Analysis of the effect of land use change on climate and biogeochemical feedbacks to Earth system models.

Description of the topic:

Background: Land use change has an impact on both greenhouse gas fluxes such as CO_2 and biophysical variables such as albedo or evapotranspiration and thus has a strong impact on climate dynamics and feedbacks between surfaces and the atmosphere. However, it is impossible using observations alone to distinguish how these land use changes impact climate and biogeochemical feedbacks separately. To do this, the use of models such as Earth System Models (ESMs) is essential. ESMs are numerical representations of the Earth system aimed at representing climate dynamics, including feedbacks between climate and the carbon cycle. These models are used in many intercomparison exercises and are used to support IPCC reports.

Objective: During this internship, the student will use simulations of several ESMs carried out in the framework of the sixth Coupled Model Intercomparison Project (CMIP6) and we will evaluate the impact of land use change on biophysical (heat flux, evapotranspiration, albedo, etc.) and biogeochemical (npp, nee, rh, etc.) variables. We will also calculate the β and γ indices using C4MIP protocols and assess how land use change impacts the climate and biogeochemical feedbacks of the models. This internship will take place in the framework of a collaborative project between the Institut Pierre et Simon Laplace (IPSL), the geology laboratory of the ENS in Paris (France), the Universidad de Rosario in Bogota (Colombia) and the Center for Climate and Resilience Research in Santiago (Chile), with a particular focus on South America

Approach :

1. Define, with the project researchers, the appropriate analysis methods
2. Compile CMIP6 simulations
3. Run the statistical analyses and review the results.
4. Suggest improvements for future generations of MSEs

Send your application to

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Laboratory / Institution / Unit concerned :

Laboratoire de géologie de l'ENS, UMR 8538 Paris

Duration of the internship: ___6_ months

Period: from 01/02/2023 to 31/07/2023

Envisaged collaborations (if any) :

Faculty of Natural Sciences, Earth System Science Program, Universidad del Rosario, Bogota (Colombie)
Center for Climate and Resilience Research à Santiago (Chili).

Is a thesis planned after the internship?

No, but depending on the candidate a scholarship application could be submitted.