISTRY, ATMOSPHERE AND CLIMATE: I have set the observational and mechanistic bases to understand the global distribution and dynamics of the emission of cloud-forming volatile sulfur by the oceans (*Science* 2007; *PNAS* 2007). I have pushed forwards reference global climatologies of volatile sulfur emissions (*GBC* 2002, 2007, 2011; *ESSD* 2022), and developed the first satellite algorithms for volatile sulfur (*BGS* 2018) and isoprene (*GRL* 2020) emissions. I led international initiatives to study ocean-atmosphere interactions (e.g., *SciRep* 2017, *ACP* 2019).

(ii) SULFUR AND VOLATILES IN MARINE ECOSYSTEMS: I explored the evolutionary and ecophysiological bases of volatile sulfur production by plankton, either with a community/ecosystem approach (*Nature* 1999, *TrEE* 2001, *L&O* 2002) or by process studies of plankton photobiology and photochemistry (e.g., *GRL* 2011, *ISMEJ* 2012). Recently I have expanded my research into non-sulfur volatile organic compounds (e.g., *CommEarthEnviron.* 2022, *SciAdv* 2023) and coral reefs (*FMarSci* 2022).

(iii) CHEMICAL ECOLOGY of plankton microbes: I led the discovery of dimethylated sulfur as a chemical attractor in microbial plankton, overturning standing paradigms (*Science*

2010), and explored the role of sulfur in plankton symbioses (*PNAS* 2012) and parasitism (*ISMEJ* 2013).

(iv) SINGLE-CELL BIOGEOCHEMISTRY: My group was first in the use of combined molecular biology and biogeochemistry tools at the single-cell level for the sulfur cycle, which led to the description of the microbial taxonomic groups involved in consumption of methylated sulfur (e.g. *EMi* 2006, 2007), and the discovery of algal osmotrophic uptake (e.g., *Science* 2006).

Community building: Leading role in both national and international initiatives, particularly through the development of the international program SOLAS (Surface Ocean – Lower Atmosphere Study), daughter of IGBP, WCRP, iCACGP and SCOR. I participated in the writing of the original Science Plan, and even more deeply in the plan of SOLAS 2.0. I was elected member of the Scientific Steering Committee, organized one of the Open Science Conferences (Barcelona 2009), and vice-chaired COST Action 735, a funding body for SOLAS in Europe, with 18 participant countries.

Member of the Coordination Team of the Malaspina Circumnavigation Expedition 2010-2011, where I served as the coordinator of Ocean Biogeochemistry, with 14 research teams.

Associate Editor of *Limnology and Oceanography* (2023-).

Guest Editor of Special Issues for *Biogeochemistry*, *Environ. Chem.*, and *Front. Mar. Sci*.

Leadership of research expeditions (as Chief Scientist):
Oceanographic cruise MALASPINA-6, Tropical N Pacific, R/V Hesperides, May-June 2011.
Ocean. cruise SUMMER, Mediterranean, R/V Garcia del Cid, 12-23/9/2011.
Ocean. cruise SUMMER-2, Mediterranean, R/V Garcia del Cid, 21-23/5/2012.
Ocean. cruise PEGASO, S. Ocean, R/V Hesperides, 2 Jan – 12 Feb 2015.
BIOGAPS research expedition to Moorea, French Polynesia, 1-28 Apr 2018.
Ocean. cruise BIOGAPS, Mediterranean, R/V Garcia del Cid, 18-26/6/2019.
Ocean. cruise SUMMIT, Mediterranean, R/V Garcia del Cid, 9-17/6/2021.

Knowledge transference and outreach, Leading author in the chapter 'Marine Ecosystems' of the 2nd and 3rd Reports on Climate Change in Catalonia. Co-author of the book Cambio Global, Col. Divulgación, CSIC (2006), among other outreach texts. I am very active in communicating science and environmental awareness to society, with frequent appearance in the media and frequent talks to elementary, secondary, and professional school kids.

