Anta-Clarisse Sarr

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Update - MAY 2023

Research interests :
Interactions between deep and superficial Earth, Earth System science, Cenozoic paleoclimate, Numerical modeling

RESEARCH EXPERIENCE

Postdoctoral Research Associate, Earth System Sciences *Nov. 2022- Oct. 2023*
ISTerre, Grenoble (France)
Laboratoire d'Ecologie Alpine (LECA), Grenoble (France)

○ Project : *GeoBioClim* - Investigating the co-evolution of solid Earth and biosphere in seaway regions | Main Collaborators : L. Husson, S. Lavergne, F. Boucher

Postdoctoral Scholar, Paleoclimate modeling *Oct. 2020- Sep. 2022*
CEREGE, Aix-en-Provence (France)

○ Project : Investigating the effect of orbital variations on ocean biogeochemistry and continental weathering using Earth System Model simulations. | Main collaborator : Y. Donnadieu

Postdoctoral Scholar, Paleoclimate modeling *Sep. 2019- Sep. 2020*
CEREGE, Aix-en-Provence (France)

○ Project : Investigating the paleogeography forcing on the Miocene climate evolution using Earth System Model simulations. | Main collaborator: Y. Donnadieu

Ph.D., Earth System Sciences
LSCE, Paris Saclay (France) - Convention d'accueil LSCE/CEA *Jan. 2017- Dec. 2018*
ISTerre, Grenoble (France) *Sep. 2015- Dec. 2016*

○ Project : Quaternary subsidence in Southeast Asia: from mantle dynamics to atmospheric circulation - Geomorphology, Geodynamics and Climate modeling. | Supervisors : L. Husson, P. Sepulchre

MsC., Geomorphology and geochronology *2014 – 2015*
ISTerre, Chambéry (France)

○ Project: Estimating sidewalls erosion in the Mont-Blanc massif: insights from in-situ produced ^{10}Be erosion rates. | Supervisors : J-L. Mugnier, J. Carcaillet

EDUCATION

Ph.D. Earth Sciences, Grenoble Alpes University, Grenoble, France 2015-2018
MsC. Earth Sciences, Grenoble Alpes University, Grenoble, France 2014-2015
MsC. Geology and Geophysics, Unilasalle, Beauvais, France 2010-2015

FUNDING

- **BQR research project** (Internal call ISTerre lab.) 2023
  Inter-model comparison for Miocene climate [PI ; 2.8 k€]
- **LabEX OSUG Fellowship (U. Grenoble Alpes)** (Call for strategic projects) 2023 – 2024
  Geology and Biosphere in Panama and Bering Strait region (GeoBioClim)
  [design and write the project ; 103 k€]
- **PhD Scholarship** (French Ministry of Education and Research) 2015 – 2018
  [$\sim$ 90 k€]
- ECORD Scholarship to attend the Urbino Summer School in Paleoclimatology [1.2 k€] 2018
- Grant for international mobility (ED TUE - U. Grenoble Alpes) [500 €] 2016

- *> 11 millions computing hours on national HPC facilities (TGCC/GENCI - CEA) (Project PI: P. Sepulchre, LSCE)* 2017 – 2022
- *Computing Project on regional HPC facilities (CIMENT - GRICAD)* 2023

PUBLICATIONS **19 publications** in peer-review journals (6 first author publications) + 1 publication in revision.

19. Pillot, Q., Succhéras-Marx, B., **Sarr, A-C.**, Bolton, C., Donnadieu, Y., A global reassessment of the spatial and temporal expression of the Late Miocene Biogenic Bloom, *Paleoceanography and Paleoclimatology* (2023).

18. **Sarr, A-C.**, Donnadieu, Y., Laugié, M., Ladant, J-B., Suchéras-Marx, B., Raisson F., Ventilation changes drive orbital-scale deoxygenation trends in the late Cretaceous ocean, Geophysical Research Letters,49:e2022GL099830 (2022).

