

Rémi Losno (losno@ipgp.fr)

LISA, Universités Paris 7







wer atmosphere stud

# *Karine Sellegri (*k.sellegri@opgc.univ-bpclermont.fr) Sea2Cloud

**Highlight 1:** Oceanic phytoplankton are a potentially important source of benzenoids to the remote marine atmosphere

Benzene, toluene, ethylbenzene and xylenes can contribute to secondary aerosol formation in the atmosphere. Laboratory culture experiments confirmed marine phytoplankton are a source of benzene, toluene, ethylbenzene, xylenes and in mesocosm experiments their seaair fluxes varied between seawater samples containing differing phytoplankton communities. These fluxes were of a similar magnitude or greater than the fluxes of dimethyl sulfide, which is considered to be the key reactive organic species in the marine atmosphere. Biogenic sources of these gases may be sufficiently strong to influence atmospheric chemistry in some remote ocean regions.





Rocco, M., Dunne, E., Peltola, M. plankton are a potentially important source of benzenoids to the remote marine atmosphere Commun Earth Environ 2, 175 (2021).



The SOLAS France activities are coordinated by the national program LEFE (Les envelopes Fluides et l'Environnement) managed by INSU (Institut National des sciences de L'Univers). Support and funding is provided by INSU (LEFE), MDESR (Universities) CNRS, ANR, IFREMER, IPEV, CEA, IRD and EU-FP6.

**SOLAS-France** zoom meeting, march 29<sup>th</sup>, 2021, about 20 attendees. Three presentations: Cécile Guieu: PEACETIMES, Clément Demasy, solubility of patagonian dust in an acidification context, Yangjunjie Xu-Yang, Atmospheric Deposition over Guadeloupe, see: http://solas.ipgp.fr/2021/



agency)

Yangjunjie Xu-Yang (yxu@ipgp.fr), Rémi Losno, Céline Dessert, Atmospheric deposition over the Caribbean region The total atmospheric deposition fluxes were continuously sampled on a weekly basis in Guadeloupe, Lesser Antilles, from March 2015 to August 2018 (41 months). Elemental deposition fluxes including AI, Ca, K, Mg, Fe, Na, P, S, and Zn were measured for all samples in order to provide the first long time series of atmospheric elemental deposition fluxes over the Lesser Antilles region. It is shown that: () the three sources of atmospheric deposits in Guadeloupe for the presented elements are sea salt (for K, Ca, Mg, Na, S), long-range transported Saharan dust (for Al, Ca, K, Fe), and biogenic particles (for P and Zn); (ii) the average deposition mass fluxes of sea salt and Saharan dust are 16.7 g.m<sup>2</sup>.year<sup>4</sup> and 10.6 g.m<sup>2</sup>.year<sup>4</sup>, respectively, without noticeable inter-annual variations; a pronounced seasonality is found for the Saharan dust deposition, for which maximum flux values are observed between June and July each year and 85% of the annual deposition flux occurs between April and September; (iv) the deposition flux of sea salt is strongly correlated to local wind speed, without seasonality.



nfluence of 10 ppb ozone concentration increase on seawater phytoplankton-derived BTEX fluxes. Comparison of toluene, benzene and xylenes fluxes (ng m-1 s-1) over the three experiments performed in ship-borne Air-Sea Interface Tanks (ASIT). Bottom and top of each box are the 25th and 75th percentile, line in the middle of each box is the median and whiskers are the maximum and minimum values.

