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The influence of volcanic eruptions on circulation regimes over the North Atlantic and their impact on European climate

Yang Feng¹, Myriam Khodri¹, Laurent Li², Marie-Alexandrine Sicre¹, and Nicolas Lebas¹

¹LOCEAN/IPSL, CNRS, France

²LMD/IPSL, CNRS, France

Large volcanic eruptions influence climate on both annual and decadal time scales due to dynamical interactions of different climate components in the Earth's system. It is well established that the North Atlantic Oscillation (NAO) tends to shift towards its positive phase during the winter season in the first 1–2 years after large tropical volcanic eruptions, causing warming over Europe. However, other North Atlantic circulation regimes such as Atlantic Ridge or zonal regime have received less attention. This study explores the volcanic fingerprint in terms of patterns and mechanisms on the North Atlantic atmospheric circulation in IPSL-CM6A-LR model simulations for tropical eruptions of the last millennium using dedicated sensitivity experiments and observations.