17. Martinot, C., Bolton, C., **Sarr, A-C.**, Donnadieu, Y., Garcia, M., Gray, E. and Tachikawa, K. Drivers of late Miocene tropical sea surface cooling: a new perspective from the equatorial Indian Ocean. Paleoceanography and Paleoclimatology, 37: e2021PA004407 (2022).

16. Pillot, Q., Donnadieu, Y., **Sarr, A-C.**, Ladant, J-B., Suchéras-Marx, B. Evolution of ocean circulation in the North Atlantic Ocean during the Miocene : impact of the Greenland Ice-Sheet and the Eastern Tethys seaway, Paleoceanography and Paleoclimatology, 37:e2022PA004415 (2022).

15. **Sarr, A-C.**, Donnadieu, Y., Bolton, C., Ladant, J-B., Licht, A., Fluteau, F., Laugié, M., Tardif, D., Dupont-Nivet, G. Neogene South Asian Monsoon Rainfall and Wind Histories diverged due to topographic effects, Nature Geoscience, 15:314-319 (2022).

14. Bolton, C.T., Gray, E., Kuhnt, W., Holbourn, A., Lübbers, J., Grant, K., Tachikawa, K., Marino, G., Rohling, E.J., **Sarr, A-C.**, Andersen, N. Secular and orbital-scale variability of equatorial Indian Ocean summer monsoon winds during the late Miocene, Climate of the Past, 18:713:738 (2022).

13. Husson, L., Riel, N., Aribowo, S., Authemayou, C., DeGelder, G., Kaus, B., Mallard, C., Natawidjadja, D.H., Pedoja, K., **Sarr, A-C.**, Slow geodynamics produces morphotectonic extremes in the far East Tethys, Geochemistry, Geophysics, Geosystems, 23(1):e2021GC010167 (2022).

12. Beaufort, L., Bolton, C., **Sarr, A-C.**, Sucheras-Marx, B., Rosenthal, Y., Donnadieu, Y., Barbarin, N., Bova, S., Cornuault, P., Gally, Y., Gray, E., Mazur, J-C., and Tetard, M. Cyclic evolution of phytoplankton forced by tropical seasonality. Nature, 601:79-84 (2022).

11. Salles, T., Mallard, C., Husson, L., Zahirovic, S., **Sarr, A-C.**, Sepulchre, P. Quaternary landscape dynamics boosted species dispersal in SE Asia, Communications earth & environment, 2(240) (2021).

10. Burls, N.J., Bradshaw, C.D., De Boer, A.M., Herold, N., Huber, M., Pound, M., Donnadieu, Y., Farnsworth, A., Frigola, A., Gasson, E., von der Heydt, A.S., Hutchinson, D.K., Knorr, G., Lawrence, K.T., Lear, C.H., Li, Xiangyu, Lohmann, G., Lunt, D.J., Marzocchi, A., Prange, M., Riihimaki, C.A, **Sarr, A-C.**, Siler, N. and Zhang, Z., Simulating Miocene warmth: insights from an opportunistic Multi-Model ensemble (MioMIP1). Paleoceanography and Paleoclimatology, 35(6):e2020PA004054 (2021).

9. Sepulchre, P., Caubel, A., Ladant, J-B., Bopp, L., Boucher, O., Braconnot, P., Brockman, P., Donnadieu, Y., Dufresne, J-L. Cozic, A., Estella-Perez, V., Ethé, C., Fluteau, F., Fromang, S., Gastineau, G., Ghattas, J., Hourdin, F., Kageyama, M., Marti, O., Meuredesoif, Y., Mignot, J., Khodri, M., **Sarr, A-C.**, Servonnat, J., Swingedouw, D., Szopa, S and Tardif, D. IPSL-CM5A2: An Earth System Model designed for long simulation of past and future climates. Geoscientific Model Development, 13:3011-3053 (2020).