Mentoring and supervision: I have supervised 8 completed and 3 ongoing PhD students; 3 have permanent positions (CT) in the CSIC, one is RyC, 2 have research contracts in prestigious labs. I have mentored 10 postdocs; currently one has a permanent position, 2 are RyC.

Institutional responsibilities and community services: In 2012 and between 2017 and 2019 I served as a member of the co-ordination Committee (Area) of Natural Resources, CSIC. In 2013-14-18-19 I was member of the candidate selection committee of the Frontiers of Knowledge Awards, FBBVA-CSIC. I have reviewed manuscripts for *Nature*, *Science*, *Nature Geosci.*, *Nature Comm.*, *Sci. Adv.*, *PNAS*, and 30 more journals. I have reviewed research proposals for ERC, ESF, NERC (UK), NSF and NOAA (USA), NSERC (Canada), AAD (Australia), NWO-Council (Netherlands), AGAUR (Catalonia), ANEP, AEI and CYTMAR (Spain).

Honors: 2000 – City of Barcelona Prize of Scientific Research
2019 - ERC Advanced Grant

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications

Number of SCI publications: 133, including *Science* (3), *Nature* (1), *PNAS* (2), *Nat.Geosci.* (1), *Nat.Comm.* (2), *Sci.Adv.* (1), *TrEE* (1), *ISMEJ* (2), *Global Biogeochem. Cycles* (11), *Limnol. Oceanogr.* (5). 7530 citations, H = 46.

10 most relevant in the last 10 years

1. Wohl, C., Q. Li, C. A. Cuevas, R. P. Fernández, M. Yang, A. Saiz-López, R. Simó (2023). Marine biogenic emissions of benzene and toluene and their contribution to secondary organic aerosols over the polar oceans. ***Science Advances*** 9: eadd9031, doi: 10.1126/sciadv.add9031
2. Hulswar S., R. Simó, M. Galí, T.G. Bell, A. Lana, S. Inamdar, P.R. Halloran, G. Manville, A.S. Mahajan (2022). Third revision of the global surface seawater dimethyl sulfide climatology (DMS-Rev3). ***Earth System Science Data*** 14: 2963–2987, doi:10.5194/essd-14-2963-2022
3. Simó R., P. Cortés, P. Rodríguez-Ros, M. Masdeu-Navarro (2022). Substantial loss of isoprene in the surface ocean due to chemical and biological consumption. ***Communications Earth & Environment*** 3: 20, doi:10.1038/s43247-022-00352-6
4. Brean J., M. Dall'Osto, Z. Shi, D.C.S. Beddows, R. Simó, R.M. Harrison (2021). Open ocean and coastal new particle formation from sulfuric acid and amines in the Northern Antarctic. ***Nature Geoscience***, doi:10.1038/s41561-021-00751-y
5. Simó R., V. Saló, R. Almeda, J. Movilla, I. Trepat, E. Saiz, A. Calbet (2018). The quantitative role of microzooplankton grazing in dimethylsulfide (DMS) production in the NW Mediterranean. ***Biogeochemistry*** 141: 125-142, doi:10.1007/s10533-018-0506-2
6. Dall'Osto M., J. Ovadnevaite, M. Paglione, D.C.S. Beddows, D. Ceburnis, C. Cree, P. Cortés, M. Zamanillo, S.O. Nunes, G.L. Pérez, E. Ortega-Retuerta, M. Emelianov, D. Vaqué, C. Marrasé, M. Estrada, M.M. Sala, M. Vidal, M.F. Fitzsimons, R. Beale, R. Airs, M. Rinaldi, S. Decesari, M.C. Facchini, R.M. Harrison, C.D. O'Dowd, R. Simó (2017). Antarctic sea ice region as a source of biogenic organic nitrogen in aerosols. ***Scientific Reports*** 7: 6047, doi:10.1038/s41598-017-06188-x
7. Fernández-Castro B., B. Mouriño-Carballido, E. Marañón, P. Chouciño, J. Gago, T. Ramírez, M. Vidal, A. Bode, D. Blasco, S.-J. Royer, M. Estrada, R. Simó (2015). Importance of salt fingering for new nitrogen supply in the oligotrophic oceans. ***Nature Communications*** 6: 8002, doi:10.1038/ncomms9002
8. Galí, M., R. Simó (2015). A meta-analysis of oceanic DMS and DMSP cycling processes: disentangling the summer paradox. ***Global Biogeochemical Cycles*** 29: doi:10.1002/2014GB004940
9. Garcés E., E. Alacid, A. Reñé, K. Petrou, R. Simó (2013). Host-released dimethylsulphide activates the dinoflagellate parasitoid *Parvilucifera sinerae*. ***ISME Journal*** 7: 1065-1068, doi:10.1038/ismej.2012.173
10. Decelle J., I. Probert, L. Bittner, Y. Desdevises, S. Colin, C. de Vargas, M. Galí, R. Simó, F. Not (2012). An original mode of symbiosis in open ocean plankton. ***Proceedings of the National Academy of Sciences of the USA*** 109: 18000-18005, doi:10.1073/pnas.1212303109

