An emulation study of the canopy radiative transfer model in a continental surface model ORCHIDEE

Mandresy Rasolonjatovo*†[1] and Xiaoni Wang‡[2]

[1]LSCE (LSCE-CNRS/CEA/UVSQ) – LSCE-CNRS – France
[2]LSCE (LSCE-CNRS/CEA/UVSQ) – LSCE-CNRS – France

Résumé

The canopy radiative transfer model is useful for computing the transmission, absorption and reflection of lights over canopies. It is a complex and time-consuming module in the current version of ORCHIDEE model. One objective of this study is to set up an emulator by using machine learning method and to to provide an accurate alternative model for the costly phyisical model. The physical module is firstly studied in detail and the training datasets are prepared. Then Random Forest is applied for the emulation. The emulator shows good accuracy by using testing data, with relative error $<$ 10% and correlation $>$ 0.9. Then SMARTSIM tool is studied in order to integrate this model into ORCHIDEE, though a few challenges need to be dealt with.

Mots-Clés: emulator, machine learning, albedo, radiative transfer, smartsim

*Intervenant
†Auteur correspondant: mandresyrasolo@gmail.com
‡Auteur correspondant: xiaoni.wang@lsce.ipsl.fr