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REUNION ISLAND, WEST INDIAN OCEAN: AN ACTIVE VOLCANO AS AN UNUSUAL SAMPLING SITE FOR MARINE-ASSOCIATED FUNGI

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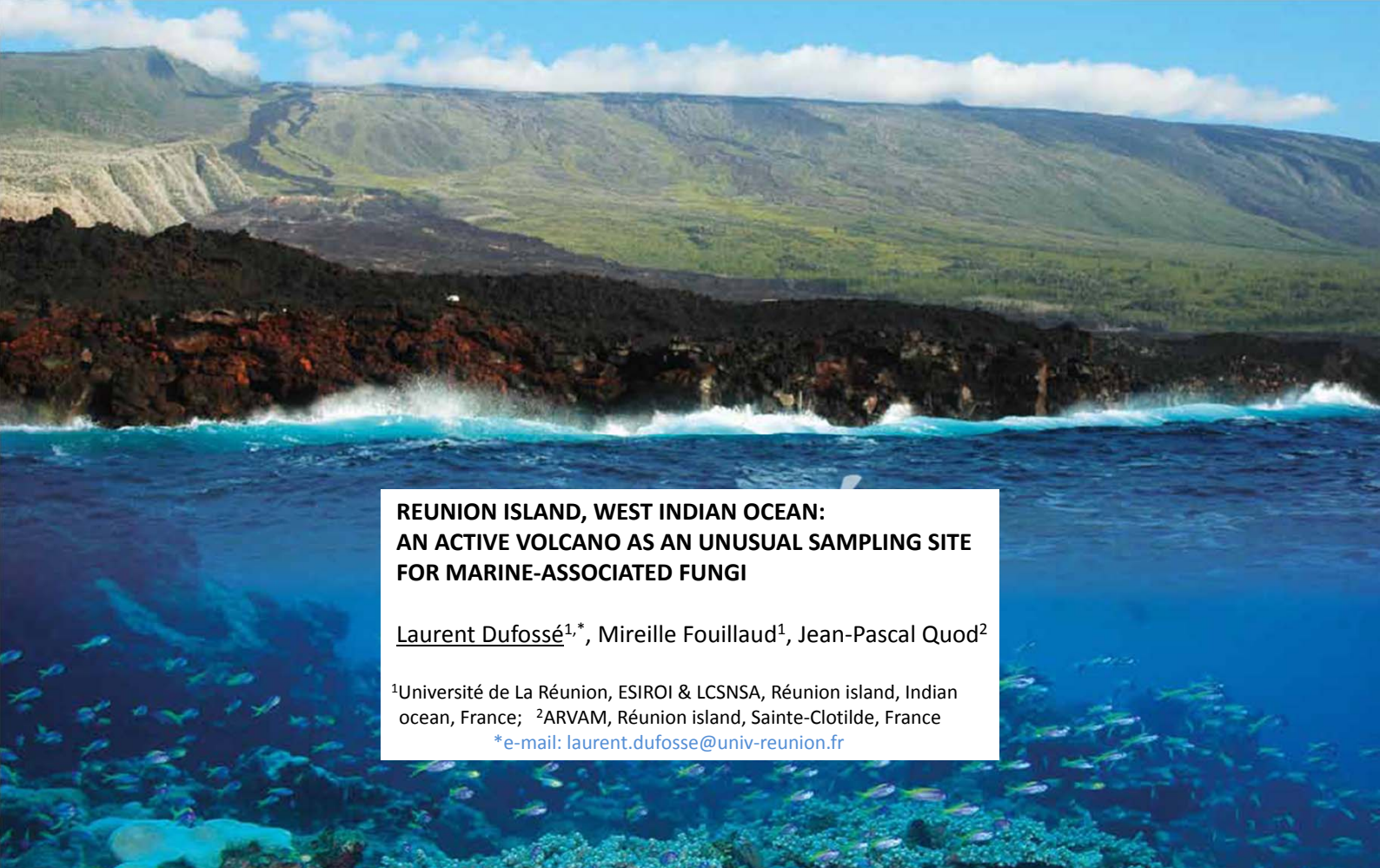
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**REUNION ISLAND, WEST INDIAN OCEAN:
AN ACTIVE VOLCANO AS AN UNUSUAL SAMPLING SITE
FOR MARINE-ASSOCIATED FUNGI**

