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Modelling the Gaskiers glaciation, the role of the rapid movement of continents during the Ediacaran

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The Ediacaran period (635-542 Ma) is a key period in the Earth's history. It is marked by the oxygenation of ocean bottom water, the development of marine fauna, a major negative anomaly in δ13C (Shuram-Wonoka event) and the last glacial event of the Neoproterozoic.
Although recorded on several continents, the Gaskiers glaciation is not considered as a global glaciation, unlike the Marinoan ($\sim$635Ma) and Sturtian ($\sim$720Ma) glaciations. The peculiarity of the Gaskiers glaciation lies in the temporal distribution of the glacial sediments. The Gaskiers glaciation has been dated at 583$\pm$2 Ma on several cratons but there are also evidences of glaciation prior to and after 583Ma. The aim of the study is to better understand the reasons of heterochrony observed in the glacial deposits during the Ediacaran.
The Gaskiers glaciation took place over a period marked by major paleogeographic changes potentially linked to rapid movements of the Earth's rotation axis (i.e. true polar wander) occurring between 620 and 560 Ma. This period was also characterized by the formation of the Gondwana continent and mountain uplift. These events lead to a rapid change of continent's position and the development of huge mountain ranges during the Ediacaran.
In this work, we investigated the impact of paleogeographic changes on climate and in particular on the development of ice-sheet. To this end, we simulated the climate at 615Ma, 580 Ma and 565Ma using the atmosphere-ocean coupled model FOAM. We tested different scenarios of CO_2 atmospheric partial pressure, due to the lack of constraints, to estimate the sensitivity of Ediacaran climate to this parameter. Finally climate model outputs were used to force the ice-sheet model GRISLI to calculate the ice-sheet extent, and compare to paleoclimate indicators.