8. Husson, L., Boucher F., **Sarr, A-C.**, Sepulchre, P., Cahyarini S.Y., Evidence of Sundaland's subsidence requires revisiting its biogeography. Journal of Biogeography, 47(4):843-853 (2020).

7. **Sarr, A-C.**, Mugnier, J-L., Abrahami, R., Carcaillet, J., Ravanel, L., Sidewall erosion: insights from in situ-produced ^{10}Be concentrations measured on supraglacial clasts (Mont Blanc massif, France). Earth Surface and Planetary Landform, 44:1930-1944 (2019).

6. **Sarr, A-C.**, Husson, L., Sepulchre, P., Pastier, A.-M, Pedoja, K., Elliot, M., Arias-Ruiz, C., Solihuddin, T., Aribowo, S., Susilohadi, Subsiding Sundaland: REPLY. Geology, 47(7):e470 (2019).

5. **Sarr, A-C.**, Sepulchre, P., Husson, L., Impact of Sunda shelf exposure on the climate of the Maritime Continent. Journal of Geophysical Research: Atmospheres, 124 (2019).

4. **Sarr, A-C.**, Husson, L., Sepulchre, P., Pastier, A.-M, Pedoja, K., Elliot, M., Arias-Ruiz, C., Solihuddin, T., Aribowo, S., Susilohadi, Subsiding Sundaland. Geology, 47:119-122 (2019).

3. Husson, L., Pastier, A-M., Elliot, M., Pedoja, K., Paillard, D., Authemayou, C., **Sarr, A-C.**, Schmitt, A., Cahyarini, S. Y., Hantoro, W. S. Reef carbonate productivity during Quaternary glacial oscillations, Geochemistry, Geophysics, Geosystems, 19:1148-1164 (2018).

2. Pedoja, K., Husson, L., Bezos, A., Pastier, A-M., Imran, A-M., Arias, C., **Sarr, A-C.**, Elliot, M., Pons-Branchu, E., Regard, E., Nexer, M., Regard, V., Hafidz, A., Robert, X., Benoit, L., Delcaillau, B., Authemayou, C., Dumoulin, C., Choblet, G. On the long-lasting sequences of coral reef terraces from SE Sulawesi (Indonesia): distribution, formation, and global significance, Quaternary Science Reviews, 188:37-57 (2018).

1. Potel, S., Maison, T., Maillet, M., **Sarr, A-C.**, Dublier M. P., Trullenque, G. and Ferreiro Mahlmann, R., Reliability of very low-grade metamorphic methods to decipher basin evolution: Case study from the Markstein basin (Southern Vosges, NE France). Applied Clay Science, 134:175-185 (2016).

PUBLICATIONS UNDER CONSIDERATION

20. †Tardif, D., †**Sarr, A-C.**. Fluteau, F., Licht, A., Kaya, M., Ladant, J-B., Meijers, N. et al. (†*corresponding authors*) The role of paleogeography in Asian monsoon evolution: a review and new insights from climate modelling, *minor revision for Earth Science Review* [re-submission 19-04-23]

COMMUNICATION

Invited seminars & keynotes

9. Neogene evolution of South Asian Monsoon and western Indian Ocean paleoceanography are forced by paleogeographic evolution. NOCS, UK (Dep. Seminar, invited by P. Wilson). November, 28th 2022.

8. ***online.*** Paleogeographic control on South Asian Monsoon dynamics and western Indian Ocean circulation during the Miocene. IISER Pune, India (Dep. Seminar, invited by D.Chattopadhyay). November, 17th 2022.

7. ***online.*** Paleogeography and Neogene South Asian Monsoon winds and rainfall evolution. Monsoon Seminar Series (invited by T.Jonnell, U. Glasgow, Scotland) November, 2nd 2022.

6. ***online*** Reconciling South Asian Monsoon Winds and Rainfall ... Miocene stories. Zhejiang University, China (Dep. Seminar, invited by J. ZhangZhou). September 2022.