Laurent Dufossé^{1,*}, Mireille Fouillaud¹, Jean-Pascal Quod²

¹Université de La Réunion, ESIROI & LCSNSA, Réunion island, Indian ocean, France; ²ARVAM, Réunion island, Sainte-Clotilde, France

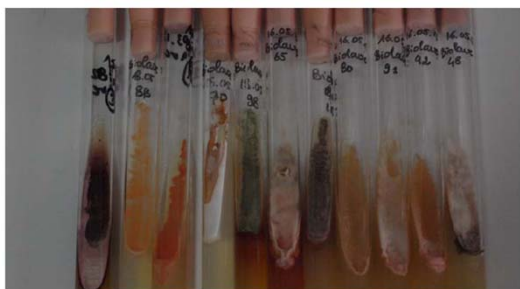
*e-mail: laurent.dufosse@univ-reunion.fr

Marine ecosystems in active volcanic areas are regularly subject to natural hazards such as being covered by incandescent lava flows, acoustic phenomena caused by microseisms, temporary changes in physicochemical conditions of water bodies and exceptional elevations of temperature. The Piton de la Fournaise (Reunion Island) is one of the most active effusive volcanoes in the world with 27 eruptions between 1998 and 2007 and a mean frequency, over a century, of an eruptive phase every 9 months. It provides a natural laboratory to study the colonization of a blank substrate. Therefore, a project called BIOLAVE was launched in 2010 in order to study species and habitat diversity on the coastal marine area of the volcano, including the first taxonomic inventory for the southeast side of the Island [1]. One hundred fungal isolates were obtained from 1977 lava flow (-25m depth), 2004 lava flow (-70m) and free water (-70m) as preliminary sampling. Density of propagules was estimated as follows: 0.085/g free water (-70m), 20/g 2004 lava (-70m) and 80/g 1977 lava (-25m) (MEA, PDA and Sabouraud media). These isolates should now be identified using phenotypic characteristics and molecular biology.

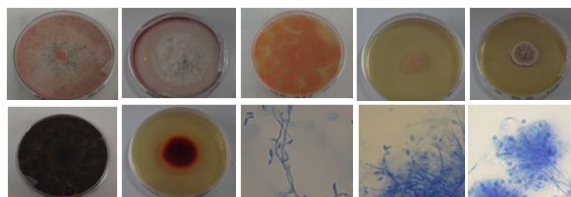
Genus / species from Free water -70m	Similarity with Accession number (GenBank)	Genus / species from Hard lava flow 1977 (-25 m)	Similarity with Accession number (GenBank)
<i>Aspergillus sydowii</i>	KC253961.1	<i>Penicillium citrinum</i>	EU030332.1
<i>Cladosporium cladosporoides</i>	JF949719.1	<i>Penicillium viticola</i>	AB606414.1
<i>Hortaea werneckii</i>	JN997372.1	<i>Epicoccum sorghi</i>	KC106717.1
<i>Myrothecium atroviride</i>	AJ302002.1	<i>Fusarium equiseti</i> (A)	JQ936153.1
<i>Nectria haematococca</i> (A)	XM_003053163.1	<i>Fusarium equiseti</i> (B)	JF311925.1
<i>Periconia</i> sp.	HQ608027.1	<i>Nectria haematococca</i> (B)	XM_003053163.1
<i>Peyronellaea glomerata</i>	JQ936163.1		
<i>Rhodospiridium paludigenum</i>	AF444493.1		



First study on metabolites
(pigmented anthraquinones) [2, 3, 4]
Extrolites available for other studies
(open scientific collaboration with labs)



Growth of marine-derived fungi collected near Lava flow on PDA



Myrothecium atroviride (PDA) *Epicoccum sorghi* *Nectria haematococca* (A) *Nectria haematococca* (B) *Aspergillus sydowii*



Myrothecium atroviride (Sabouraud)

References:

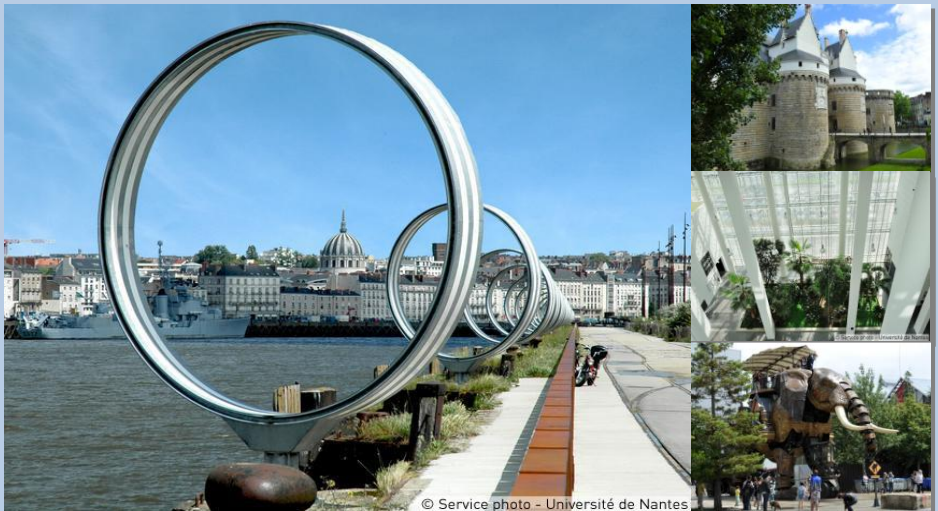
- [1] Bollard S. et al., *Cah. Biol. Mar.*, **2013**, 54, 491-497
- [2] *Natural hydroxyanthraquinoid pigments as potent food grade colorants: an overview.* Caro Y., Anamale L., Fouillaud M., Laurent P., Petit T., Dufossé L. *Natural products and Bioprospecting*, **2012**, 2(5), 174-193.
- [3] *Filamentous fungi are large-scale producers of pigments and colorants for the food industry.* Dufossé L., Fouillaud M., Caro Y., Mapari S.A.S., Sutthiwong N. *Current Opinion in Biotechnology*, **2014**, 26, 56-61.
- [4] *Anthraquinones, the Dr Jekyll and Mr Hyde of the food pigment family.* Dufossé L. *Food Research International*, **2014**, 65, 132-136.



1st International Conference of the
Marine Fungal Natural Products Consortium

Joint with

the 14th International
Marine and Freshwater Mycology Symposium



July 22-24th 2015, Faculty of Pharmacy, Nantes, France
University of Nantes & Ifremer





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Program



1st International Conference of the
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University of Nantes - Faculty of Pharmacy

Tuesday 21st July 2015

From 6:00 pm - Participants registration / Opening cocktail

Wednesday 22nd July 2015

From 8:30 am - Participants registration

09:00-09:20 - Conference opening - Welcome speech

First session

Marine fungal biodiversity I

Chair: Dr. Ka-Lai Pang

09:20-10:10 - Inaugural lecture - Pr. E. B. Gareth Jones – “Gaps in documenting marine fungal biodiversity and their industrial application”

10:10-10:30 - Dr. Marlis Reich – “The many faces of marine fungal communities – Combining information on marine fungal community structure”

10:30-10:45 - *Coffee break*

Second session

Marine fungal biodiversity II

Chair: Pr. E. B. Gareth Jones / Pr. Peter Proksch

10:45-11:05 - Dr. Ka-Lai Pang – “Fungal community associated with *Pterocliadiella capillacea* in northern Taiwan”

11:05-11:25 - Dr. Teppo Rämä – “Diversity and biodiscovery of arctic marine fungi”

11:25-11:45 - Dr. Mohammed Rizman bin Idid – “Revealing antimicrobial potential of selected marine derived endophytic fungi from *Vitex rotundifolia* and *Ipomoea pes-caprae*”

11:45-12:05 - **Flash communications** (5 min/poster)

Dr. Amaria Matallah-Boutiba - *“Fungal isolates from western algerian marine environment”*

Ms. Marion Navarri - *“Antimicrobial activities of deep-sea marine fungi”*

Dr. Elodie Blanchet - *“Intra- and interspecific communication of bacterial and fungal endophytic communities of Posidonia oceanica”*

Pr. Lan Liu - *“Isolation, identification and cytotoxic activity analysis of symbiotic filamentous fungus from Himerometra magnipinna”*

