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**TOWARDS A REALISTIC SIMULATION OF BOREAL SUMMER  
TROPICAL RAINFALL CLIMATOLOGY IN STATE-OF-THE-ART  
COUPLED MODELS**

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Résumé :

State-of-the-art global coupled models used in seasonal prediction systems and climate projections still have important deficiencies in representing the boreal summer tropical rainfall climatology. These errors include prominently a severe dry bias over all the Northern Hemisphere monsoon regions, excessive rainfall over the ocean and an unrealistic double Inter-Tropical Convergence Zone (ITCZ) structure in the tropical Pacific. While these systematic errors can be partly reduced by increasing the horizontal atmospheric resolution of the models, they also illustrate our incomplete understanding of the key mechanisms controlling the position of the ITCZ during boreal summer. Using a large collection of coupled models and dedicated coupled experiments, we show that these tropical rainfall errors are partly associated with insufficient surface thermal forcing and incorrect representation of the surface albedo over the Northern Hemisphere continents. Improving the parameterization of the land albedo in two global coupled models leads to a large reduction of these systematic errors and further demonstrates that the Northern Hemisphere subtropical deserts play a seminal role in these improvements through a heat low mechanism.