5. ***solicited keynote.*** Indian Ocean Climate, (Paleo-)Circulation, and Model Integration. MagellanPlus Workshop *"Indian Ocean: Devling into the Past"*, Graz (Austria) 2022.

4. Paleogeography and Neogene South Asian Monsoon winds and rainfall evolution. University of Urbino, Italy (Urbino Summer School in Paleoclimatology and Paleoceanography, invited by A.Sluijs, C.Bolton, S.Galleotti and A.Paytan). July 2022.

3. IPSL-CM5A2, A climate model for deep time paleoclimate studies. IPGP, Paris, France (GDR-climats anciens, invited by G. LeHir). March 2022.

2. Quaternary evolution of the Sunda shelf paleogeography : impact on the atmospheric circulation in SE Asia. CEREGE, Aix en Provence, France (Group Seminar, invited by Y. Donnadieu). March 2019.

1. Quaternary subsidence in SE Asia : from mantle dynamics to atmospheric circulation. ISTerre, Grenoble, France (Lab. Seminar, invited by L. Husson). January 2019.

Selected oral presentations

9. ***solicited.*** **Sarr, A-C.**, Donnadieu,Y., Bolton, C. et al. Reconciling South Asian Monsoon Winds and Rainfalls. *EGU*, Wien (Austria) 2022.

8. **Sarr, A-C.**, Laugié, M., Donnadieu, Y. et al. Orbital-scale deoxygenation trends driven by ventilation in Cretaceous ocean. *EGU*, Wien (Austria) 2022.

7. Tardif, D., **Sarr, A-C.**, Fluteau, F., et al. Contrôle paléogéographique des moussons asiatiques au Cénozoïque : le Tibet et (surtout) tous les autres. Paleogeographic control on Cenozoic Asian Monsoons : Tibet and (especially) everyone else. *RST*, Lyon (France) 2021.

6. **Sarr, A-C.**, Donnadieu,Y., Bolton, C. et al. Développement asynchrone des pluies et des vents de mousson au Miocene. Asynchronous development of Monsoon winds and rainfall during the Miocene. *RST*, Lyon (France) 2021.

5. **Sarr, A-C.**, Donnadieu,Y., Bolton, C. et al. A modeling study of physical and biogeochemical changes occurring in the tropical Indian Ocean during Miocene times. *Chapman Conference on Monsoon*, Washington (USA) 2020.

4. **Sarr, A-C.**, Sepulchre, P., Husson, L. Impact of Sunda shelf exposure on Southeast Asian atmospheric circulation and on Indonesian Throughflow. *EGU*, Wien (Austria) 2018.

3. **Sarr, A-C.**, Husson, L., Sepulchre, P. et al. Quantifying subsidence of the Sunda shelf (SE Asia) from coral reef morphology. *EGU*, Wien (Austria) 2017.

2. **Sarr, A-C.**, Husson, L., Sepulchre, P. et al. Subsidence de la plateforme de la Sonde (Asie du Sud-Est) : contraintes apportées par la modélisation des récifs. *RST*, Caen (France) 2016.

1. **Sarr, A-C.** Mugnier, J-L, Abrahami, R. et al. Sidewalls erosion at the surrounding of modern glacier in the Mont-Blanc Massif: insights from in-situ produced 10Be concentration in supraglacial sediments. *Congres ASF*, Chambéry (France) 2015.

Selected posters

*7. Maffre, P., **Sarr, A-C.**, Donnadieu, Y. Orbital cycles and Cretaceous anoxia : perspectives from Earth system modeling approach. Goldschmidt conference. Lyon (France) 2023.

*6. Wright, N.M., Acosta, P., von der Heydt, A., Weiffenbach, J., Paxman, G., **Sarr, A-C.**, Fluteau, F., Burls, N., MioMIP2: Middle Miocene Paleogeography. Poster. *MioMEET*, Utrecht (Netherlands) 2023.