12:05-13:45 – *Lunch*

Third session

Adaptation / chemical response of marine fungi

Chair: Pr. Soizic Prado

13:45-14:35 - Invited lecture - **Pr. Peter Proksch** – *“Co-cultivation - A powerful tool for enhancing the chemical diversity of fungi”*

14:35-14:55 - **Ms. Marine Vallet** – *“Diversity, metabolome and ecological role of endophytic fungi associated with brown algae”*

14:55-15:15 - **Dr. David Overy** – *“Affects of osmotic stress upon secondary metabolism in Aspergillus aculeatus”*

15:15-16:45 - *Coffee break / Poster session / exhibition*

Fourth session

Richness of marine fungi from unique environments

Chair: Dr. Gaëtan Burgaud

16:45-17:35 - Invited lecture - **Pr. Bin-Gui Wang** – *“Enhancing chemical diversity of secondary metabolites produced by marine-derived endophytic fungi from chinese sea waters”*

17:35-17:55 - **Dr. Vanessa Rédou** – *“Marine fungi from deep seafloor sediments: species richness and adaptation”*

17:55-18:15 - **Dr. Zhu-Hua Luo** – *“Fungal diversity and abundance in a hydrothermal vent site at the Mid-Atlantic Ridge of the South Atlantic Ocean”*

Thursday 23rd July 2015

From 8:30 am - Participants registration

First session

Marine fungi, a bioresource of growing interest I

Chair: Pr. Russel G. Kerr

09:00-09:50 - Invited lecture - **Pr. Johannes Imhoff** – “*Marine Fungi - still an underrepresented source of marine natural products*”

09:50-10:10 - **Pr. Laurent Dufossé** – “*Anthraquinones from marine-derived fungi, challengers for natural colors in industrial fields?*”

10:10-10:30 - **Ms. Camila Dias** – “*Lipids from marine-derived fungi as source of bioactive compounds*”

10:30-10:45 - *Coffee break*

Second session

Metabolomics applied to marine fungal extracts

Chair: Pr. Bin-Gui Wang / Dr. Rainer Ebel

10:45-11:05 - **Dr. Samuel Bertrand** – “*Aggressive LC-MS/MS data annotation: application to extract prioritisation*”

11:05-11:25 - **Ms. Alyssa Grunwald** – “*Characterization of tetramic acid containing compounds from *Tolyposcladium* species isolated from Canada’s Arctic*”

11:25-11:45 - Shimadzu sponsor communication

11:45-12:05 - Flash communications (5 min/poster)

Ms. Sahar Daoud - “*Identification of potential bioactive compounds against breast cancer cells from the metabolic profiles of marine-derived *Penicillium* strains*”

Dr. Henrik Harms - “*Epipolythiodiketopiperazines from the marine-derived fungus *Dichotomomyces cejpii* with NF- κ B inhibitory potential*”

Mr. Peter Hufendiek - “*Epipyrones from the marine-derived fungus *Epicoccum nigrum* Link inhibit the proteases Cathepsin K and S*”

Mr. Jan Schrör - “*Secondary metabolites of the fungus *Stemphylium globuliferum* and their biological activity*”

12:05-13:45 – *Lunch*

Third session

Marine fungi, a bioresource of growing interest II

Chair: Pr. Rob J. Capon

13:45-14:35 - Invited lecture – **Dr. Rainer Ebel** – “*Induction of secondary metabolites by/ in marine-derived fungi*”

14:35-14:55 - **Dr. Olivier Grovel** – “*Combining dereplication and semi-synthesis to reveal marine-sourced fungal chemodiversity*”

14:55-15:15 - **Ms. Anne-Isaline van Bohemen** – “*Marine-derived fungi, a new source for bio-control agents: antifungal activity of peptaibols and of a peptaibol-producing strain, Trichoderma atroviride*”

15:15-16:45 - *Coffee break* / **Poster session** / **exhibition**

16:45-18:15 - Round table / Marine Fungal Natural Products Consortium discussion
Chair: Pr. Russell G. Kerr / Pr. E.B. Gareth Jones

20:00 - *Gala dinner*

Friday 24th July 2015

First session

From ecology, physiology to innovative products from marine fungi

Chair: Pr. Gabriele König / Pr. Johannes Imhoff

09:20-09:40 - **Ms. Aiko Hayashi** – “*Australian dust storm associated with extensive Aspergillus sydowii fungal “bloom” in coastal waters*”