Sea also: Peltola, M., Rose, C., Trueblood, J. V., Gray, S., Harvey, M., and Sellegri, K.: New particle formation in coastal New Zealand with a focus on open-ocean air masses, Atmos. Chem. Phys., 22, 6231-6254, https://doi.org/10.5194/acp-22-6231-2022, 2022. https://doi.org/10.5194/acp-2021-819





## Clément Demasy, demasy@ipgp.fr, Marie Boyé

Solubility and bioavaibility of patagonian dust in the future Southern Ocean. Since the industrial revolution, humans have been generating large amounts of CO<sub>2</sub> and these greenhouse gases are the main source of the global warming. In this regard, trace metals such as iron (Fe) are present at very low concentrations in the open ocean (~fmol.kg<sup>-1</sup> to nmol.kg<sup>-1</sup>) and therefore play an essential role for the growth of microalgae. the SAGAS project (Solubility of Patagonian dust in the future Southern Ocean, funded by the IDEX-Université de Paris Cité in 2020 and coordinated by M. Boye at IPGP) aimed to diagnose the effects of increased dust deposition and other predicted changes on the solubility of Fe and other trace metals contained in Patagonian dust. It relies on abiotic experiments that were conducted under the actual and future controlled conditions using Patagonian dust and filtered seawater sampled during the OISO-30 cruise.

Philippe Goloub (philippe.goloub@univ-lille.fr), L. Blarel, G. Dubois, B. Torres, O. Pujol, F. Ducos, Gest L., N. Marquestaut, et al., Monitoring of Aerosol Properties in the Indian Ocean.



A first automatic shipborne CIMEL CE318T photometer was permanently installed early January 2021 aboard the French research vessel Marion Dufresne in the frame of the MAP-IO (Marion Dufresne Atmospheric Program - Indian Ocean, research programme.

### David Antoine (david.antoine@curtin.edu.au), Peter Sutherland, Karine Leblanc, Cédric Cotte, Rémi Losno: Polar Pod project.

Polar-Pod program really starts after a decade of preparation. See: https://www.polarpod.fr/ More than 100 researchers of 43 worldwide research institutions are involved in the Polar POD scientific program. It will be an essential contribution to the program of the United Nations Decade of Ocean Science for Sustainable Development (2021-2030). All data will be available to the entire scientific community as well as the general public.





Vitesse du vent et pression atmosphérique



Photograph of the incubators on board the R/V Marion Dufresne, equipped with *light filters and supplied by surface* seawater to maintain representative radiance and temperature of the surface ocean



Carla Geisen (carla.geisen@locean.ipsl.fr), Céline Ridame and Damien Cardinal.

Southern Ocean diatoms benefit from nutrients provided by desert dust and volcanic ash. A phytoplankton response triggered by a representative deposition event of natural aerosols in the Indian sector of the Southern Ocean.

An experimental study focusing on marine biogeochemistry has been carried out as part of the OISO program (French Océan Indien Service d'Observations) during an oceanographic campaign in January-February 2019 in the Indian sector of the Southern Ocean aboard the R/V Marion Dufresne. Incubations (Figure 1) show that a representative deposition of natural aerosols triggers a phytoplankton response in different regions of the Southern Ocean, while modifying the structure of the planktonic community to the benefit of diatoms. This study, conducted mainly by researchers from LOCEAN-IPSL and LISA-IPSL, has just been published in open access in the journal Limnology and Oceanography (Geisen et al. 2022).

### Cécile Guieu (guieu@obs-vlfr.fr) and Karine Desboeufs, (Karine.Desboeufs@lisa.u-pec.fr), **PEACETIME** field campaign

The Mediterranean Sea, a hot spot for biodiversity but also for climate change and anthropogenic pressure, is an ideal natural laboratory to study the processes occurring at the atmosphere-ocean interface. The project PEACETIME (ProcEss studies at the Air-sEa Interface) after dust deposition in the Mediterranean sea) will provide the understanding necessary to accurately represent natural and anthropogenic chemical exchanges at the air-sea interface and their impacts on marine ecosystems and services, today and in the future. PEACETIME is relevant for the questions addressed in the "SOLAS 2015-2025 Science Plan and Organisation" in particular regarding the theme "Atmospheric deposition and ocean biogeochemistry". In the frame of PEACETIME, an oceanographic cruise onboard the R/V 'Pourquoi Pas?' took place in the Western/Central Mediterranean Sea May 10–June 11, 2017



#### Air-sea instrumentation

Mass spectrometer





The Fast Action during PEACETIME allowed a direct observation of a dust deposition event to the ocean as shown on the AOT images (the boat location is the red star).