C.2. Conferences

-32 invited talks, including SOLAS Open Science Conference Halifax 2004, ASLO/AGU Ocean Sciences meeting Portland 2010, American Academy of Microbiology Colloquium Dallas 2011, Symposium in Aquatic Microbial Ecology Helsinki 2005, Microscale Interactions in Aquatic Environments Chamonix 2013

7 of those as keynote speaker

Chairman or convener of 10 sessions

-Organization of 9 international meetings, including the Intl. Symposia on Biological and Environmental Chemistry of DMS(P) (Norwich 2006, Goa 2010, Barcelona 2014), the SOLAS Open Science Conferences (Barcelona 2009, Seattle 2012) and the CIFAR-GBMF workshop “Chemical communication at sea” (Eilat 2017)

C.3. Research projects – 7 most relevant

Title: **SUMMIT**. Novel roles of dimethylated Sulphur in Marine Microbial Interactions. ERC Advanced Grant (ERC-2018-ADG #834162)
Funding source: European Research Council, Advanced Grant; amount granted: 2.499.187 €
PI: R. Simó; starting and ending dates: 1/09/2019 – 31/08/2024

Title: **POLAR-CHANGE**. Aerosol emissions from Polar changing environments (PID2019-110288RB-I00)
Funding source: MICINN; amount granted: 258.940 €
PI: R. Simó, M. Dall’Osto; starting and ending dates: 01/06/2020 – 31/05/20023

Title: **BIOGAPS**. Biogenic trace gases and their cycling processes in the surface sea. (CTM2016-81008-R)
Funding source: MINECO; amount granted: 258.940 €
PI: R. Simó; starting and ending dates: 31/12/2016 – 30/12/2019

Title: **PEGASO**. Plankton-derived Emission of trace Gases and Aerosols in the Southern Ocean (CTM2012-37615)
Funding source: MINECO; amount granted: 327.600 €
PI: R. Simó; starting and ending dates: 01/01/2013 – 31/12/2015

Title: **Circunnavigation Expedition Malaspina 2010**: Global Change and Biodiversity Exploration of the Global Ocean (CSD2008 – 00077 Proyecto CONSOLIDER-INGENIO 2010)
Funding source: MICINN/CSIC/IEO/AZTI; amount granted: 4.350.000 €
PI co-ordinator: C.M. Duarte (IMEDEA-CSIC)
Leader Biogeochemistry WP: R. Simó; starting and ending dates: 01/01/2009 – 31/12/2013

Title: **SUMMER**. Surface Mixing Modulation of the Exposure to solar Radiation (CTM2008-03309)
Funding source: MICINN; amount granted: 358.000 €
PI: R. Simó; starting and ending dates: 01/01/2009 – 31/12/2011

Title: **COST Action 735.** Tools for assessing global air-sea fluxes of climate and air pollution relevant gases
Funding source: COST (Earth System Science and Environmental Management), EU; amount granted: 360.000 €
PI: P.S. Liss (R. Simó vice-chair and Spanish delegate); starting and ending dates: 01/01/2006 – 31/12/2011

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

None.