09:40-10:00 - **Dr. Giovanna Cristina Varese** – “*Phylogenetic diversity and chemical profiling of algicolous marine fungi active against multidrug resistant bacteria*”

10:00-10:20 – **Pr. Rob J. Capon** – “*Polyketides from marine mollusc-associated fungi*”

10:20-10:35 - *Coffee break*

Second session

Metabolites of marine-derived fungi

Chair: Dr. Catherine Roullier

10:35-11:25 - Invited lecture - **Pr. Gabriele M. König** – “*Marine-derived fungal metabolites – focussing on structural diversity, biosynthesis and bioactivity*”

11:25-12:00 – Awards

12:00-12:15 – Conclusion

13:30-18:00 - *Social event*



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POSTERS

(& flash communications)

Reunion Island, West Indian Ocean: an active volcano as an unusual sampling site for marine-associated fungi

Laurent Dufossé^{1,*}, Mireille Fouillaud¹, Jean-Pascal Quod²

¹Université de La Réunion, ESIROI & LCSNSA, Réunion Island, Indian Ocean, France.

²ARVAM, Réunion Island, Sainte-Clotilde, France.

*E-mail: laurent.dufosse@univ-reunion.fr

Marine ecosystems in active volcanic areas are regularly subject to natural hazards such as being covered by incandescent lava flows, acoustic phenomena caused by microseisms, temporary changes in physicochemical conditions of water bodies and exceptional elevations of temperature. The Piton de la Fournaise (Reunion Island) is one of the most active effusive volcanoes in the world with 27 eruptions between 1998 and 2007 and a mean frequency, over a century, of an eruptive phase every 9 months. It provides a natural laboratory to study the colonization of a blank substrate. Therefore, a project called BIOLAVE was launched in 2010 in order to study species and habitat diversity on the coastal marine area of the volcano, including the first taxonomic inventory for the southeast side of the Island [1].

One hundred fungal isolates were obtained from 1977 lava flow (-25m depth), 2004 lava flow (-70m) and free water (-70m) as preliminary sampling. Density of propagules was as follows: 0.085/g free water (-70m), 20/g 2004 lava (-70m) and 80/g 1977 lava (-25m) (MEA, PDA and Sabouraud media). These isolates should now be identified using phenotypic characteristics and molecular biology.



[1] Bollard *et al.*, *Cah Biol Mar*, **2013**, 54, 491.