5. **Sarr, A-C.**, Donnadieu,Y., Bolton, C. et al. Topographic evolution is responsible for diverging South Asian Monsoon Rainfall and Wind Histories during the Neogene. *Geological Society of London event on Asian Climate, Tectonics and Biodiversity*, London (UK) 2022.

4. **Sarr, A-C.**, Laugié, M., Donnadieu, Y. et al. Orbital-scale deoxygenation trends driven by ventilation in Cretaceous ocean. *ICP14*, Bergen (Norway) 2022.

3. **Sarr, A-C.**, Husson, L., Sepulchre, P. et al. Subsiding Sundaland. *AGU*, Washington (USA) 2018.

2. **Sarr, A-C.**, Husson, L., Sepulchre, P. et al. Dynamic foundering of the Sunda shelf during the Quaternary revealed by coral reef geomorphology: impact on the external spheres of the Earth. *EGU*, Wien (Austria) 2018.

1. **Sarr, A-C.**, Maillet, M., Chassagnac, D., et al. Low-grade metamorphic study based on Àrkai Index and Kübler Index correlation in Markstein basin (Southern Vosges, NE France). *RST*, Pau (France), 2014.

MENTORING

Cédric Dobin, MsC. 1st year (University Grenoble Alpes) ”Évolution de l’environnement continental en réponse aux changements paléogéographiques du Miocène : approche par modélisation numérique du Système Terre”. Principal Advisor (Duration : 2 months). 2023

Victoire Buffet, MsC. 1st year (University Grenoble Alpes) ”Climate variability in Indonesia during the Last Interglacial (127 ka) and implication for H.Erectus viability”. Co-advisor (25%). Principal Advisor : L. Husson (Duration : 2 months). 2023

Quentin Pillot, MsC. 2nd year (University of Lyon) ”Evolution of North Atlantic oceanic circulation during the Miocene”. Co-advisor (50%). Principal Advisor : Y. Donnadieu (Duration : 5 months). 2020.*Now PhD Student at CEREGE, France.*

TEACHING

Invited instructor at Urbino Summer School on Paleoclimate and Paleoceanography (Italy) 2022, 2023

- *Climate of the Miocene*
- *Climate modeling*

SKILLS

- Numerical modeling - **Ocean and atmosphere** : IPSL-CM5A2 (Earth System model), LMDz (Atmosphere) ; **Marine biogeochemistry** : PISCES ; **Geodynamics** : CITCOMCU, LaMEM (3D thermo-mechanical models).
- Tools - **Visualization** : Ferret/pyferret, NCL, Generic Mapping Tool (GMT), Jupyter notebooks, Paraview ; **GIS** : ArcGIS.
- Programming languages - Basic skills in fortran, bash and python.
- Field Experience - 3 weeks (2016) - Indonesia [GPS, coral sampling] ; 2 days (2014) - Mont-Blanc massif [supra-glacial sediments sampling] ; 4 weeks (2012) - Vosges massif [sampling, tectonic mapping].

SERVICES

Reviewer for : Climate of the Past, Paleoceanography & Paleoclimatology, Geophysical Research Letters (GRL).

Outreach :

- Scientific animation at events for Primary and Highschool students (Fête de la Science [CEREGE] ; Forum Météo-Climat [LSCE-IPSL - Paris]).
- Podcast - CycloPod by D. de Vleeschouwer Episod 11 (June 2022) https://rss.com/podcasts/cyclopod/521228/

Conferences convener . Seminars organizer :

- 2023/04 EGU session - *Data and models constraining Earth's deep-time paleogeography*. Co-convener, with Sabin Zahirovic, Maelys Arnould, Jono Leonard and Alexandre Pohl.
- 2023/03 Seminar series on Geology-Ecology trans-disciplinary research at Grenoble Alpes University (1 day, 17 speakers). Organizer