



Global and regional climate model simulations of extreme climate conditions in Sweden in a 100,000 year perspective

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The Swedish Nuclear Fuel and Waste Management Company is planning to build a geological final repository for spent nuclear fuel in Sweden. In about 100,000 years, the radioactivity of the spent fuel will decline to a level comparable with the level from the uranium ore that was used to manufacture the nuclear fuel. Changing climate conditions over long periods will have an impact on the storage. To explore possible extreme climates that could occur during the coming 100,000 years, a fully coupled atmosphere-ocean general circulation model is used. Three cases of extreme climate conditions for Sweden are explored; i) a cold climate with an extensive ice sheet over Scandinavia, ii) a cold climate with ice-free permafrost conditions in Southern Sweden and, iii) a warmer than present climate in which the Greenland ice sheet is assumed to have melted. Further, detailed results for Sweden are derived with a regional climate model operating over Europe at 50 km horizontal resolution. The simulated cold climates are compared to paleo climate data from equivalent periods during the last 100,000 years; i) the last glacial maximum around 21 kyr BP and ii) a cold period within Marine Oxygen Isotope Stage 3.