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List of participants

Last name	First name	Country	Institution	E-mail
Abdel-Raheem	Ahmed	Egypt	Sohag University, Faculty of Science	a.abdel-raheem@mailcity.com
Amelot	Roxanne	France	Biogenouest	roxanne.amelot@biogenouest.org
Amzil	Zouher	France	Ifremer	zouher.amzil@ifremer.fr
Bertrand	Samuel	France	University of Nantes	samuel.bertrand@univ-nantes.fr
Blanchet	Elodie	France	Obs océanologique de Banyuls sur mer UPMC-CNRS	eblanchet@obs-banyuls.fr
Boustie	Joël	France	Université Rennes1/ ISCR	joel.boustie@univ-rennes1.fr
Burgaud	Gaëtan	France	Université de Bretagne occidentale	gaetan.burgaud@univ-brest.fr
Capon	Rob	Australia	The University of Queensland	r.capon@uq.edu.au
Chaurand	Ludivine	France	University of Nantes	ludivine.chaurand@gmail.com
Chollet-Krugler	Marylène	France	Equipe PNSCM - UMR CNRS 6226	marylene.chollet@univ-rennes1.fr
Daoud	Sahar	France	University of Nantes	daoud.sahar@hotmail.com
Dias	Camila	France	University of Nantes	acamiladias@gmail.com
Dufosse	Laurent	Indian Ocean, France	University of Reunion Island, Indian ocean	laurent.dufosse@univ-reunion.fr
Ebel	Rainer	United Kingdom	University of Aberdeen	r.ebel@abdn.ac.uk
Gentil	Emmanuel	France	University of Nantes	emmanuel.gentil@univ-nantes.fr
Grovel	Olivier	France	University of Nantes	olivier.grovel@univ-nantes.fr
Grunwald	Alyssa	Canada	University of Prince Edward Island	agrunwald@upe.ca
Hayashi	Aiko	Australia	Institute for Marine and Antarctic Studies	Aiko.Hayashi@utas.edu.au
Herrenknecht	Christine	France	University of Nantes	Christine.Herrenknecht@univ-nantes.fr
Hess	Philip	France	IUML (Institut Universitaire Mer et Littoral)	Philipp.Hess@ifremer.fr
Hoang	Thi Phuong Thuy	France	University of Nantes	phuongthuy.pharma@gmail.com
Hufendiek	Peter	Germany	University of Bonn	s6pehufe@uni-bonn.de
Idid	Mohammed Rizma	Malaysia	University of Malaya	rizman@um.edu.my
Imhoff	Johannes F.	Germany	Helmholtz-Zentrum für Ozeanforschung Kiel	jimhoff@geomar.de
Jones	E. B. Gareth	Kingdom of Saudi Arabi	King Saud University	torperadgi@gmail.com
Kalyanaraman	Rajagopal	India	Vels University, Chennai	hodbio@technology@velsuniv.org
Kerr	Russell	Canada	University of Prince Edward Island	rkerr@upe.ca
König	Gabriele	Germany	University of Bonn	g.koenig@uni-bonn.de
Labes	Antje	Germany	GEOMAR	alabes@geomar.de
Lagarde	Aurélie	France	Université de Limoges	aurelie.lagarde@etu.unilim.fr
Le Bellec	Matthieu	France	University of Nantes	
Le Devehat	Francoise	France	PNSCM, InInstitut des Sciences chimiques de Rennes	francoise.le-devehat@univ-rennes1.fr
Le Ficher	sonia	France	SHIMADZU France	slf@shimadzu.fr

Last name	First name	Country	Institution	E-mail
Le Lamer	Anne-Cécile	France	Université de Rennes1	anne-cecile.le-lamer@univ-tlse3.fr
Legoupil	Thierry	France	SHIMADZU France	tlg@shimadzu.fr
Legrave	Nathalie	France	Université de Rennes 1	nathalie.legrave@univ-rennes1.fr
Liu	Lan	China	Sun Yat-sen University	cesllan@mail.sysu.edu.cn
Luo	Zhu-Hua	China	Third Institute of Oceanography, State Oceanic Administration, China	luozhuhua@hotmail.com
Matallah-Boutiba	Amaria	Algeria	University of Oran	amariamatallah@hotmail.com
Meslet-Cladiere	Laurence	France	Université de Bretagne occidentale	laurence.meslet@univ-brest.fr
Navarri	Marion	France	Université de Bretagne occidentale	marion.navarri@univ-brest.fr
Noël	Alba	France	Université Rennes 1	alba.noel@univ-rennes1.fr
Ory	Lucie	Switzerland	University of Geneva	lucie.ory@unige.ch
Overy	David	Canada	University of Prince Edward Island	kerr757@aol.com
Pang	Ka-Lai	Taiwan	Institute of Marine Biology, National Taiwan Ocean University	klpang@ntou.edu.tw
Pouchus	Yves François	France	University of Nantes	yves-francois.pouchus@univ-nantes.fr
Prado	Soizic	France	National History Museum MNHN	sprado@mnhn.fr
Proksch	Peter	Germany	Heinrich Heine University Düsseldorf	Peter.Proksch@uni-duesseldorf.de
Rämä	Teppo	Norway	UiT – The Arctic University of Norway	teppo.rama@uit.no
Redou	Vanessa	France	Université de Bretagne occidentale	vanessa.redou@univ-brest.fr
Reich	Marlis	Germany	University of Bremen	reich@uni-bremen.de
Robiou du Pont	Thibaut	France	University of Nantes	thibaut.robiau@univ-nantes.fr
Roullier	Catherine	France	University of Nantes	catherine.roullier@univ-nantes.fr
Ruiz	Nicolas	France	University of Nantes	nicolas.ruiz@univ-nantes.fr
Sage	Lucile	France	Université Joseph Fourier	lucile.sage@ujf-grenoble.fr
Sallenave-Namont	Claire	France	University of Nantes	claire.sallenave-namont@univ-nantes.fr
Schrör	Jan	Germany	University of Bonn, Institute of Pharmaceutical Biology	jschroer@uni-bonn.de
Souard	Florence	France	Université Joseph Fourier	florence.souard@ujf-grenoble.fr
Suire	Thierry	France	NITROCRAFT	thierry.suire@nitrocrafr.fr
Tasdemir	Deniz	Germany	GEOMAR Helmholtz Centre for Ocean Research Kiel	dtasdemir@geomar.de
Tomasi	Sophie	France	PNSCM, UMR CNRS ISCR 6226	sophie.tomasi@univ-rennes1.fr
Vallet	Marine	France	National History Museum MNHN	mvallet@edu.mnhn.fr
van Bohemen	Anne-Isaline	France	University of Nantes	ai.vanbohemem@gmail.com
Vansteelandt	Marieke	France	Université Toulouse III	marieke.vansteelandt@univ-tlse3.fr
Varese	Giovanna Cristina	Italy	University of Torino	cristina.varese@unito.it
Wang	Bingui	China	Institute of Oceanology of the Chinese Academy of Sciences	wangbg@ms.qdio.ac.cn



