

## FINAL REPORT PROGRAM LEFE

Program LEFE/ IMAGO	Project Title	Years 2017
	Understand the relation between solar variability, climatic change and biodiversity in the Tropics  (UV-TROP)	
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<p><i>Context:</i> Using both solar and climatic proxy we can observe the possible connexions between solar activity and the variability of the tropical climatic drivers such as the Inter Tropical Convergence Zone, oceanic current and South American Summer Monsoon</p> <p><i>Objectives / scientific questions:</i> This project aimed to reconstruct at high resolution the climate changes (precipitation, temperature and length of the dry season) and the changes in UV radiation recorded by the pollen grains from samples collected in the crater of Colonia in Brazil and see how climate relates to UV radiation during several glacial interglacial cycles.</p> <p><i>Main results:</i> We obtained 2 cores of 50m depth each and we did some very encouraging U-V tests on 30 pollen grains of Poaceae and 5 sediment samples. In this attempt tests have been performed on fossil pollen grains of Poaceae in order to evaluate the variability of the U-V spectra between the different pollen grains of the same taxa and on the other hand on different sediment samples to evaluate the variability between the samples located at different depth along the core. Chemical analyses have been performed with spectrometry IFTR and pollen grains are extracted from the sediment following classical standard pollen treatment. We examined 30 pollen of Poaceae and the spectral band was defined at 1510 cm<sup>-1</sup>. The spectral bands of absorbance show a good homogeneity within the different pollen grains for this absorption. The small differences observed could be due to different state of conservation within the pollen grains. Figure 2 shows results obtained for 5 samples located between 209 and 280 cm depth on core CO14. Differences observed on absorbance band 1510 cm<sup>-1</sup> show U-V absorption variability as function of the depth of the sample according to the method published by Jardine et al. 2016, 2017; Julier et al 2016.</p> <p>References            Jardine et al 2016 Pollen and spores as biological recorders of past ultraviolet irradiance Scientific reports DOI: 10.1038/srep39269            Jardine et al 2017 Shedding light on sporopollenin chemistry, with reference to UV reconstructions Review of Palaeobotany and Palynology 238, 1-6            Julier, A.C.M., Jardine, P.E., Coe, A.L., Gosling, W.D., Lomax, B.H., Fraser, W.T., 2016. Chemotaxonomy as a tool for interpreting the cryptic diversity of Poaceae pollen. Rev. Palaeobot. Palynol. 235, 140–147.            doi:10.1016/j.revpalbo.2016.08.004</p>		

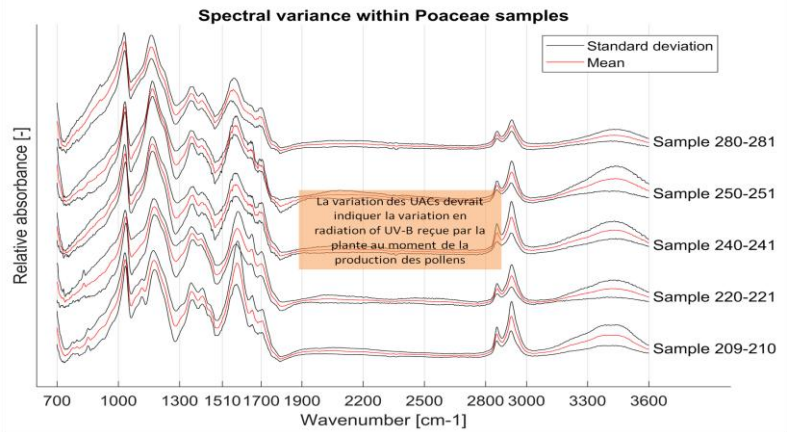


Fig. 1 Deep drilling at Colônia São Paulo, Brazil in August 2017

Fig. 2 Absorbance of the fossil pollen grains of Poaceae in 5 test samples of the core CO 14 from Colonia São Paulo Brazil dated between 50 and 40 kyr (data W Gosling, University of Amsterdam) following the method described in Jardine et al 2016, 2017.

*Future of the project* : Applying for fundings to perform the UV analyses on more fossil samples and reconstruct the UV activity over the last 2 million years

*Nombre de publications, de communications et de thèses  
(citer au maximum 5 publications en lien direct avec le projet)*

Montade V, Ledru MP, Giesecke T, Peyron O, Behling H., Flantua S (accepted) A new modern pollen dataset describing the Brazilian Atlantic Forest. The Holocene

PhD Adriana Camejo Responses of the atlantic Forest to glacial cycles University of Campinas (2018-2020) co direction Pfra Fresia Ricardi-Branco et Marie-Pierre Ledru (fundings CAPES Brazil)

Prado R, Espin Fenoll I, Ulah I, Miura G, Crosta A, dos Santos R, Vagner E, Machado E, Reimold WU, Diogo L, Riccomini C. (in press) Geophysical investigation of the Colônia structure, Brazil. Meteoritics and Planetary Science

Other publications

Ledru, M.P., Reimold W.U., Ariztegui, D., Bard E., Crósta, A.P., Riccomini, C., Sawakuchi A.O. (2015) Why drilling deep in the Colônia Basin (Brazil). *Scientific Drilling*. 20, 33-39.

Ledru, M.-P., Mourguiart, P., Riccomini C. (2009). Related changes in biodiversity, insolation and climate in the atlantic rainforest since the last interglacial *Palaeogeography, Palaeoclimatology, Palaeoecology* 271, 140-152.