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List of co-authors

Last name	First name	
Alias	Siti Aisah	OC-4
Allard	Pierre-Marie	Po-19
Almeida	Celso	IL-6
Balakrishnan	Harshini Devi	OC-4
Banos	Stefanos	OC-1
Barbier	Georges	OC-7, Po-07*
Barnathan	Gilles	OC-10
Batailler	Nicole	Po-03*
Berrue	Fabrice	OC-12
Bertrand	Samuel	OC-10, OC-11, OC-15
Bills	Gerald H.	OC-6
Blanchet	Elodie	Po-03*, OC-14
Boumard	Marie-Claude	OC-15, Po-12
Boutiba	Zitouni	Po-06*
Brillet	Benjamin	Po-07*
Burgaud	Gaëtan	OC-7, Po-05, Po-07*
Capon	Rob J.	OC-6, OC-18
Caro	Yanis	OC-9, Po-01
Cha	Hyo-Jung	OC-2, Po-14, Po-16
Chailloux	Chloé	Po-10*
Chang	Wen-Husan	Po-16
Chen	D.	Po-04*
Chi	Wei-Chiung	Po-09, Po-15
Coman	Frank	OC-16
Correa	Hebelin	OC-6
Couzinet-		
Mossion	Aurélie	OC-10
Cuendet	Muriel	Po-19
Cuet	Pascale	OC-9, Po-01
Damun	Nesaei-Mosaferan	Po-11*
Daoud	Sahar	Po-10*
D'Auria	Maria Valeria	OC-17
Davies	Claire	OC-16
de Pascale	Donatella	OC-17
Delmail	David	Po-22
Diederich	Marc	Po-11*

Last name	First name	
dos Santos Dias	Ana Camila	OC-10
Du	Kady	OC-5
Dufossé	Laurent	OC-9, Po-01, Po-02
Dupont	Joëlle	OC-5
Ebel	Rainer	IL-5, OC-6
El Maddah	Fayrouz	IL-6
Esposito	Fortunato Palma	OC-17
Fabre	Nicolas	Po-18
Fani	Renato	OC-17
Festa	Carmen	OC-17
Fleury	Yannick	Po-07*
Fouillaud	Mireille	OC-9, Po-01, Po-02
Gachon	Claire M. M.	OC-5
Garzoli	Laura	Po-05
Gindro	Katia	Po-19
Glöckner	Frank O.	OC-1
Gnavi	Giorgio	OC-17, Po-05
Grovel	Olivier	OC-14, Po-12
Grunwald	Alyssa	OC-12
Guillemette	Thomas	OC-15
Guitton	Yann	OC-11, OC-14
Gütschow	Michael	Po-13*, Po-17*
Haddad	Mohamed	Po-18
Hallegraeff	Gustaaf	OC-16
Haltli	Bradley	OC-12
Harms	Henrik	Po-11*
Hayashi	Aiko	OC-16
Hoang	Thi Phuong Thuy	Po-12
Hsiao	Che-Jen	Po-14
Huang	Xiang-Ling	OC-8
Hufendiek	Peter	Po-13*, IL-6, Po-17*
Hurvois	Jean-Pierre	Po-21
Huvelin	Jean-Michel	Po-10*
Hyde	Kevin	OC-4
Imhoff	Johannes F.	IL-4, OC-1
Inguibert	Nicolas	Po-08

Last name	First name	
Jargeat	Patricia	Po-18, Po-20
Jaspars	Marcel	IL-5
Ji	Seungwon	Po-11*
Jones	E.B. Gareth	IL-1
Kehraus	Stefan	IL-6, Po-13*, Po-17*
Kerr	Russell G.	OC-6, OC-12
König	Gabriele M.	IL-6, Po-11*, Po-13*, Po-17*
Labes	Antje	OC-1
Lacey	Ernest	OC-16
Lagarde	Aurélie	Po-20
Lami	Raphaël	Po-03*
Le Bellec	Matthieu	OC-10
Le Bot	Ronan	OC-14
Lecoultre	Nicole	Po-19
Lee	Tzong-Huei	Po-09, Po-14, Po-15, Po-16
Lee	Ming-Shian	Po-14
Legrave	Nathalie	Po-22
Li	Guang-Wei	OC-8
Li	Y.	Po-04*
Li	J.	Po-04*
Liu	Lan	Po-04*
Luo	Zhu-Hua	OC-8
Magalon	Hélène	OC-9, Po-01
Mambu	Lengo	Po-20
Marti	Guillaume	Po-18
Matallah-Boutiba	Amaria	Po-06*
Meddah	Asma	Po-06*
Meslet-Cladière	Laurence	OC-7, Po-07*
Millot	Marion	Po-20
Monti	Maria Chiara	OC-17
Navarri	Marion	Po-07*, OC-7
Nazih	Hassan	OC-10, Po-10*
Nazir	Mamona	IL-6
Noël	Alba	Po-21
Orlikova	Barbora	Po-11*
Ory	Lucie	Po-19

Last name	First name	
Overy	David P	OC-6, OC-12
Pang	Ka-Lai	OC-2, OC-6, Po-09, Po-14, Po-15, Po-16
Panzer	Katrin	OC-1
Parrot	Delphine	Po-21
Phuong	Nam Ngoc	Po-08
Poirier	Laurence	Po-08
Poli	Anna	OC-17, Po-05
Pouchus	Yves-François	OC-10, OC-14, OC-15, Po-06*, Po-08, Po-10*, Po-12
Prado	Soizic	OC-5, Po-03*
Prigione	Valeria	Po-05
Proksch	Peter	IL-2
Quod	Jean-Pascal	Po-02
Rämä	Teppo	OC-3
Rateb	Mostafa E	OC-6, IL-5
Rédou	Vanessa	OC-7
Reich	Marlis	OC-1
Renaux	Yann	OC-15
Richardson	Anthony J.	OC-16
Rizman-Idid	Mohammed	OC-4
Robiou du Pont	Thibaut	Po-12
Roullier	Catherine	OC-6, OC-11, OC-14, Po-10
Ruiz	Nicolas	OC-10, OC-15, Po-06*, Po-08
Schrör	Jan	Po-17*, IL-6
Shang	Zhuo	OC-6
Silva	Ricardo	OC-14
Slotwinski	Anita	OC-16
Stien	Didier	Po-03*
Strittmatter	Martina	OC-5
Tedesco	Pietro	OC-17
Tomasi	Sophie	Po-21, Po-22
Vallet	Marine	OC-5
van Bohemen	Anne-Isaline	OC-15, Po-08
Vansteelandt	Marieke	OC-14, Po-18
Varese	Giovanna Cristina	OC-17, Po-05

Last name	First name	
Venkatachalam	Mekala	OC-9, Po-01
Vignaud	Laetitia	Po-20
Wakefield	Jennifer	IL-5
Wang	Bingui	IL-3
Weiß	Michael	OC-1
Whittock	Lucy	OC-16
Wielgosz-Collin	Gaëtane	OC-10
Wolfender	Jean-Luc	Po-19
Xu	Wei	OC-8
Xu	J.	Po-04*
Yilmaz	Pelin	OC-1
Zalouk-Vergnoux	Aurore	OC-15, Po-08
Zwick	Vincent	Po-19

* *Flash communications*